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Poster Presentation Abstracts

P100 - EFFECT OF A DELAYED-RELEASE RISEDRONATE 35 MG ONCE-A-WEEK FORMULATION TAKEN WITH OR WITHOUT BREAKFAST ON BMD

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Aims: Oral bisphosphonates must be taken on an empty stomach at least 30 to 60 minutes before first food or drink. To address this restriction on food, a novel delayed release (DR) formulation of risedronate (RIS) 35 mg once-a-week (OaW) that can be taken with or without breakfast has been developed. One year efficacy and safety results of this new formulation are presented.
Methods: This phase III study was designed to test the non-inferiority, based on the percent change in lumbar spine BMD from baseline at Endpoint (last observation carried forward at Week 52), of the RIS 35 mg OaW DR formulation taken before or after breakfast compared to the RIS 5 mg daily immediate release (IR) dose taken per label. Participants were postmenopausal women at least 50 years of age, ≥ 5 years since last menses, with a lumbar spine (LS) or total hip BMD corresponding to a T-score<-2.5 or a T-score<-2.0 and at least one prevalent vertebral fracture (T4 to L4). Patients were randomly assigned to RIS 35 mg OaW DR following breakfast (FB) (n=307), or RIS 5 mg IR daily (n=307) or RIS 35 mg OaW DR at least 30 minutes before breakfast (BB) (n=308).
Results: At 52 week endpoint, the mean percent change in lumbar spine BMD was 3.1% (95% CI, 2.71% to 3.53%) in the 5 mg IR daily group, 3.4% (95% CI, 2.94% to 3.77%) in the 35 mg DRFB group and 3.4% (95% CI, 3.01% to 3.82%) in the 35 mg DRBB group. The mean difference (95% CI) between IR - DRBB was -0.296% (-0.873, 0.281) and between IR - DRFB was -0.233% (-0.816, 0.349). Because the upper limit of the 95% 2-sided CI of the treatment differences did not exceed the pre-defined non-inferiority margin of 1.5% (chosen based on data from previous studies), the RIS 35 mg OaW DR formulation, whether taken before or after breakfast, was shown to be non-inferior to the 5 mg IR daily. The mean percent changes in BMD in the hip regions were similar across groups. The magnitude of bone turnover marker response (NTX, CTX, and BAP) was similar across groups; some statistical differences were observed, however these differences over the first 52 weeks of treatment were small and not deemed by the investigators as having major clinical importance. Both the 5 mg IR daily and the 35 mg OaW DR regimens were well tolerated, and the overall frequency of adverse events was similar.
Conclusions: Risedronate 35 mg OaW DR, whether taken before or after breakfast, provided similar efficacy and tolerability to risedronate 5 mg IR taken daily per the label.

Disclosure of Interest: M. McClung Consultant / Speaker's bureau / Advisory activities with: Consultant, Advisory activities, J. Zanchetta Consultant / Speaker's bureau / Advisory activities with: Consultant, C. Benhamou Consultant / Speaker's bureau / Advisory activities with: Consultant, A. Balske Employee of: Company employee, J. Sarley Employee of: Company employee, R. Recker Consultant / Speaker's bureau / Advisory activities with: Consultant, Advisory activities

P101 - GREATER CHILDHOOD VIGOROUS PHYSICAL ACTIVITY IS ASSOCIATED WITH IMPROVED STRUCTURAL PARAMETERS AND VOLUMETRIC DENSITY AT THE FEMORAL NECK

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Aims: To explore the relationships between objectively measured physical activity and hip geometry, strength and volumetric density at 6 years old.
Methods: Children were recruited at 6 years old from the Southampton Women's Survey. They underwent measurement of bone mass by DXA (Hologic), including hip structure analysis (HSA), and by pQCT at the tibia (Stratec). Physical activity (PA) was assessed by accelerometry (Actiheart, Cambridge Neurotechnology Ltd, Cambridge, UK) for 7 continuous days.
Results: There were 215 children with PA data who underwent a DXA scan and of these 49 children also underwent pQCT assessment. Mean daily time spent in vigorous activity (VPA) was posi-

tively associated with femoral neck and intertrochanteric section modulus (r=0.23, p=0.001; r=0.23, p=0.001 respectively), cross sectional area (CSA) (r=0.26, p=0.0002; r=0.24, p=0.0009) and cortical thickness (r=0.17, p=0.02; r=0.19, p=0.009). These relationships were independent of maternal and childhood dietary, lifestyle and anthropometric factors. Similar associations for VPA with section modulus (r=0.17, p=0.02) and CSA (r=0.16, p=0.02) were observed at the femoral shaft. In the subset that underwent pQCT, VPA was positively related to cortical volumetric bone mineral density (r=0.29, p=0.05).
Conclusions: Higher levels of vigorous physical activity in childhood are associated with increased femoral neck strength, both in terms of geometric shape and volumetric mineral density. This work supports the notion that increasing physical activity in childhood is likely to be a potential public health strategy to improve childhood skeletal development.

Disclosure of Interest: None Declared

P102 - HEALTH-RELATED QUALITY OF LIFE AFTER TOTAL KNEE OR HIP REPLACEMENT: A 7-YEAR PROSPECTIVE STUDY

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Aims: Arthritic conditions are extremely painful for the patient and are associated with a significant reduction in health related quality of life (HRQOL), mainly in term of physical and functional impairment. Therefore, the demand for total joint replacement (TJR) is increasing as patients gain substantial pain relief and increased mobility and HRQOL, at least over a short-term period. However, few long-term studies are available. The objective of the present study was to assess the long-term effect of TJR on HRQOL.
Methods: We conducted a prospective study with 7 years of follow-up. Patients experiencing a TJR at the level of the hip or the knee because of arthritic condition were eligible for this study. Generic HRQOL was assessed with the Short-Form 36 (SF36) and specific HRQOL with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). These questionnaires were administered preoperatively and after 3 months, 6 months and 7 years of follow-up.
Results: Out of the 65 subjects included in this study, 45 (69.2%) completed all follow-up visits. Preoperative characteristics, including age, sex, body mass index, number of co-morbidities and reason for TJR, were not significantly different between completer and non-completer groups. Patients who completed all visits were aged (mean±SD) 64.2±12.6 years, have a body mass index of 27.6±4.1 and were predominantly women (75.6%). Out of the 45 subjects, 26 (57.8%) experienced a hip replacement surgery. Six months after surgery, there was a significant improvement, compared to preoperative score, in 3 of the 8 dimensions of the SF-36 (i.e. physical function, role-physical and pain). Surprisingly, there was a significant worsening in the general health dimensions of the SF-36. After 6 months of follow-up, pain and physical function dimensions of the WOMAC were significantly improved but there was no significant change in the stiffness score. Changes in SF-36 scores from month 6 to 7 years showed a significant improvement in physical function ($p<0.001$), role-physical ($p<0.001$), role-emotional ($p<0.01$) and pain ($p<0.05$). From month 6 to year 7, all scores of the WOMAC improved ($p<0.001$ for pain, $p<0.001$ for stiffness and $p<0.01$ for physical function).
Conclusions: The improvement observed in HRQOL over a short-term period after surgery is at least maintained over a 7-year follow-up period.

Disclosure of Interest: None Declared

P103 - EPIGENETIC MODULATION OF THE ENOS PROMOTER AT BIRTH PREDICTS BONE MINERAL CONTENT AT AGE 9 YEARS

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Aims: Endothelial nitric oxide synthase (eNOS) has been implicated in the regulation of osteoblast and osteoclast function (1). We investigated whether epigenetic changes within the promoter of the eNOS gene in human umbilical cords were associated with altered bone development, assessed by the DXA of the child at age 9 years.
Methods: Participants were drawn from a Southampton birth cohort, with appropriate institutional ethics committee approval and participants' informed consent. Methyl-DNA Immunoprecipitation followed by a commercial tiled oligomer microarray in 15 human umbilical cords was used to identify potentially informative genomic regions in a panel of gene promoters, including eNOS, with strong correlations between methylation status and bone mineral content at age 9-years, assessed by DXA (Lunar DPXL). We used Sequenom MassARRAY to carry out in-depth analysis of the methylation status of part of the eNOS promoter in the umbilical cords of 66 children from the same cohort.
Results: Methylation at particular CpG sites varied greatly. After taking account of the child's age and sex, there was a positive association between the methylation status of a particular CpG site within the eNOS promoter and whole body bone mineral content at 9 years of age ($r_p=0.36$, $p=0.003$).
Conclusions: We have demonstrated that perinatal epigenetic variations within the eNOS promoter are associated with altered bone mineral content in childhood. These findings provide further support for a role of eNOS in bone metabolism and suggest that its contribution may at least in part have its origins in altered bone development.
EpiGen Working Group: Cameron McLean, Bright Starling Emerald, Catharine Gale, Sarah Crozier
References: 1. Zaman G et al, J Bone Miner Res 1999;14:1123.

Disclosure of Interest: None Declared

P104 - ODANACATIB TREATMENT OF POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY: 3-YEAR CONTINUED THERAPY AND RESOLUTION OF EFFECT

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Aims: Odanacatib (ODN), a selective cathepsin K inhibitor, progressively increased bone mineral density (BMD) and decreased bone resorption markers during 2 years of treatment in a dose-ranging study of postmenopausal women with low BMD. A 1-year extension study assessed the efficacy and safety of ODN and the effects of discontinuing therapy.

Methods: In the base study, postmenopausal women with BMD T-scores between -2.0 and -3.5 at the lumbar spine, femoral neck, trochanter or total hip (n=399) received placebo or ODN at 3, 10, 25 or 50 mg weekly. After 2 years, patients (n=189) remaining blinded were re-randomized to ODN 50 mg weekly or placebo for an additional year, and 169 completed 3 years. Endpoints included BMD at the lumbar spine (primary), total hip and hip subregions, and 1/3 radius; levels of bone turnover markers; and assessments of safety and tolerability.

Results: Continued treatment with 50 mg ODN for 3 years produced significant increases from baseline and during the third year in spine (8% and 2%), total hip (6% and 2%), femoral neck (5% and 2%), and trochanter (7% and 3%) BMD and maintained BMD at the 1/3 radius. Urine NTx remained suppressed at Month 36 (-50%), but BSAP rose to slightly above baseline (18%) after the initial decrease. Treatment discontinuation resulted in bone loss at all sites, with higher rates in the initial 6 months after switching to placebo. At the end of Year 3, mean BMD among patients who took 50 mg ODN for 2 years and placebo in the third year was still above baseline at the femoral neck, was near baseline at the spine, and did not differ from placebo for total hip, trochanter, and 1/3 radius. Following ODN discontinuation, biochemical markers of bone remodeling increased rapidly above baseline values. This rebound in bone turnover occurred promptly after treatment discontinuation and largely resolved with time. For example, mean urine NTx increased to 50% above baseline by Month 30, but was only approximately 28% above baseline by Month 36. No differences in the overall incidence of adverse events were observed between the pooled placebo and ODN treatment groups.

Conclusions: Three years of ODN treatment resulted in progressive increases in lumbar spine and femur BMD and was generally well-tolerated. Bone resorption markers remained suppressed, whereas formation markers were relatively unaffected. ODN effects were reversible: bone resorption increased and BMD decreased following discontinuation of treatment.

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P105 - THE INCIDENCE OF VERTEBRAL FRACTURES IN ITALY: RESULTS FROM A 3-YEARS MULTICENTRIC STUDY

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Aims: vertebral fractures or deformities are the most common osteoporotic fractures. However, two-thirds of vertebral fractures do not come to clinical attention because most of them are asymptomatic (although they are also with increased risk of morbidity and mortality). Therefore, it is very difficult to assess their incidence among general population. Our aim was to assess the incidence of vertebral fractures in Italy.

Methods: We have carried out a survey on about 28,000 fractured patients referring to Emergency departments of ten major Italian hospitals in different northern, central and southern regions of the country. Physicians involved were asked to systematically record specific data concerning the fractures observed between 2004 and 2006: the skeletal site of the fracture, the gender and age of the patient, the type of trauma suffered from the patient (low energy trauma). Fractures occurred because of low energy trauma were considered as osteoporotic fragility fractures. Orthopaedic surgeons involved in the study had to record if the patient was discharged from emergency department after having been treated or if the patient was hospitalized because of the fracture. The hospitalization rate was computed on the whole sample and applied to the overall hospitalization occurred in Italy because of vertebral fractures, thus enabling us to estimate the number of clinical vertebral fractures all over the country. We assumed these clinical fractures to represent 30% of the overall deformities occurring each year in Italy in order to provide a final estimation of the annual incidence.

Results: We have estimated about 170,000 vertebral fragility fractures to occur each year in Italy, with 48,000 of them requiring

medical attention (clinical vertebral fractures) and 13,000 resulting in hospital admissions.
Conclusions: On the basis of our multicentric study, vertebral deformities currently represent the most incident type of fragility fracture in Italy.

Disclosure of Interest: None Declared

P106 - TYPE 2 DIABETES AND SELF-REPORTED HIP AND FOREARM FRACTURES IN WOMEN AND THE ROLE OF BONE MINERAL DENSITY: THE HUNT STUDY

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Aims: Even if several studies have shown increased risk of hip fracture[1,2], studies also have shown elevated bone mineral density (BMD) in type 2 diabetes. The aim of the present study was to examine the relation between self-reported hip and forearm fracture and type 2 diabetes in women, and the role of BMD.
Methods: In the Nord-Trøndelag Health Study 1995-97 (HUNT 2) 12903 women had BMD of the non-dominant forearm measured with single-energy X-ray absorptiometry. Among these 11889 answered questions on ever having had hip and/or forearm fractures or not, had their height and weight measured and had blood samples analysed for serum C-peptide and anti-GAD. The latter analyses were performed in order to avoid misclassification of type 1 and type 2 diabetes which had been difficult in earlier studies[1,2]. Correct classification was important since type 2 diabetes results in hyperinsulinemia - an anabolic agent in bone while type 1 diabetes results in insulinopenia which has a negative effect on bone. Logistic regression was used to study the age adjusted relation between type 2 diabetes and self-reported fractures (hip and forearm) and linear regression was used to study the age adjusted relation between type 2 diabetes and BMD. Due to power consideration, the combined endpoint of hip fracture and forearm fracture was used.
Results: The mean age was 58 years (SD=17). Those with type 2 diabetes had an age adjusted OR of fracture of 0.61(0.56-0.66) compared to those without type 2 diabetes, and an OR of 0.65 (0.47-0.90) after additional adjustment for BMI and BMD. The age adjusted difference in BMD between those with and without type 2 diabetes was 23 (17-30) mg/cm^2, p<0.001 which decreased to 15 (9-22) mg/cm^2, p<0.001 after additional adjustment for BMI.
Conclusions: Our results may indicate that the increased BMD in type 2 diabetics prevent fractures at the early stage of the disease. A follow-up with respect to fractures is needed to further study the role of time since diagnosis.
References: 1) Forsén et al. Diabetologia 1999;42:920; 2) de Liefde et al. Osteoporosis Int 2005;16:1713.

Disclosure of Interest: None Declared

P107 - BENEFICIAL EFFECTS OF STRONTIUM RANELATE COMPARED TO ALENDRONATE ON BONE MICRO-STRUCTURE – A 2-YEAR STUDY

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Aims: In a head-to-head study, we compared the effects of strontium ranelate (SrRan) and alendronate (ALN), anti-osteoporotic agents with antifracture efficacy, on bone microstructure, a component of bone quality, hence of bone strength.
Methods: In a randomised, double-dummy, double-blind controlled trial, 88 postmenopausal osteoporotic women were randomised to SrRan 2g/day or ALN 70mg/week for 2 years. Microstructure of the distal radius and distal tibia were assessed by HR-pQCT after 3,6,12,18 and 24 months of treatment. Primary endpoint was HR-pQCT variables relative changes from baseline. An ITT analysis was applied.
Results: Baseline characteristics were similar in both groups (mean ±SD): age: 63.6±7.5 vs. 63.7±7.6 yrs; $_{L1\text{-}L4}$T-Score: -2.7±0.8 vs. -2.8±0.8g/cm², Cortical Thickness (CTh), trabecular bone fraction (BV/TV) and cortical density=721±242 vs. 753±263µm, 9.5±2.5 vs. 9.3±2.7%, and 750±87 vs. 745±78mg/cm^3 respectively. Over 2 yrs, distal radius values changes were within 1 to 2% without significant differences except cortical density. In contrast distal tibia CTh, BV/TV, trabecular and cortical densities increased significantly more in the SrRan group than in the ALN group (Table). No significant between-group differences were observed for the remaining measured parameter (trabecular number, trabecular spacing, and trabecular thickness). After 2 years, L1-L4 and hip aBMD increases were similar to results from pivotal trials (L1-L4:+6.5% and +5.6%;total hip:+4.1% and +2.9%, in SrRan and ALN groups, respectively). In the SrRan group, bALP increased by a median of 18% (p<0.001) and sCTX decreased by a median of –16% (p=0.005) while in the ALN group, bALP and CTX decreased by median of –31% (p<0.001) and –59% (p<0.001) respectively.

Relative changes from baseline to last observation (%)	SrRan	ALN	Estimated between group difference	p value
CTh (µm)	6.29±9.53	0.93±6.23	5.411±1.836	0.004
BV/TV (%)	2.48±5.13	0.84±3.81	1.783±0.852	0.040
Trabecular density (mgHA/cm3)	2.47±5.07	0.88±4.00	1.729±0.859	0.048
Cortical density (mgHA/cm3)	1.43±2.77	0.36±2.14	1.137±0.530	0.045

The two treatments were well tolerated.

Conclusions: Within the constraints related to HRpQCT technology, it appears that strontium ranelate has greater effects than alendronate on distal tibia cortical thickness, trabecular and cortical bone densities in women with postmenopausal osteoporosis

after two years of treatment. A concomitant significant increase in bone formation marker is observed in the SrRan group.

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P108 - INHIBITION OF SCLEROSTIN BY SYSTEMIC TREATMENT WITH A SCLEROSTIN MONOCLONAL ANTIBODY ENHANCES FRACTURE HEALING IN RODENT AND PRIMATE MODELS

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Aims: Inhibition of sclerostin by a sclerostin antibody (Scl-Ab) stimulates bone formation and increases bone mineral density in animal models of osteopenia and in both men and women. Here, the effects of systemically administrated Scl-Ab on bone healing in a mouse osteotomy and a non-human primate fibular osteotomy model were investigated.
Methods: Two groups of 9-week-old male CD1 mice underwent osteotomy on their right femurs and were injected subcutaneously (sc) with vehicle (Veh) or a murine Scl-Ab at 25 mg/kg, 2x/week for 4 weeks (n=9-10/group). Additionally, male cynomolgus monkeys (aged 4-5 years) underwent bilateral fibular osteotomies with intramedullary fixation, and were injected sc with Veh or Scl-Ab, 25 mg/kg, biweekly for 10 weeks (n=18-21/group).
Results: In the mouse model, maximum load and stiffness were increased by 117% and 195% ($p<0.05$) respectively, in the fracture site of Scl-Ab-treated mice, compared with Veh controls. In the monkey model, Scl-Ab significantly increased serum bone formation markers, BMD at the lumbar spine, hip and distal radius, and bone strength of the lumbar vertebral body. At the fracture site, Scl-Ab significantly increased total callus bone mineral content (BMC), hard callus area, and BMC (all $p<0.05$ vs. Veh). The Scl-Ab-mediated improvements in callus maturity were associated with 48% greater mean torsional stiffness compared to Veh ($p<0.05$), while maximum torque was increased by a non-significant 32% (n=12/group). Histology analysis of fracture sites (n=10/group) showed that Scl-Ab-treated fibulae had a higher rate of complete union compared to Veh (90% vs. 45%). The calluses in the Scl-Ab group contained less cartilage as measured by both semi-quantitative scoring (-52%) and histomorphometry (-80%) compared to Veh. The osteotomy gaps in the Scl-Ab group had less fibrous/granulation tissue area (-94%) and were more filled with bone by both semi-quantitative scoring (+59%) and histomorphometry (+37%). Total gap area was significantly lower in the Scl-Ab group (-59%) compared with Veh.
Conclusions: Inhibition of sclerostin by Scl-Ab improved bone healing in two different animal models. In addition, Scl-Ab significantly increased bone formation and bone mass in non-fractured skeletal sites. These results suggest that Scl-Ab may have therapeutic benefits in enhancing fracture healing and increasing bone formation and bone mass in non-fractured skeletal sites, thereby preventing fractures at other skeletal sites.

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P109 - ADHERENCE TO TREATMENT OF OSTEOPOROSIS AND FRACTURE RISK: THE SWEDISH ADHERENCE REGISTER ANALYSIS (SARA)

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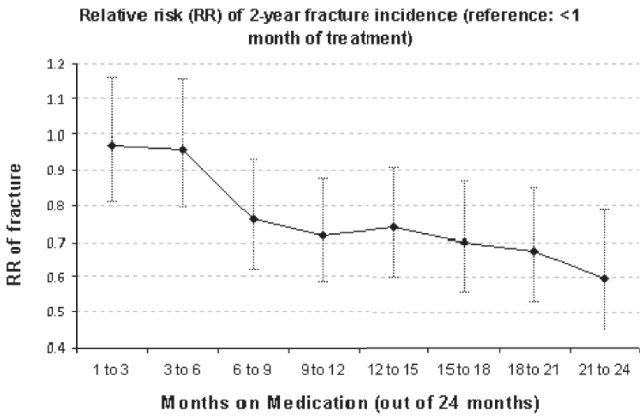
Aims: To estimate the association between persistence and compliance to osteoporosis treatment and fracture risk in a Swedish population
Methods: The sample was an open cohort from the Swedish prescription, inpatient care, and cause-of-death registers. It comprised all patients >50 years of age who filled prescriptions for one or more osteoporosis treatments (alendronate, risedronate, strontium, and raloxifene) between 2005 and 2007, and including those who switched therapy. Patients with secondary osteoporosis or cancer were excluded. Patients were considered persistent if they remained on treatment without prescriptions gaps greater than 8 weeks. Compliance was quantified as medication possession ratio (MPR), only measuring prescription gaps while patients were still persistent. The association between persistence/compliance and fracture risk was estimated using parametric survival analysis allowing multiple fractures and controlling for available covariates.
Results: The sample consisted of 37,394 patients (86% females) with a mean age of 71 years, sustaining 1,151 fractures. 95% of persistent patients had a MPR>80%. Mean MPR and follow-up were 94.6% (SD±7) and 400 days (max 760), respectively. Non-persistence was associated with increased 2-year risk of fracture compared with the risk associated with less than 1 month's treatment ($p<0.001$). In persistent patients, however no association between MPR and fracture risk was found. The hazard ratios in each interval indicate that at least 6 months of treatment is necessary to achieve an anti-fracture effect (Figure 1). Patients persistent for 24 months had similar relative risk reductions to those found in clinical trials. Increased fracture risk was also found in patients who were institutionalized (HR2.43, $p<0.001$), switched treatment (HR1.31, $p=0.002$), had a prior fracture (HR1.63, $p<0.001$) or co-morbidity (HR1.57, $p<0.001$).



Conclusions: At least 6 months of treatment was necessary to reduce fracture incidence over 24-months. There was no clear association with compliance, as assessed by MPR, and fracture risk. Lack of persistence was associated with increased cumulative fracture risk.

Disclosure of Interest: O. Ström Grant / Research Support from: sponsored by Amgen, E. Landfeldt Grant / Research Support from: sponsored by Amgen, S. Robbins Employee of: Amgen, F. Borgström Grant / Research Support from: sponsored by Amgen

P110 - ANNUAL HIGH-DOSE ORAL VITAMIN D FOR FALLS AND FRACTURES IN ELDERLY WOMEN: A RANDOMISED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL (VITAL D STUDY)

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Aims: We hypothesised that an annual dose of 500,000 IU cholecalciferol administered orally to older women would reduce their risk of falls and fracture.
Methods: In this double-blind, placebo-controlled trial, 2,256 community-dwelling women (median age 76 years, IQR 73, 80.0 years) were randomly assigned to receive a single oral dose of cholecalciferol 500,000IU or placebo each autumn/winter for 3 to 5 years. Falls and fractures were ascertained using monthly calendars and details confirmed by telephone interview. Fractures were radiologically confirmed. In a sub-study, 137 randomly-selected participants underwent serial blood sampling at baseline as well as 12-months post-dose (coinciding with immediate pre-dose for the current year). In 2006 and 2007 blood sampling was also done at one- and three-month post-dose. Serum 25-hydroxyvitamin D (25D) levels were measured in batches using DiaSorin immunoassay.
Results: The vitamin D group had a 15% higher rate of falling (Incidence Rate Ratio (IRR): 1.15; 95%CI 1.02, 1.30; p=0.03) and 26% higher rate of fracture (IRR: 1.26; 1.00, 1.59; p=0.05) compared to the placebo group. The increased rate of falling in the vitamin D group was higher in the first three months following dosing (p=0.02). This temporal pattern was also apparent in fracture rates although statistical significance was not reached (interaction p=0.36). The cumulative incidence of first fall and first fracture were both increased in the vitamin D group (hazard ratios; 95% CI: Falls 1.16; 1.05, 1.28 p=0.003; Fractures 1.26; 0.99, 1.59 p=0.057). In the sub-study, the median baseline serum 25D was 49nmol/L. Less than 3% of the sub-study participants had baseline levels <25nmol/L. In the vitamin D group, one- and 12-month post dose levels were 3-fold and 1.4-fold higher than baseline, respectively.
Conclusions: The results indicate that high-dose vitamin D administered orally once yearly to elderly community-dwelling women causes harm by increasing falls and fractures.

Disclosure of Interest: None Declared

P111 - COST-EFFECTIVENESS OF DENOSUMAB COMPARED WITH ORAL BISPHOSPHONATES IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Aims: In addition to the therapeutic value of a new treatment, it becomes important to evaluate whether it represents good value for money compared with the most relevant alternative treatments. Health economic evaluations play an increasing role to assist health policy decision-makers. The present study aims to estimate the cost-effectiveness of denosumab compared with oral bisphosphonates (branded and generic drugs) in the treatment of postmenopausal osteoporotic women.
Methods: The cost-effectiveness of 3-year denosumab was compared with branded risedronate, branded and generic alendronate using an updated version of a previously validated Markov microsimulation model [1]. The model was populated with relevant cost, adherence and epidemiological data for Belgium from a health-care perspective and the results were presented in cost (€2009) per quality-adjusted life-year (QALY) gained. Analyses were performed in populations (over 60 years) where osteoporosis medications are currently reimbursed in many European countries, i.e. bone mineral density T-score is below 2.5 or prevalent vertebral fracture. Patients on denosumab were assumed to have a 50% lower risk of discontinuation than those on oral bisphosphonates and the effect of denosumab after treatment cessation was assumed to decline linearly for a maximum of 1 year.
Results: Denosumab was cost-effective compared with all other therapies, assuming a willingness to pay of €40,000 per QALY gained. In particular, denosumab was found to be cost-effective compared with branded alendronate and risedronate at a threshold value of €30,000 for a QALY and denosumab was cost-saving (i.e. lower cost and greater effectiveness) compared with risedronate from the age of 70 years in women with densitometric osteoporosis. The cost-effectiveness of denosumab compared with generic alendronate was estimated at €38,875 €20,690 and €26,153 per QALY for women with T-score ≤-2.5 aged 60, 70 and 80 years, respectively. The equivalent values were €37,856 €18,764 and €17,309 per QALY for women with prevalent vertebral fractures.

Conclusions: This study suggests that denosumab is a cost-effective strategy compared with oral bisphosphonates (including generic alendronate) for the treatment of postmenopausal Belgian osteoporotic women, aged 60 years and above.
References: [1] Hiligsmann et al, Value Health 2009;12:687.
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Disclosure of Interest: M. Hiligsmann Grant / Research Support from: Amgen, J. Y. Reginster Grant / Research Support from: Amgen, Consultant / Speaker's bureau / Advisory activities with: Amgen

P112 - PREGNANE X RECEPTOR KNOCKOUT MICE DISPLAY OSTEOPENIA WITH REDUCED BONE FORMATION AND ENHANCED BONE ABSORPTION

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Aims: SXR (Steroid and Xenobiotic Receptor) and its murine ortholog PXR (Pregnane X Receptor) are nuclear receptors which are expressed mainly in the liver and the intestine where they function primarily as xenobiotic sensors. Recently, we found SXR/PXR functions as a receptor for vitamin K2 (J Biol Chem 2003;278:43919, J Biol Chem 2006;281:16927), which is clinically used for treatment of osteoporosis in Japan and other Asian countries. In this study, we investigated the functions of SXR/PXR in the bone tissue by analyzing phenotypes of PXR knockout (PXRKO) mice.
Methods: Femoral and tibial bones of 4 month-old PXRKO female mice (129/Sv strain) and age-matched control wild type (WT) female mice were used for this study. Mice were injected intraperitoneally with tetracycline hydrochloride 5 days and calcein 2 days tissue collection. 30 hours after calcein injection, mice were euthanized and both legs were dissected. The bone mineral densities (BMD) of the right femoral bones were measured by dual-energy X-ray absorptiometry. Micro-computed tomography scanning was performed on the right femoral bones. Bone histomorphometry was performed on undecalcified sections with the Villanueva Bone Stain.
Results: BMD of PXRKO mice was significantly decreased compared with BMD of WT mice in micro-CT analysis of femoral trabecular bones, the 3-dimensional bone volume fractions of PKRKO mice were markedly reduced compared with those of WT mice. The histomorphometrical analysis of trabecular bones from the proximal tibia revealed a remarkable reduction of bone mass in PXRKO mice. As for bone turnover, BFR/BS was decreased in PXRKO mice, whereas ES/BS was enhanced in PXRKO mice. This indicates that bone formation is reduced and bone resorption enhanced in PXRKO mice. Histomorphometrical analysis of femoral cortical bones also revealed decreased cortical area and width in PXRKO mice.
Conclusions: These results indicate that SXR/PXR is required for proper bone homeostasis. Signaling through SXR/PXR protects bone structure by promoting bone formation and suppressing bone resorption.

Disclosure of Interest: None Declared

P113 - ASSOCIATION BETWEEN 25(OH)-VITAMIND3 LEVELS AND DISEASE ACTIVITY IN PATIENTS WITH ESTABLISHED RHEUMATOID ARTHRITIS

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Aims: 1,25(OH)2-vitaminD3 may have a role in modulating rheumatoid arthritis (RA) activity in experimental settings. Vitamin D Receptor (VDR) has been demonstrated in macrophages, chondrocytes and synoviocytes in RA synovium and sites of cartilage erosion in RA patients, but not in controls. There may also be a relationship between VDR gene polymorphisms and RA onset and activity. Although two previous studies have failed to show a link between 25(OH)-vitaminD3 (25(OH)vit.D3) and CRP or ESR in established RA, a recent one reported an inverse association between RA activity and vitamin D in early polyarthritis.We intended to determine if vitamin D adequacy state contributes to differences in RA activity and bone turnover markers in established RA.
Methods: Clinical data and blood samples were collected in the last monitoring visit. The Portuguese version of the Standford Health Assessment Questionnaire (HAQ), Disease Activity Score (DAS28), three and four variables, 68 tender and swollen joint count were obtained. We measured ESR and CRP, 25(OH)vit.D3, serum β-C-telopeptide of collagen1 cross-links (β-CTX1), osteocalcin (OC), Dkk-1 (ELISA, Biomedica) and osteoprotogerin (OPG)(ELISA, Biomedica). SPSS14.0 was used for statistical data analysis.
Results: We evaluated 185 RA patients, 125 (68%) women, 91 (49%) under biologics, 81 (44%) under TNFα blockers, with mean ages of 53±12 years, 14±10 years of disease duration, mean DAS28(4v) of 4,25±1,32 and a mean HAQ of 1,252±0,683. 13% of the patients had vitamin D deficiency (<15ng/ml) and 53% had inadequate (between 15 and 30 ng/ml) serum levels. In a multivariate modelling (adjusted for age, age at diagnosis, disease duration, daily dose of prednisone, years of corticosteroid use and anti-resorptive therapy) 25(OH)vit.D3 deficiency or inadequacy were associated with higher DAS28(4V) ($p<0,01$), DAS28(3v) ($p<0,01$), 68 swollen joint count ($p<0,01$), patient global activity ($p<0,01$), OC ($p<0,05$) and β-CTX1 levels ($p=0,05$). We did not find any association with ESR, CRP, Dkk-1, OPG, rheumatoid factor or anti-CCP antibodies levels.
Conclusions: Vitamin D deficiency and inadequacy were highly prevalent in our population. There was also evidence that vitamin D levels seem to play an immunomodulatory role in established rheumatoid arthritis as was previously reported for early polyar-

thritis, reinforcing the need to monitor and correct its serum levels in clinical daily practice and in an individual base.

Disclosure of Interest: None Declared

P114 - SERUM RECEPTOR ACTIVATOR OF NUCLEAR FACTOR KB LIGAND (RANKL) AS BIOMARKER OF CHRONIC HEART FAILURE IN ELDERLY MALES

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Aims: Chronic heart failure (CHF) and osteoporosis are common conditions in frail individuals. The osteoprotegerin (OPG)/ receptor activator of nuclear factor κB ligand (RANKL) system is thought to play an important role in bone remodeling and cardiovascular disease as well. This study aimed to investigate whether OPG/RANKL is associated with neuroendocrine activation in CHF.
Methods: 75 elderly males with mild to moderate CHF and 20 age-, sex- and BMI-matched healthy subjects. Serum RANKL, OPG, NT-pro-BNP, adiponectin, leptin, clinical and echocardiography parameters were evaluated.
Results: In comparison to the control group, the CHF patients showed significantly increased RANKL levels [126.8 (122.6) vs. 47.8 (44.4) pg/ml, $p<0.0001$]. In the CHF patients, the log-transformed values of RANKL levels correlated positively with the log-transformed values of the serum NT-pro-BNP and adiponectin levels ($p=0.004$, $r=0.326$ and $p=0.037$, $r=0.241$, respectively). In multivariate regression model, RANKL was a significant determinant of NT-pro-BNP independent of age, BMI and creatinine clearance ($p=0.002$, $R^2=0.546$).
Conclusions: In conclusion, our study suggests that in elderly males with CHF serum RANKL is associated with the established biomarker of CHF, the NT pro-BNP, as well as with the new biomarker of CHF, adiponectin. It would be tempting to target OPG/RANKL system with human monoclonal antibody against RANKL, denosumab, with the aim to improve cardiac performance.

Disclosure of Interest: None Declared

P115 - MORPHOGENESIS OF THE BONE SYSTEM AFTER IMPLANTATION BIOLOGICAL HYDROXYAPATITE (OC-015) IN TO THE TIBIA DEFECT

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Aims: Researched of the bone morphogenesis, after tibia defects filling by Ukrainian material "Ceramic osteoapatite OC-015", based on the biological hydroxyapatite.
Methods: Researched 126 white rats with initial mass of 130-135 grams, divided into 3 groups: 1st group intact animals, 2nd group rats with 2.2 mm defect on the border between proximal metaphysic of the tibia and diaphysis. In the 3rd group, into the bone defect was implanted blocks of the biological hydroxyapatite 2.2 mm diameters (OC-015).The observations terms from 7 to 180 days. After the end of the experiment, were separated the humerus, pelvic bones and also the 3rd lumbar vertebrae, and their osteometry was taken by caliper.
Results: In the 1st group, was observed the continuous growth of all sizes of the researched bones. During the observed time the lengths of the humerus increased from 22,89±0,23 mm to 27,24±0,26 mm, pelvis bone from 33,43±0,25 mm to 41,01±0,33 mm, height of the vertebral body was also increased from 5,10±0,05 mm to 6,56±0,10 mm. In 2nd group of rats was observed deceleration of the bones growth speed. Length of the humerus was less than in 1st group, from 30 till 90 days by 3,21%, 2,44% and 5,43% respectively. Height of the vertebral body after 30 days observations was also less than in 1st group-by 3,05. Largest thickness of the humerus, was less than in group 1st by 5,64%, 5,42%, 8,83%, 6,87% and 6,14%, respectively. In the 3rd group growth speed was also decelerated, however less than in 2nd group. Longitudinal growth speed was decelerated only for humerus. The length of the humerus was less than in 1st group, by the 7, 30, 60 90 days by 2,69%, 3,16%, 3,06% and 4,20% respectively. Largest thickness of the humerus, was less than in group 1st on the 7,22%, 3,31% and 6,45% respectively from 15 to 60 days.
Conclusions: The tibia defect, are accompanied with decreasing skeletal bones growth speed. Decreasing skeletal bones growth speed depended on reparative regeneration activity degree in bone defect zone. Probably we can have influence on the reparative regeneration process in the defect zone, filling the biological hydroxyapatite (OC-015) and systemic skeletal reactions, when we change composition in the implanted material.

Disclosure of Interest: None Declared

P116 - OXYTOCIN MEDIATES SKELETAL ACTIONS OF ESTROGENS

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Aims: We have already demonstrated the presence of functional oxytocin receptors (OTR) on osteoblasts (OBs) and the role of the hormone as an enhancer of bone cell activity(1). Here we show that the anabolic effects of estrogen on the skeleton and on OBs activities are oxytocin mediated. Our findings indicate a local Oxytocin source and indeed we found by northern blot, RT-PCR and immunofluorescence that OT mRNA as well as the peptide synthesis (demonstrated by western blot by the level of its intracellular precursor neurophysin I) were induced by 17-b- estradiol after 6-12 hours treatment in human and mice OBs.

Methods: To better understand which genes are regulated by E_2 or by E_2-induced Oxytocin, we utilized an OTR silenced MC3T3 OBs line or primary cells obtained from OTR-KO mice in which the treatment with E_2 should activate only oxytocin-independent genes. The ex-vivo and in-vivo experiments with OTR null mice were performed as 21-days culture in mineralizing conditions and one month injections with anabolic doses of 17- b -Estradiol, respectively.
Results: Estrogen-induced Oxytocin expression requires an intact MAPK kinase signal transduction pathway. Interfering with the MAPK signaling cascade ablates the ability of estrogen to induce OT mRNA. Furthermore the treatment with BSA conjugated-E_2, unable to permeate plasma membrane, still increases OT-mRNA indicating a non-canonical signaling pathway. After estrogen treatment, the up-regulation of many osteoblast relevant genes as Osteopontin, BSP, Osteocalcin, the transcription factors ATF4, Runx2 and Osterix and the members of the Shnurri family: Shn2 and Shn3 was obtained only if intact OTRs were present. BMP2 expression at the contrary was not affected. The result on OBs differentiation ex vivo revealed a striking mineralization reduction in OTR-/- calvaria osteoblasts. Exposure to 17- b-Estradiol increased mineralized bone nodules only in wild type cells, but failed to rescue the defect in OBs from OTR-/- mice. The administration of 17- b -Estradiol to wild type mice increased the bone mineral density, as expected, but didn't fully restore the BMD of OTR null mice, further confirming that many estradiol actions on bone are oxytocin-mediated.
Conclusions: This study suggest that OT could represent a novel tissue specific pharmacologic therapy for postmenopausal osteoporosis when, in the absence of estrogen, is not directly produced by bone cells.
References: (1) Tamma R et al, PNAS, 2009

Disclosure of Interest: None Declared

P117 - VITAMIN D LEVELS AND ENDOTHELIAL FUNCTION IN HEALTCARE PROFFESIONALS

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Aims: Vitamin D deficiency is a worldwide problem. Hospital staff is one of the risk groups of vitamin D deficiency. The aim of this study was to evaluate vitamin D status and its association with an early atherosclerosis marker endothelial function in Marmara university Hospital staff which is located in a sunny city Istanbul.
Methods: Eighty heath care professionals (doctors and nurses) of Marmara University hospital (F/M:50/30,35±4yrs) also 70 (F/M 45/35) volunteers from nonhealtcare professionals were included as controls. Vitamin D levels measured with HPLC, serum calcium and Phosphor were measured. Endothelial function evaluated with flow mediated dilatation (FMD)by ultrasonography. All parameters were studied during October 2009.
Results: Serum calcium and phosphor levels were not different between hospital staff and controls. Vitamin D levels were 59.7±25 nmol/l and 67±28 nmol/L(p> 0.05) for study and controls respectively. In the hospital staff group±5 have vitamin D levels<20 nmol/L and±52.5 have vitamin D levels<40 nmol/L. Flow mediated dilation were not different between the study group (% 12.2±9.4) and controls (±11.7± 9.8).Vitamin D levels were not different between men (55±22 nmol/L) and women (62± 27 nmol/L). FMD measurements were±8.9± 7.5 and±14.4±10 for men and women respectively (P=0.07).
Conclusions: We observed that more than±50 of the hospital staff have vitamin D insufficiency at the end of the summer in a sunny geographic area. Although effects of vitamin D deficiency on endothelial function needs to be studied in larger groups Hospital staff needs vitamin D replacement also in summer time

Disclosure of Interest: None Declared

P118 - RECOMBINANT LEPTIN THERAPY INCREASES SKELETAL MUSCLE MASS IN AGED MICE: IMPLICATIONS FOR THE PREVENTION OF SARCOPENIA, FALLS AND FRACTURES

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Aims: Age-associated loss of muscle mass, or sarcopenia, contributes directly to frailty and an increased risk of falls and fractures among the elderly. Aged mice and elderly adults both show decreased muscle mass as well as relatively low levels of the fat-derived hormone leptin. Here we test the hypothesis that leptin treatment can improve muscle mass and fiber size in aged mice.
Methods: C57BL/6 mice 12 and 24 months of age received daily subcutaneous injections of either vehicle (saline) or recombinant leptin (10 μg/day) for 10 days. Mice were euthanized after the 10 day treatment period and body weight and quadriceps mass recorded. The extensor digitorum longus (EDL; predominantly type II, or fast-twitch fibers) and soleus (primarily type I, or slow-twitch fibers) muscles were dissected free, embedded in OCT medium, and snap frozen. Cryostat sections of the EDL and soleus were stained with H&E and muscle fiber cross-sectional areas measured.
Results: Body weight data demonstrate that the aged mice weighed significantly less than the younger mice (P<.05), and that leptin treatment did not significantly alter body weight in mice of either age group. Quadriceps muscle weights were significantly lower (P<.001) in the aged mice. Leptin treatment did, however, significantly increase quadriceps muscle mass both absolutely (P<.05) and relative to body mass (P<.01) in the aged mice but not in the younger mice. Muscle fiber cross-sectional areas of the extensor digitorum longus muscle (EDL) were slightly lower in aged mice, and leptin treatment significantly (P<.05) increased EDL fiber area in the aged mice but not the young mice. Muscle fiber cross-sectional areas of the soleus muscle were similar between young and aged mice, and leptin treatment produced a slight but non-significant increase in soleus fiber area in mice from each age group.
Conclusions: We hypothesize that a decline in musculoskeletal function with age is due in part to a decline in nutrient-activated anabolic signals, and that leptin is a key factor linking nutrient

intake with normal musculoskeletal function. Results from our study support this hypothesis by revealing that a nutrient-related peptide (leptin) can have anabolic effects in aging skeletal muscle. Recombinant leptin treatment may therefore have potential as a novel therapeutic approach for the prevention of sarcopenia, falls and fractures.

Disclosure of Interest: None Declared

P119 - EARLY CHANGES IN BONE SPECIFIC TURNOVER MARKERS DURING THE HEALING PROCESS AFTER VERTEBRAL FRACTURE

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Aims: The present study measured longitudinal changes in bone turnover markers in elderly patients with vertebral fracture and investigated the relationship among bone turnover markers, duration of bed rest and bone mineral density (BMD) during healing process.
Methods: Criteria for patient selection were aged 50 years and older, and presence of vertebral fracture. Serum BAP was measured as a marker of bone formation. Urinary NTX was measured as a marker of bone resorption. In principle, samples of venous blood and spot urine were collected six times as closely as possible according to the following schedule: just after injury, within 24 h, and 1, 2, 3, 5 and 8 weeks after. We also measured duration of bed rest and bone mineral density.
Results: The study population consisted of 42 cases (mean 77.7 years). The average BMD of the lumbar vertebrae was 0.670±0.174 g/cm^2. Bed rest period was 17.9±8.8 days. BAP was significantly higher value at 2 and 3 weeks compared with the baseline value. Thereafter, BAP decreased at 8 weeks. Urinary NTX was increased soon after onset with the same patterns in BAP. Urinary NTX reached a peak at 3 weeks then after and kept significantly high value compared with baseline within 8 weeks. The peak value of bone formation marker was affected by differences in the duration of bed rest, although the peak value of bone resorption marker was not affected. And the peak value of serum BAP and urinary NTX showed a negative correlation to the BMD value at onset.
Conclusions: Bone turnover markers remained higher even at 8 weeks after vertebral fracture, and had an affect on physical activity and BMD. In osteoporosis patients with high turnover, vertebral fracture might affect the level of bone turnover markers.

Disclosure of Interest: None Declared

P120 - HISTOMORPHOMETRIC EVALUATION OF TWO POTENTIAL OSTEOGENIC PROTEINS IN CRITICAL SIZED DEFECTS

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Aims: The aim of the present study was to evaluate the quantity and quality of the new bone formation in a critical sized defect (6mm of diameter) in the calvaria region by surgical technique, in 70 Wistar rats (250g), by histomorphometrical technique.
Methods: The animals were randomly distributed in five groups with seven rats in each, and sacrificed by intracardiac perfusion according to the period of time, 2 and 4 weeks. The treatments employed are the following: group I- 5µg of the rhBMP-2 pure; group II- 5µg of the *Hevea brasiliensis* pure; group III- 5µg of the rhBMP-2/monoolein gel; group IV- 5µg of the *Hevea brasiliensis*/monoolein gel; group V- monoolein gel. The obtained samples were submitted to histological processing and the histomorphometrical results evaluated by statistical methods.
Results: Results showed significant differences ($p<0.05$) in the following comparisons: 1-) group V (2 weeks) compared to the group III (4 weeks), IV (2 weeks) and I (2 and 4 weeks); 2-) group V (4 weeks) compared to the group I (2 and 4 weeks); group II (2 weeks) compared to the group I (2 and 4 weeks); 3-) group III (4 weeks) compared to the group V(2 weeks); 4-) group IV (2 weeks) compared to the group V (2 weeks); 5-) group I (4 weeks) compared to the groups V (2 and 4 weeks) and II (2 weeks); group I (2 weeks) compared to the groups V (2 and 4 weeks) and II (2 weeks).
Conclusions: It can be concluded based on this methodology and using this experimental animal model that occurred a significant difference for the group factor ($p<0.001$), but it was not observed significance for the time factor ($p=0.139$), and it was not observed interaction between these two factors ($p=0.707$).
Acknowledgement: The authors are grateful to Fapesp for the financial support

Disclosure of Interest: None Declared

P121 - EVALUATION OF RHBMP-2 AND NATURAL LATEX AS POTENTIAL OSTEOGENIC PROTEINS IN CRITICAL SIZE DEFECTS BY HISTOMORPHOMETRIC METHODS

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Aims: This in vivo study evaluated the osteogenic potential of two proteins, recombinant human bone morphogenetic protein-2 (rhBMP-2) and a protein extracted from natural latex (*Hevea brasiliensis*, P-1), and compared their effects on bone defects when combined with a carrier or a collagen gelatin.
Methods: Eighty-four (84) Wistar rats were divided into two groups, with and without the use of collagen gelatin, and each of these were divided into six treatment groups of seven animals

each. The treatment groups were: (1) 5 μg of pure rhBMP-2; (2) 5 μg of rhBMP-2/monoolein gel; (3) pure monoolein gel; (4) 5 μg of pure P-1; (5) 5 μg of P-1/monoolein gel; (6) critical bone defect control. The animals were anesthetized and a 6 mm diameter critical bone defect was made in the left posterior region of the parietal bone. Animals were submitted to intracardiac perfusion after 4 weeks and the calvaria tissue was removed for histomorphometric analysis.
Results: Group 1 (rhBMP-2) associated with collagen gelatin presented higher levels of newly formed bone (P<0.05) than all other groups. Also, with collagen gelatin, Groups 1 and 2 presented significant higher levels of new bone formation (P<0.05). When the collagen gelatin was not used, Group 1 presented higher levels of newly formed bone (P<0.05).
Conclusions: In this experimental study, it was concluded that rhBMP-2 allowed greater new bone formation than P-1 protein and this process was more effective when the bone defect was covered with collagen gelatin (P <0.05).
Acknowledgement: FAPESP (Fundação de Amparo à Pesquisa do Estado de São Paulo)

Disclosure of Interest: None Declared

P122 - ANALYSIS OF BIOAVAILABLE PHOSPHORUS CONTENT IN DIFFERENTLY PROCESSED CEREALS

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Aims: The amount of bioavailable phosphorus in different foodstuffs is unknown and is expected to vary. In Western countries the intake of phosphorus is higher than recommended which can be detrimental to bone health. To get information on bioavailable phosphorus (BP), a new *in vitro* method for analysis was developed. The amounts of total phosphorus (TP) were also analysed and compared to the values of Finnish food database Fineli®. We focused on the analysis of cereals.
Methods: Total and bioavailable phosphorus contents of wheat flour, rye flour, oat flakes, barley grits, barley porridge, self-made wheat sourbread, wheat bread and rye sourbread, and one bakery wheat bread and two bakery rye breads were analysed (N=5). For the BP analysis the samples were first processed by simulating the processing of chyme with alimentary enzymes and incubating at room temperature. The samples were dialyzed against water in room temperature and phosphorus analysis was made from the dialyzate by inductively coupled plasma mass spectrometry device (ICP-MS). TP analysis was also made by ICP-MS.
Results: In each sample, the amount of BP was significantly lower (P<0.05) than the amount of TP. In wheat breads the amounts of BP were about 50± of TP and did not significantly differ from wheat flour (P=0.086 and P=0.154). In rye breads the BP part of TP was 69-78± and in rye flour it was 45±, and they differed significantly from each other (P<0.05). Measurement uncertainty was 6-7±.
Conclusions: BP contents in cereals differed from TP which suggests that the estimations based on food databases do not give an accurate estimation of the phosphorus intake. This method seems to be useful for BP analysis. TP values of Fineli® seem to require evaluating. BP contents in foodstuffs need further investigation and the method should be validated against an *in vivo* method.

Disclosure of Interest: None Declared

P123 - COMBINED AND SEPARATE EFFECTS OF WRIST FLEXOR AND EXTENSOR MUSCLES ON DISTAL RADIUS BONE MINERAL DENSITY

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Aims: To examine the combined and separate effects of wrist flexor and extensor muscles on distal radius bone mineral density (BMD).
Methods: Twenty-six young-adult healthy males, aged 22-42, were included in this study. Dominant hand was right in all cases. Distal radius BMD was bilaterally measured by dual energy X-ray absorptiometry. Isokinetic torque was measured in the right and left forearm with the Cybex extremity-testing system. The muscles tested included the right and left wrist flexors and extensors. A flexor/extensor strength ratio (flexor muscle strength/extensor muscle strength) was calculated.
Results: There were no correlations between distal radius BMDs and the wrist flexor or extensor muscles strength in both sides. A significant correlation between ultradistal radius BMD and the flexor/extensor ratio was found in the right and left forearm (respectively, R=0.518, p=0.007 and R=0.392, p=0.048). There was also a significant correlation between total radius BMD and the flexor/extensor strength ratio in the right and left forearm (respectively, R=0.449, p=0.022 and R=0.466, p=0.016).
Conclusions: The wrist flexor and extensor muscles do not contract independently of each other in activity of daily living. Present study suggest that combined effects of wrist flexor and extensor muscles may be more important for distal radius BMD.

Disclosure of Interest: None Declared

P124 - EFFECTS OF BONE EXPOSED TO CYCLIC MECHANICAL LOADING ON ELECTRICAL ACTIVITY OF MUSCLES

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Aims: Based on the bone myoregulation reflex, bone sensing mechanical stimuli can send the signals to central nervous system and may neuronally regulate muscle activity[1]. Aim of this study was to determine whether radius bone exposed to cyclic mechanical loading affects background muscle electrical activity of m. flexor carpi radialis (FCR) in healthy adult volunteers.

Methods: Fifty-six healthy adult volunteers (39 males and 17 premenopausal females, aged 20-55 yr) were included in this study. Muscle electrical activity of m.FCR was measured as EMGrms by surface EMG. EMGrms was derived from the root mean squared (rms) form of the raw signal. Background-EMGrms indicates the motoneuron pool activation[2]. Background-EMGrms and H-reflex of the right FCR were measured at pre-vibration and during vibration. The right distal radius BMD and BMC were measured by DXA after trials.
Results: Background-EMGrms significantly increased during vibration in all cases. Multiple linear regression analysis revealed that BMC-UDradius was an independent predictor for the change in the rest-EMGrms with vibration (R= 0.741, Adjusted R square= 0.540 F= 65.6 p=0.0001). However, age, gender, BMC-Midradius, BMC-Totalradius and distal radius BMDs were not. This analysis also indicates that ultradistal radius BMC explains only 54.0± of the variance in the background- EMGrms with vibration. H-reflex was significantly suppressed during vibration in all cases.
Conclusions: The current study suggested that bones may regulate muscle activity, based on their bone mineral content. This finding may also help to explain the increases in vibration-induced EMG activity.
References: 1-Karacan I et al, Nobel Med 2009;5:9; 2-Fratini A et al, Med Eng Phys 2009;31:1166.

Disclosure of Interest: None Declared

P125 - ACUTE EFFECTS OF MONO- AND POLYPHOSPHATES ON MINERAL METABOLISM IN HEALTHY YOUNG WOMEN

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Aims: A high phosphorus intake together with low calcium intake has been shown to elevate serum parathyroid hormone concentration which causes bone resorption and increased bone turnover. Different phosphate salts are commonly used as additives in food industry. The aim of this study was to compare acute effects of mono- and polyphosphates on mineral metabolism.
Methods: In this short-term intervention study we compared acute effects of monophosphate (MP) and polyphosphate (PP) on calcium and bone metabolism in 14 healthy young female volunteers. Each subject participated in the study at three separate 24-h sessions, one session being a control session with placebo. The diet at each session was exactly the same containing 340 mg of calcium and 500 mg of phosphorus. Phosphorus intake from MP and PP supplements was 1500 mg. The supplements and placebo were given in three equal doses during a day (0800, 1200 and 1600) and the order of the days was randomized.
Results: Relative to control session, both MP and PP increased S-P (p=0.0001). The difference in S-P between MP and PP sessions was not significant (p=0.145). Both MP and PP increased U-P as compared with the control session (p=0.0001). MP increased S-P more than PP (p=0.019). S-iCa decreased at the MP session relative to control session (p=0.045). PP decreased U-Ca relative to control session (p=0.002). Both MP (p=0.02) and PP (p=0.005) increased S-PTH.
Conclusions: Both mono- and polyphosphates absorbed well and increased S-PTH. Based on U-P and S-P, monophosphate may have absorbed slightly better than polyphosphate. U-Ca decreased more at the polyphosphate session than at the monophosphate session, which could be due to polyphosphate binding calcium in intestine.

Disclosure of Interest: None Declared

P126 - CA-ENRICHED MINERAL WATER IS A GOOD SOURCE OF CA: A CONTROLLED SHORT-TERM STUDY IN HEALTHY WOMEN

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Aims: The importance of adequate Ca intake for bone health is well established. However, in many countries dietary Ca intake fails to meet nutritional recommendations. The main dietary Ca sources in Western diets are dairy products, but there are individuals who cannot consume dairy products due to allergy, lactose intolerance or veganism. The aim of this study was to investigate the acute effects of three different Ca sources: Ca-enriched mineral water (CEMW), milk (MI) and Ca supplement (CaS) on Ca and bone metabolism. In addition, we studied whether CEMW is a good Ca source by comparing the effects of CEMW with the effects of MI and CaS.
Methods: Each of 14 healthy female subjects aged 19-32 years attended four 24-h study sessions, which were randomized with regard to a Ca source (mineral water (control day), CEMW, MI and CaS), and each subject served as her own control. The meals were exactly the same on each study day and provided 305 mg of Ca. In addition, each Ca source provided 800 mg of Ca, which were taken into four equal sized doses during the study day. 24-h urine sample and six blood samples were collected on each study session.
Results: Compared with control day, all studied Ca sources (CEMW, MI, CaS) significantly decreased serum parathyroid hormone (S-PTH) concentration (p<0.001, ANOVA), increased serum ionized calcium (S-iCa) concentration (p=0.001, ANOVA) and elevated urinary calcium excretion (U-Ca) (p<0.001, ANOVA). Serum total calcium (S-Ca) concentration increased only with CaS (p<0.001) and CEMW (p=0.004) but not with milk (p=0.24) when compared with mineral water (control day).
Conclusions: Our results show that Ca-enriched mineral water is a good Ca source. Ca-enriched mineral water, Ca supplement and milk similarly increased S-iCa and decreased S-PTH concentrations and increased U-Ca excretion. Ca-enriched mineral water can be recommended as a Ca source to individuals who can not consume dairy products.

Disclosure of Interest: None Declared

P127 - FOREARM MUSCLE STRENGTH DEVELOPMENT IN ADOLESCENCE PREDICTS BONE AREA AND DENSITY AT DISTAL RADIUS BUT NOT IN RADIAL DIAPHYSIS IN MIDLIFE – EVIDENCE FROM A 40-YEAR PROSPECTIVE STUDY

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Aims: To examine the role of forearm muscle strength development in adolescence in determining radius properties and estimated strength in midlife.
Methods: We recruited 48 adult participants (30M; 18F; mean age 49.7yrs, SD 2.6yrs) from the longitudinal Saskatchewan Growth and Development Study (SGDS) with annual measures from years 1964-73 to follow up in 2009. Muscle strength development of elbow and wrist flexion and extension collected annually in 1964-73 was used to calculate adolescent Peak Strength Velocity (PSV) for each individual by fitting a cubic spline for the longitudinal strength development data. In 2009, we measured non-dominant radius total bone area (ToA, mm^2), density (ToD, mg/cm^3) and strength index in compression (BSI_c) from the distal radius (4% of length), and cortical bone area (CoA, mm^2), density (CoD, mg/cm^3), polar strength strain index (SSI_p) and muscle cross-sectional area (MCSA, mm^2) from radius diaphysis (65%) with pQCT (Stratec XCT2000). We used linear regression to assess if muscle strength development in adolescence predicted adult bone outcomes when controlling for significant determinants of bone size (MSCA and limb length) in adulthood. $\alpha < 0.05$ defined a significant improvement of the models' goodness-of-fit (R^2).
Results: Adding adolescent PSV of the elbow extension to the model (with MCSA and length) improved the prediction of distal radius ToA and ToD in midlife (R^2 increased from 0.55 to 0.68) whereas BSI_c prediction (R^2=0.31-0.34) remained the same. Adolescent PSV of wrist extension improved the distal radius ToA in adulthood (R^2 from 0.55 to 0.68). Adolescent PSV of elbow or wrist flexion did not improve any predictive models at the distal radius. At the radius diaphysis, the model with limb length and MCSA predicted 55% of variance in CoA and 80% of SSIp but none of CoD (R_2=0.03). Adolescence PSVs did not improve prediction of radius diaphysis properties or estimated strength.
Conclusions: Development of elbow and wrist extension strength in adolescence seems to predict adult bone area and density at clinically relevant distal radius, whereas cortical area and estimated strength at the radius diaphysis in midlife are mainly determined by adult body and muscle size.

Disclosure of Interest: None Declared

P128 - MENIN PROTEIN INTERACTS WITH MICRORNA 26A DURING THE EARLY DIFFERENTIATION OF HUMAN ADIPOSE TISSUE-DERIVED STEM CELLS TO THE OSTEOBLAST LINEAGE INDUCED BY TREATMENT WITH DXAMETHASONE

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Aims: MicroRNAs (miRNAs) act as post transcriptional regulators of gene expression, interplaying with transcription factors in complex regulatory networks . Menin expression modulates mesenchymal cell commitment to the myogenic and osteogenic lineages. The microRNA 26a (miR-26a), modulates the expression of SMAD1 protein during the osteoblastic differentiation of Human Adipose Tissue-Derived Stem Cells (hADSCs) induced to differentiate with DXAmethasone. The aim of this study was to investigate the interplay between menin and miR-26a as regulators of early osteogenic differentiation in the hADSCs induced by DXAmethasone,
Methods: RNA silencing approaches were used to downregulate MEN1 mRNA expression. Pre-miR reconstitution assay was used to validate the silencing data. qRT-PCR analysis and western blot were used to study both mRNA and protein expression.
Results: We found that in hADSCs the siRNA-induced silencing of MEN1 mRNA resulted in a down regulation of miR-26a, with a consequent up-regulation of SMAD1 protein and osteogenic differentiation markers We showed also that menin interacted in a specific manner with pri-miR26a.
Conclusions: These results showed the specific interaction between of menin protein and miR-26a during Human Adipose Tissue-Derived Stem Cells osteogenesis.

Disclosure of Interest: None Declared

P129 - MICRODENSITY OF HUMERAL HEAD: IMPORTANCE FOR SURGERY

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Aims: We aimed to provide an anatomical basis for surgical techniques in rotator cuff reinsertion. The purpose of this study was to investigate the 3-dimensional trabecular bone mineral density (BMD) in the humeral head bone and determine areas of low density. Limited information exists for humeral head to understand its mechanical behaviour.
Methods: 15 unpaired fresh humeral heads were harvested and frozen. The mean age was 75 years old .All abnormal bones underlying fractures, major arthrosis or surgical interventions were excluded from the study All the heads were scanned using a three-dimensional HR-pQCT system providing 80 microns slices nominal resolution. Manually outlining of the contours of cancellous bone was done in different areas: lesser tuberosity, greater tuberosity, articular part and centre. The parameters included in the analysis were: bone volume density (BV/TV, Trabecular thickness (tb. Th) (mm), Trabecular separation(TB.Sp)(mm), Trabecular number(TB.N) (1/mm).

Results: The average density of the lesser tuberosity is the highest of the whole head (BV/TV= 0,228). The centre of the head is devoided of large trabeculae with a very low density (BV/TV =0,1). The greater tuberosity is rich in thin trabeculae (Tb Th=0,265) separated by large spaces (1,5) .The articular part presents the higher density (BV/TV =0,3) .
Conclusions: Emphasis has traditionally been placed on cortical bone as quality predictor due to its stiffness for achieving primary stabilisation .However screws and anchors are mainly in contact with cancellous part of bone, and mechanical characteristics of cancellous bone also influence the load-bearing capacity of implant-bone union This studies is interesting in showing areas of poor cancellous bone quality and may help to improve surgical techniques.

Disclosure of Interest: None Declared

P130 - FACTORS INFLUENCING SKELETAL STATUS ASSESSED BY QUANTITATIVE ULTRASOUND IN CHILDREN WITH BRONCHIAL ASTHMA

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Aims: The aim of the study was to analyze the possible influence of treatment and some other factors on the skeletal status assessed by quantitative ultrasound (QUS) measurement in asthmatic children.
Methods: The study group comprised 69 children (47 boys and 22 girls) at mean age 10.9±2.6 y., height 144.5±16.6 cm, weight 40.1±12.9 kg. The mean time since diagnosis was 6.3±2.7 y. and the mean time of treatment was 5.2±2.7 y. The control group was selected from previously examined healthy children and comprised 251 subjects matched for sex (171 boys and 80 girls), age (10.9±2.3 y.) and body size (height 144.8±14.3 cm, weight 39.8±12.4 kg). Skeletal status was evaluated by QUS performed at proximal phalanges of right hand's fingers II-V using DBM Sonic device (IGEA, Italy) which measures amplitude-dependent speed of sound (Ad-SoS [m/s]). In addition the value of Z-score was calculated for each child from study and control group on the basis of reference data in healthy children.
Results: The mean value of Ad-SoS in asthmatic children was 1953.8±60.2 m/s and the mean Z-score was -0.05±1.02 and the results did not differ from results obtained in control group (1951.0±53.9 m/s and -0.26±1.05, respectively). All asthmatic children were treated with inhaled steroids and correlation analysis did not reveal any relation between Ad-SoS values and steroid dose. Possible influence of other kinds of therapy was checked by comparison between treated and untreated children (t-test for independent variables) and no significant differences were shown in case of nasal steroids, long-acting β-agonists, antihistamine drugs, antilekotriene drugs and allergen immunotherapy. Similar comparison performed for children with or without prior fracture and for children with or without atopic family history did not revealed an influence of those factors on QUS results as well.
Conclusions: Skeletal status in children with bronchial asthma assessed by QUS shows no difference in comparison with healthy children and no symptoms of negative influence of any kind of treatment on bone metabolism. It can be concluded, that modern management of bronchial asthma and co-existing atopic disturbances gives the possibility of effective control of the disease without any major side effects on bone tissue, at least when QUS measurement is applied as a diagnostic tool.

Disclosure of Interest: None Declared

P131 - BODY COMPOSITION: FAT MASS OR MUSCULAR PROTECTOR OF BONE MASS DENSITY

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Aims: Evaluate the lean mass (LM) and the fat mass (FM) associated with total corporal, lumbar spine and hip region bone mineral density (BMD).
Methods: 787 women ranging from 35 to 55 years, were studied with neither hormonal or pharmacological treatment, or some disease related to osteoporosis. Body composition with Dual energy X-ray absorptiometry (DXA) was analyze in order to obtain FM (%) and LM (%); the BMD total (g/cm^2) and lumbar spine and hip regions. The body mass index (BMI) was obtained and was correlated with BMD with the LM and FM percentage in relation to age.
Results: 95% of the women demonstrated high FM and 53.4% high LM. The BMD was correlated in a negative form according to age and FM percentage; and positively with the total BMD and the high BMI and LM percentage. Adjusted BMD total for age and BMI, there was significant LM protection (r=0.142 p=0.000) against FM (r=0.115 p=0.517). FM protection in the hip was observed (r=0.137 p=0.000) and LM risk (r=0.157 p=0.000). The opposite effect to the lumbar spine region; LM protection and FM risk ($p<0.05$).
Conclusions: The lean mass is associated as a protector factor form bone mineral density total and lumbar spine region, unlike the hip; the fat mass as a risk factor for bone mineral density total and lumbar spine region, on the other hand is a protector in the hip region.
Acknowledgement: Conacyt Fondos Sectoriales

Disclosure of Interest: None Declared

P132 - DETERMINATION OF STANDARD VALUES FOR MINERAL DENSITIES OF HAND BONES ACCORDING TO PATIENTS' AGES

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Aims: To determine standard values for mineral densities of hand bones according to patients' ages and assess their correlation with lumbar vertebra (L1-L4) and femur neck region in female population referred to our hospital with or without any disease state necessitating bone mineral density measurements in order to be able to use hand (Dual Energy X-Ray Absorptiometry) DXA in the diagnosis and monitorization of osteoporosis.
Methods: Turkish speaking women aged between 20-70 years without any disease (genetic, endocrine, metabolic, neurologic, rheumatismal, and orthopedic disorders) necessitating bone mineral density measurements were enrolled into the study. Nulliparous or multiparous women with a history of >3 pregnancies, those using > 10 cigarettes a day and /or consuming > 400 cc alcoholic beverages a day, and cases using drugs affecting bone metabolism were excluded from the study. The patients were divided into 5 decade-groups based on their ages.
Results: BMD (gr/cm^2) values for each age group were as follows: for the dominant hand: 0.382 (20-30 yrs), 0.407 (41-50 yrs), 0.372 (51-60 yrs), 0.339 (61-70 yrs) for the non-dominant hand: 0.373 (20-30 yrs), 0.393 (31-40 yrs), 0.396 (41-50 yrs), 0.367 (51-60 yrs), 0.329 (61-70 yrs). BMD values for dominant, and non-dominant hands appeared to demonstrate a statistically significant positive correlation (r= 58±) with T-scores of lumbar and femur neck (p<0,01).
Conclusions: It is important to measure bone mineral density of the problematic region in order to better reflect the underlying disease. This approach increases the accuracy of diagnosis and it is convenient for the patient. Therefore, in clinical conditions which might cause localized osteoporosis of the hand (hemiplegia, reflex sympathetic dystrophy, rheumatologic diseases, tendon and nerve injuries of the hand, upper extremity fractures) bone mineral density measurements can be performed using hand DXA. Besides it is an excellent method which might be used in the diagnosis and follow-up of osteoporosis in that it has a good correlation with bone mineral densities of lumbar vertebra (L1-4), and femoral neck regions.

Disclosure of Interest: None Declared

P133 - DIFFERENTIAL FACTORS AFFECTING BMD IN RURAL AND URBAN MEXICAN WOMEN

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Aims: The objective of this study was to evaluate the difference in bone mineral density between Méxican women living in rural and urban areas.
Methods: In this cross-sectional study, a total of 409 women were recruited, from which 187 and 222 were living in rural and urban area, respectively. Age and place of residence was obtained by checking official identification documents. Anthropometric data included weight, height and body mass index (BMI). Clinic history evaluated presence of menopause. Dual absorptiometry X-ray was performed in all the participants using an Hologic Explorer equipment to determine total and by corporal segments bone mineral density (BMD).
Results: Women age and BMI were in average 46.4±4.3 years, and 29.8±5.6 kg/m^2, respectively. Mean total-BMD was 1.1±0.1 g/cm^2. No significant differences were found in total-BMD between rural and urban women (1.04±0.1 vs. 1.06±1.1 g/cm^2 respectively); however, rural women had higher BMD in arms (0.87 g/cm^2 vs. 0.85g/cm^2, P<0.008) and thoraxes (0.87 g/cm^2 vs. 0.85 g/cm^2, P=0.049) than urban women. BMD in the lumbar area and legs were significant higher in urban women. Of all women 80± had normal bone structure with a mean total-BMD of 1.10± 0.08 g/cm^2, 15± were osteopenic with a 0.99±0.06 g/cm^2 and 5± were osteoporotic with a 0.90 ±0.08 g/cm^2 BMI was directly correlated with BMD in rural and urban women (P=0.02). Menopause was inversely associated with BMD only in urban women (P=0.01).
Conclusions: There is high prevalence of low BMD in Mexican women of both rural and urban areas but loss of BMD affect in different body parts which may be associated with differences in diet and body composition.

Disclosure of Interest: None Declared

P134 - BONE MINERAL DENSITY AND BODY COMPOSITION IN ADOLESCENT WITH FAILURE TO THRIVE

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Aims: to evaluate bone mineral density in adolescents with failure to thrive correlating to some aspects of body composition.
Methods: Case control study involving 126 adolescents (15 to 19 years old), in final puberty maturation [P>IV and GIV (boys) P>IV and M>IV (girls)] being 76 eutrophic (-1,5 z > height/age ≤+1,5 z and P5th> body mass index<P85th) and 50 with failure to thrive (family or constitutional delay of growth) (-3,0 z ≥height/age ≤-1,5 z and P5th> body mass index<P85th), according to matching ages, gender and puberty maturation. Weight and height were measured and the z score was calculated for height/age and body mass index; bone mineral content, bone mineral density and bone mineral adjusted density were determined for total body, lumbar column and femur; total thin mass and adjusted for stature, total fat mass and adjusted for the stature. Statistical analyses were performed using the *t*-test (weight, height and body composition); Mann-Whitney(bone mass) and multiple linear regression (bone mass determinants).
Results: Weight, height and the z scorefor height/age were larger (statisticalsignificance) amongeutrophic adolescents. Both groups did not showsignificant statistical differencefor fat mass, ± fat mass, fat mass index skeletal and thinmass index skeletal. However, thin mass was smaller for the failure to thrive group.
Conclusions: Regarding bone mass it was not found statistical significant difference among teenagers with failure to thrive,

however the physiology enrolled with bone formation should be better studied, due to positive correlation with thin mass detected among these individuals.

Disclosure of Interest: None Declared

P135 - MCCUNE-ALBRIGHT SYNDROME: EVALUATION OF BONE STRENGTH USING PERIPHERAL QUANTITIVE COMPUTED TOMOGRAPHY (PQCT) OF THE TIBIA

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Aims: The evaluation of bone strength and progress of therapy in a 14 years old girl with McCune -Albright syndrome using tibia pQCT.
Methods: We present the case of a 14 years old girl referred to our department 3 years ago with cystic lesions consistent with fibrous dysplasia (right humerus, femur and tibia, bone skull), precocious puberty (7.5 years) and café au lait spots (lower abdomen). McCune-Albright syndrome was diagnosed using clinical and imaging (radiographs, MRI) findings and was confirmed by genetic testing (heterozygous c.601C>T mutation in exon 8 of the GNAS1 gene). We commenced therapy with iv pamidronate followed by iv zolendronic acid and performed pQCT (Stratec XCT-2000 scanner, Stratec Medizintechnik, Pforzheim, Germany) of right and left tibia before and during treatment.
3 slices (1mm each) were obtained (4%, 14% and 38% of tibia length sites). The 38% site of the right tibia corresponds anatomically to the location of the cystic lesion. For each slice we assessed trabecular (Trab_Cont) and cortical mass (Cort_Cont) and trabecular (Trab_Dens) and cortical densities (Cort Dens) and for 14% and 38% slices Stress Strength Indexes (SSI) . We compared pQCT variables between right and left tibia at baseline and through follow-up and estimated therapy-induced changes (%) prospectively.
Results: Cort Dens of the right tibia at the 38% site was significantly decreased compared to the left at baseline (916.53 mg/cm^3 vs. 1154.47 mg/cm^3, - 20,62%), and throughout treatment. SSI (38% site) was similarly reduced at baseline (941,14 vs. 1110.35, -15,22%) and during treatment. All parameters (mass, density, strength) increased at the 38% site between 2006 and 2009 at both legs using bisphosphonates: Cort Cont left [2.85 vs. 3.18g/cm, + 10.37%], Cort Dens left: [1154.47 vs. 1247.57 mg/cm^3, +8.05%], SSI left: [1110.35 vs. 1236.30, +11,35%], Cort Cont right [2.13 vs. 2.27 g/cm, + 6.6%], Cort Dens right [916.53 vs. 1022.16 mg/cm^3, + 11.5%], SSI right [941.14 vs. 1151,67, +22%]. Similar changes were observed in the other 2 pQCT slices of both legs.
Conclusions: 1) With 3 dimensional densitometry we can practically see the, characteristic for the disease, loss of cortical and trabecular bone and strength in a child with McCune-Albright syndrome.

2) Iv biphosphonates increased bone mass and strength in this child. Tibia pQCT may be the easiest and safest non invasive way for monitoring disease progress.

Disclosure of Interest: None Declared

P136 - THE EFFECT OF THE REIMBURSEMENT POLICY FOR DXA EVALUATION ON THE DIAGNOSTIC RATE IN OSTEOPOROSIS

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Aims: Aim of this study was to evaluate the effect of DXA reimbursement policy on the diagnostic rate of osteoporosis.
Methods: 9000 medical records of patients evaluated through DXA between 2002 and 2008 were analysed according to the reimbursement of the procedure (DXA reimbursement was largely available in Romania since 2005 without very restrictive recommendations). We compared the profile of the investigation (skeletal sites which were scanned), prevalence of the diagnosed patients with osteoporosis and other risk factors between two groups of patients: patients who received DXA reimbursement and patients who paid by themselves the procedure
Results: We found about 1200 patients without reimbursement who were evaluated mostly between 2002 and 2005 (group A) and 7800 patients with DXA reimbursement (5200 with full reimbursement and the rest with partially reimbursement), who were measured mostly in the last years (after 2005), named group B. Mean age was significantly lower in group B comparing to group A (61.2 yrs and 65.4 respective, $p<0.01$). Regarding measured skeletal sites, lumbar and femoral measurements were more frequent in group B comparing to group A where a lot of the patients had only one skeletal site measured (92% and 64% respective, $p <0.01$). Prevalence of the osteoporosis was found slightly higher in the group A (29% comparing to 24.5%). Prevalent fractures were significantly more frequent in group A (24%) comparing to group B (10.9±).
Conclusions: Our data suggests that DXA evaluation reimbursement in the absence of a specific case finding strategy is obviously increasing the absolute number of the diagnosed patients and improving the quality of the procedure, but is also associated to a higher cost/ efficiency ratio because of low utility investigations in younger and low risk people.

Disclosure of Interest: None Declared

P137 - STUDY OF ASPECTS OF BONE MINERAL DENSITY IN CHILDREN WITH SCOLIOSIS

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Aims: Aim of the study was to determine if bone density has any importance in developing scoliosis in teenager.

As children grow, their bones grow and the corresponding bone density rises continually during each year of growth. During the teenage years the bone density takes a big jump; this rapid increase follows the growth spurt and is under hormonal control. In the late teens and early twenties, our bone density hits a

maximum, called the "peak bone mass." Once peak bone mass is achieved, it never can increase further.
Methods: We evaluate 60 subjects in two groups, 30 healthy teenagers and 30 teenagers with scoliosis (structural or functional scoliosis). Each subject performed DXA, using the same standard parameters.
Results: There is a significant difference between the two groups: DXA in healthy teenagers is almost the same as in healthy adult. For children with scoliosis the mean value was significant for low bone density.
Conclusions: low bone density in teenager might be one of the risk factors for developing scoliosis.

Disclosure of Interest: None Declared

P138 - FRACTURES IN OSTEOPENIC WOMEN

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Aims: Evaluate the relation between osteopenia, prevalence of previous fractures, presence of risk factors and pharmacological intervention.
Methods: Prospective study in a sample of 1946 women of ages between 40 and 73 years (average age: 60; DS: 6,9), whose BMD valued by means of bone densitometry (DXA), was in the interval of osteopenia. Inclusion criteria were of T-score -1,5 SD and -2,49 SD . The risk factors and the presence of pharmacologic treatment were valued .
Results: 1946 women with osteopenia, a 78% presented risk factors of these factors, Body mass Index (BMI)<20: 17,6%, Family Osteoporosis: 8,1%, smokers: 10,6%, early menopause: 7,4%, Corticosteroids: 8%, height decrease: 26,7%, in a 22% did not present any risk factor . We funded 11.3% had suffered fractures. Of the total of the fractures, a 12,27% were vertebral, a 5,9% of hip and a nonvertebral 85,45%. The vertebral fracture and hip was correlated of significant form with the age (p=0,002). Nonvertebral were most common before sixties: 69,1%, in vertebral fracture before sixties: 25,9±, in hip fracture 15,38%. A 63.6% of the patients received treatment, After the pursuit visit they received treatment 94.8% .The most common treatments were Raloxifene biphosphonates and HT, all supplemented with calcium + Vitamin D
Conclusions: The BMD does not indicate the bone resistance, which demonstrates in our sample then in a 11.3% of the population with osteopenia, fractures take place. Remember that a previous fracture is a powerful republished of a new fracture. Our group recommends precociously to initiate a pharmacologic treatment in this group of patients with prevalent o clinical fractures is necessary an exhaustive study of these patients.

Disclosure of Interest: None Declared

P139 - COFFEE EFFECT AS MODIFIER OF BONE MINERAL DENSITY

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Aims: Some previous reports about pre and postmenopausal women suggest an inverse relationship between caffeine intake and bone mass, but their results are quite different and the results are too contradictory. In México we don´t have studies to evaluate the risks of chronic use of coffee in women. This study assessed the possible association between habitual caffeine intake and bone mass by DXA in urban women between 35 and 50 years old.
Methods: The association between caffeine intake and bone mass was evaluated in 120 females, aged 35 to 50 years, adjusted according to relevant biological and lifestyle factors. They were divided into two groups: experimental (84 cases of coffee consumers) and a control group (36 cases non consumers) . The accepted cases could not have any systemic diseases neither any of the obviously related diseases associated to bone mass loss. The intake of coffee was obtained by means of a validated questionnaire that determined the amount and caffeine content and was categorized: null consumption (0ml/day), Low (<200ml/day), moderate (200-450ml/day), or elevated (>450ml/day), and bone mineral density (BMD)
Statistical Analysis: SPSS-17 software was used to central tendency and dispersion measures, independent T test samples and "r" Pearson correlation for continuous variables, contingency tables, Pearson Chi Square and confidence intervals for the categorical variables.
Results: Low consumers were 22.5±, middle 22.5± and 25% elevated consumers. Statistical analyses revealed no significant statistical differences in BMD of the hip; meanwhile there was a significant decrease of bone mineral density in the vertebral spine in experimental group (0.942 ±0.138 gr/cm2 VS 1.05 ±0.091 gr/cm2) p<0.05
Conclusions: 1. Our data showed habitual middle to high consumption of coffee in Mexican women.

2. Perhaps coffee adversely affects bone mass in vertebral bodies and this possibility should be taken as a risk factor specially in osteopenia and low bone mass treatment

References: 1) Frary CD, Johnson RK, Min QW, J Am Diet Assoc 2005;105:110; 2) Conlisk AJ, Galuska DA, Prev Med 2000;31:562; 3) Ferrini RL, Barrett-Connor E, Am J Epidem 1996;144:642.
Acknowledgement: CONACYT- México, Universidad del Valle de México-Qro

Disclosure of Interest: None Declared

P140 - A COMPARISON BETWEEN FRAX® AND OSTEOPOROSIS CANADA'S TOOL IN ASSESSMENT OF MAJOR OSTEOPOROTIC FRACTURE RISK IN POSTMENOPAUSAL WOMEN

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Aims: Nowadays, the prevention strategy of osteoporosis strongly suggests the use of algorithms to assess individual patient's 10-yr hip and major osteoporotic fracture risk .The study was carried out to compare the 10-yr risk of major osteoporotic fracture provided by the tool of Osteoporosis Canada (OC)[1] and by the WHO's calculator FRAX®[2] on an identical group of postmenopausal women.
Methods: We randomly selected n.298 women aged 50 yr and older referring to our center. We collected the risk factors requested by the algorithms and we performed DXA scan (spine and hip). Then we calculated the risks and we divided the FRAX®'s results for major osteoporotic fracture probability in 3 risk classes analogue to the ones of OC's tool: low (<10%), moderate (10–20%), high (>20%).
Results: The mean age of our sample was 60,05 yr (range 50-84), 74,5% of our population was aged 65 yr or younger. In 71% of patients the risk factors were absent. According to WHO criteria, osteoporosis was present in 29% at spine, 15% at femoral neck and 4% at femur total. Results are shown on Table1. As expected, the differences in the rate of women's assignment to analogue risk classes by the two tools were statistically significant (p<0,001). The rate of accordance, in terms of class risk allocation, was of 41,9%, in all other cases FRAX® indicated lower risk classes than the OC's tool and in 9,7% they respectively assigned a low risk vs. an high risk for identical women. Low rate of accordance (51%) was seen even when the tools consider the same BMD values (i.e. the femoral neck).

Table 1. Distribution of major osteoporotic fracture probability in risk classes with different tools (N=298)

	Low risk (<10%)	Moderate risk (≥10% and ≤20%)	High risk (>20%)
	%	%	%
FRAX®	87,58	9,73	2,68
OC's tool	36,24	44,63	19,13

Conclusions: In our "quite" young postmenopausal population, results provided by the two tools are clearly different. This could be due to the fact that the two algorithms use different ways of calculations and in FRAX® spine BMD values are not considered. Regarding women potentially eligible for treatment, according to NOF guidelines (major osteoporotic fracture risk >20%), we are much less likely to treat younger postmenopausal women with osteopenia using FRAX®.
References: 1. Siminoski K et al, Can Assoc Radiol J 2008;56:178; 2. Kanis JA et al, Osteoporos Int 2008;19:385.

Disclosure of Interest: None Declared

P141 - PATENTS WITH TYPE 1 DIABETES HAVE LOWER BONE MINERAL DENSITY AT LUMBAR SPINE AND PROXIMAL HIP THAN HEALTHY AGE MATCHED CONTROLS

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Aims: Accumulating recent evidence suggests that diabetes mellitus type 1 is associated with low bone mineral density and related increased risk of fractures. However the exact reason for this is not quite well understood.
Methods: A total of 125 randomly selected patients with diabetes mellitus type 1 (74 women and 51 men), aged 20-40 years, and 120 (70 women and 50 men) age matched nondiabetic controls had undergone DXA measurement of the bone mineral density (BMD) at lumbar spine and proximal hip, as well as measurements for oteocalcine, alkaline phosphatase, 25 (OH) vitamin D, IGF-1, PTH, Ca, P, Mg, Ca-uria, glycemic status, anthropometry
Results: BMD was significantly lower in diabetic group in comparison with controls for both sexes and for both sites of measurement (1,1035 ±0,1269 g/cm^2 vs. 1,1978 ±0,1359 g/cm^2,P<0.05 women, 1,2114 ±0,1587 g/cm^2 vs. 1,3346 ±0,1635 g/cm^2, P<0.01 men at lumbar spine and 0,86568 ±0,1223 g/cm^2 vs. 0,92368 ±0,1453 g/cm^2 P<0.01 women, 0,9138 ±0,2134 g/cm^2 vs. 0,9868 ±0,1534 g/cm^2,P<0.001 men at femoral neck). BMD was not associated with glycemic control (HbA1c) and diabetes duration. Parathyroid hormone was associated inversely with BMD at lumbar spine (r= -0,437, P=0,020) but not at femoral neck (r=-0,321, P=0,110) and this correlated with higher calciuria in diabetics (P=0.032). Calciuria showed positive correlation with HbA1c (r=0,411, P=0,036). Serum values of 25 (OH) D were significantly lower in diabetics (37,578±16,706 nmol/l) than in control group (58,345±19,637 nmol/l; P=0.023) but showed no significant association with BMD at any site. Osteocalcine and alkaline phosphatase showed significant inverse association with BMD at lumbar spine (r=-0,418, P=0,004; r=-0,318, P=0,038 respectively) but again not with BMD at femoral neck (r= -0,271,P=0,078; r=-0,217,P=0,184 respectively) for both sexes.
Conclusions: This cross- sectional study reports significantly lower BMD for women and men at lumbar spine and femoral neck in patients with diabetes mellitus type 1 in comparison with age and sex matched control group. Although HbA1c was not associated with BMD at any site, diabetic patients with higher HbA1c had higher calciuria and higher levels of parathyroid hormone and lower BMD at lumbar spine for both sexes. Markers for bone formation showed inverse correlation with BMD at lumbar spine probably in an attempt to compensate increased resorption.

Disclosure of Interest: None Declared

P142 - LONGITUDINAL ASSESSMENT OF IN VIVO BONE MICROARCHITECTURE AT THE DISTAL RADIUS BY HR-PQCT OVER TWO YEARS: THE OFELY STUDY

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Aims: Though there is evidence that cortical and trabecular bone microarchitecture are impaired with age, these have not yet been assessed longitudinally with a noninvasive method.
Methods: Assessment of total, trabecular and cortical volumetric densities (vBMD) and microarchitecture (trabecular number, heterogeneity of trabecular distribution and cortical thickness) were assessed at the distal radius by high resolution peripheral quantitative computed tomography (HR-pQCT, XtremeCT, Scanco Medical AG) at baseline and after 2 years (1.9±0.1 yrs), in 151 pre- and 297 untreated postmenopausal women (mean age 38±6 and 69±8 yrs respectively) from the OFELY cohort (treatments included: bisphosphonate, HRT, SERM, tibolone, corticoid or aromatase inhibitor). Baseline data are given in the table below, and the median rates of change per year in vBMD and microarchitecture were expressed in percentage.
Results: We found that vBMD and both cortical and trabecular microarchitecture parameters were significantly altered in postmenopausal compared to premenopausal women. A significant total and cortical vBMD loss was observed in postmenopausal women (respectively -0.9% and -0.4%, p<0.001), but not in premenopausal women (both 0.1%). In premenopausal women, however, we observed a slight but significant increase in trabecular vBMD in parallel with an increased trabecular number and a decreased cortical thickness (respectively 0.4%, 0.5% and -0.3%, p≤0.05). The loss of cortical thickness was more pronounced in postmenopausal women (-2.0%, p<0.001) and no change was seen for trabecular vBMD, number and distribution. When the high intra-individual variability was taken into account, the trabecular number change did not exceed the least significant change (CV=3%) in 75% of the postmenopausal women whereas it decreased in only 8% and increased in 16%.

Table : HR-pQCT baseline data and median rates of change per year

	Premenopausal		Postmenopausal	
	Baseline data	Median rates of change per year (%)	Baseline data	Median rates of change per year (%)
Total vBMD (g/cm³)	339 ± 61	0.1	273 ± 68 *	-0.9 ‡
Cortical vBMD (g/cm³)	915 ± 43	0.1 ‡	816 ± 76 *	-0.4 ‡
Cortical thickness (µm)	828 ± 149	-0.3 ‡	933 ± 187 *	-2.0 ‡
Trabecular vBMD (g/cm³)	156 ± 32	0.4 ‡	134 ± 36 *	0.1
Trabecular number (1/mm)	1.73 ± 0.21	0.5 ‡	1.57 ± 0.30 *	0.3
Trabecular distribution (µm)	208 ± 53	-0.5	287 ± 100 *	0.1

* p<0.05, postmenopausal vs premenopausal women
‡ p<0.05, one sample median test (reference value = 0)

Conclusions: This study is the first to present longitudinal assessment of radius bone density and microarchitecture over a 2 years period by HR-pQCT. The results outlined the degradations that occur after menopause but also early architectural changes in premenopausal women. The high intra-individual variability in the follow-up measurements should be accounted for in the interpretation of individual data.

Disclosure of Interest: None Declared

P143 - REPRODUCIBILITY OF FINITE ELEMENT MEASURES AND 3D REGISTRATION BASED ON HR-PQCT IMAGES

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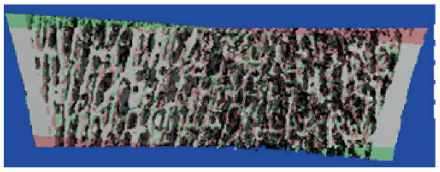
Aims: The purpose of this study is to determine the short-term reproducibility of Finite Element Analyses (FEA) of bone and grey-levels in images after 3D image registration in-vivo, and thus to estimate the sensitivity of this approach to detect bone loss or gain.
Methods: 15 healthy women (21–47yr) underwent 3 HR-pQCT (82 µm³ isotropic voxel size, XtremeCT, ScancoMedical AG) scans of the distal radius and tibia within a 1-month period. The standard registration based on cross-sectional area matching to find the common scanning region was used for segmented FEA, simulating compression tests [1]. A 3D image registration was also applied to the grey-level images using an algorithm that maximizes the image correlation. Reproducibility of stiffness, estimated failure load (strength) and the percentage of load carried by the trabecular bone at the distal and proximal (%Ftrab-Dist and -Prox) ends, as well as grey values were calculated as root-mean-square coefficient of variation (RMS-CV).
Results: Reproducibility ranged from 1.7 to 3.3% for stiffness and strength, from 2.1 to 7.6% for the percentage of load carried (Table). RMS-CV were slightly better for the tibia, especially for the ±Ftrab-Dist and -Prox, which is likely due to the definition of cortical and trabecular bone and because movement artefacts occur more often at the radius. The reproducibility of voxel grey-values was worse than the other measures, probably because it is strongly influenced by movement artefacts, noise in the image and the accuracy of the registration procedure. The small angular deviation revealed in the figure implies that it is difficult to find a common region for FEA with 3D image registration since 2 flat ends are required at both sides. Then, even small offsets will reduce the common region for FEA.

Table: RMS-CV values for the repeated measurements

	Stiffness	Strength	%FtrabDist	%FtrabProx	Grey Values
Radius	3.3%	3.0%	5.1%	7.6%	11.4%
Tibia	2.0%	1.7%	2.1%	3.4%	12.6%

Figure: Overlay image of two tibia showing some angular deviation between scans



White pixels represent common bone pixels, greenred colored pixels are present in one of both images only.

Conclusions: By computing least significant change, these findings indicate that change in tibia (radius) bone strength can be depicted individually as soon as it reaches 4.8% (8.4%). This provides confidence for the assessment of longitudinal changes in estimated biomechanical properties by HR-pQCT based FEA, even with the standard registration.
References: 1. Pistoia et al, Bone 2002
Acknowledgement: This study was supported in part by the Osteoporotic Virtual Physiological Human project (VPHOP).

Disclosure of Interest: None Declared

P144 - BIRTH HEIGHT AND WEIGHT ARE DETERMINANT FACTORS OF FEMORAL BONE MINERAL DENSITY AND GEOMETRY IN YOUNG ADULT WOMEN

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Aims: To analyze the influence of weight and height at birth on bone mineral density (BMD), bone geometry values and physical aptitudes in young adult women.
Methods: our population was composed of 70 women aged 22.9±3.2 years, divided in two groups: athletes (n=40), participating in various weight-bearing sports (10.2±2.2 hours/week for 10.0±4.9 years) and controls (n=30). Age of menarche was similar in athletes and controls. Birth weight (W) and height (H) were collected from the health record of each participant. We calculated birth Body Mass Index as $BMI=W/H^2$. BMD (g/cm^2) was measured by DXA at whole body, lumbar spine (L1-L4) and non dominant femur (total hip and femoral neck). The Hip Structural Analysis (HSA) software was applied to assess cross-sectional area (CSA), cross-sectional moment of inertia (CSMI), section modulus (Z) and cortical thickness of three regions of the proximal femur: intertrochanter (IT), narrow neck (NN) and femoral shaft (FS).
Results: all bone sites BMD's and HSA parameters values were significantly higher in athletes compared to controls ($p\leq0.05$). Birth height ($p=0.02$) and weight ($p=0.002$) were significantly higher in athletes compared to controls. We found significant positive correlations between birth weight and all BMD measurements ($0.30<r<0.46$; $0.02<p<0.04$), and between birth height and TH BMD ($r=0.32$; $p=0.04$), FN BMD ($r=0.38$; $p=0.04$).We found significant positive correlations between birth weight and HSA parameters ($0.36<r<0.50$; $0.0001<p<0.007$), except for IT and NN cortical thickness. We found the same type of results between HSA parameters and birth height ($0.26<r<0.35$; $0.0009<p<0.04$). The correlations were not significantly improved when we used birth BMI instead of birth height or weight. Birth weight associated to birth height explained up to 29.1% of the adult BMD variance, 33% of the adult BMC variance, 11.6% of the adult CSA variance, 8.2% of the adult CSMI variance, 9.3% of the adult Z variance, and 13.7% of the adult cortical thickness variance.
Conclusions: Adult bone mass and geometry are conditioned mostly by birth weight but also birth height which can be used to predict fracture risk in later life in female population. Moreover, predisposition to practice a high level sport during life could be related to the greater birth anthropometry values described in athletes.

Disclosure of Interest: None Declared

P145 - PROSPECTIVE STUDY OF THE ROLE OF CORTICAL THICKNESS ON THE RISK OF HIP FRACTURE

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Aims: Hip fractures are associated with an increased risk of mortality and morbidity. Bone mineral density (BMD) is regarded as the reference method for diagnosis and fracture prediction but it explains only a part of an individual's fracture risk because of the multiple determinants of fragility fracture. Bone geometry parameters could be useful for the prediction of the risk of fracture but the predictive value and the choice of these parameters remain to be determined. Objectives: to study the relationship between the hip structural geometry derived from DXA and the 5-year risk of hip fractures in postmenopausal osteoporotic women.
Methods: Using the five years data of the placebo group of TROPOS study, a double-blind, placebo-controlled, randomized clinical trial of strontium ranelate, we have reanalyzed the hip DXA scans to determine the role of hip geometry parameters on the risk of hip fractures. Included patients were those having BMD measurements on Hologic QDR 4500 device, and with adequate image acquisition. The outcomes included the DXA-derived hip structure analysis program by Beck, which included cross-sectional area (CSA), section modulus, cortical thickness, and buckling ratio, measured in cross-sectional regions at femoral neck, intertrochanteric region and femoral shaft.
Results: The study population consisted of 636 postmenopausal osteoporotic women (mean age of 77.6±5.5 years) treated with calcium and vitamin D; 28 hip fractures were observed over the 5-year follow-up. Postmenopausal osteoporotic women with hip fracture were significantly older, had a lower total hip BMD, a significant decrease in cortical thickness, a decrease of CSA and an increased of the buckling ratio at 3 sites. Multivariate analysis showed that after adjustment on age, total hip BMD and BMI, the geometric parameters associated with an increase risk of hip fracture were intertrochanteric CSA (for each decrease of a SD) (OR= 3.06; CI 1.33-7.06 p= 0.009) and femoral shaft cortical thickness (for each decrease of a SD) (OR= 4.44; CI 95% 1.57-12.62; p= 0.005). BMD was not predictive of the risk of fracture in this multivariate model.
Conclusions: This study suggests that in postmenopausal osteoporotic women, cortical thickness assessment can improve the prediction of hip fractures independently from BMD.

Disclosure of Interest: None Declared

P146 - FRACTURE RISK ON FRAGILITY TROCHANTERIC FRACTURES TREATED BY SURGERY (FIXATION WITH DHS)

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Aims: Fracture risk evaluation of the patients with fragility trochanteric fractures treated by surgery (fixed with DHS) at "St. Pantelimon" Emergency Hospital Bucharest.
Methods: Our study is based on 200 women 60 years of age or older(mean age was 78 years) who had sustained a low-trauma fracture of the hip, operated in St. Pantelimon" Emergency Hospital, Bucharest in the last 6 years. Two groups of patients were studied.

First group contain 100 patients with: anti-resorptive medication, intensive and earlier assisted kinetotherapy, measures for decrease of osteoporosis risk factors and falling risks. The second group of patients did not use: antiresorptive drugs, intensive kinetotherapy, medical follow up of the associated diseases and had a poor diet and social life. All patients did every year BMD determination (DXA). In the first year of follow up, every 3 month post-operative we tempted BMD determination with ultra-sounds on calcaneus site. To evaluate the fracture risk in women patients with hip fragility fractures we used FRAX® Score, too.
Results: In the first group of patients we obtained a better increase or a maintain of BMD comparative with the second group. Mortality was 19% at one year (in the first group) and 26% (in the second). A new fracture appear at 14% of patients in the first group for 6 years of follow up, comparative with 19% in the second group.
Conclusions: In patients with- antiosteoporotic medication, measures for the decrease of osteoporosis and falling risk factors, prophylactic and curative kinetotherapy, we obtained well to decrease the risk of fractures, to maintain and increase the BMD and prevent to occur a new fracture. The FRAX® score successfully identified 78% of those who sustained a fracture. It was a very good predictor for a new fracture comparative with simply BMD measurement.

Disclosure of Interest: None Declared

P147 - THE ELECTROSTIMULATION ON THE HIP MUSCLE LOWERS THE RISK OF HIP FRACTURE

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Aims: It is known that the most sever causes of hip fracture is osteoporosis. The presence of good muscle mass on the hip has a protective effect. Our gate is to evaluate the effect of electrostimulation applied on hip muscle to increase the muscle mass and stimulate the periost to produce the new bone mass, and prevent the hip fracture.
Methods: There were taken 45 patients (35 females and 10 males) diagnosed with osteoporosis, T-score under -3.5 standard deviation, who receive electrostimulation with rectangular currents on the gluteus medium and gluteus maximum. The session last 60 minutes for 4 weeks, repeated at 3 months for one year. All patients receive bisphosphonates in therapeutically doses during the study. There were taken a number of 38 patients as a witness lot with a T-score under -3.5, who receive only medication- bisphosphonates without electrostimulation sessions. The both groups were evaluated at the beginning and the end of the study by DXA on the hip, muscles testing and Short Form Health Survey - SF 36 scale.
Results: We noticed at the end of study that the patients who receive electrostimulation with rectangular currents obtained better scores: 25% improving of muscles hip as stabilizers, T-score increased with 0.45, by comparisons with witness group who had only a 0.25 increase. The Short Form Health Survey, SF 36 scale, improved by 36% to the group who receive electrostimulation, while the witness group only had a 12% increase.
Conclusions: The electrostimulation using rectangular currents is an easy technique, localized, which increases muscle force, and indirectly can stimulate the periost, the place where the new bone is formed. Using this method we can focus on hip to prevent the fracture in this strict area.

Disclosure of Interest: None Declared

P148 - CROSS-SITE REPRODUCIBILITY OF CORTICAL AND TRABECULAR BONE DENSITY AND MICRO-ARCHITECTURE MEASUREMENTS BY HR-PQCT

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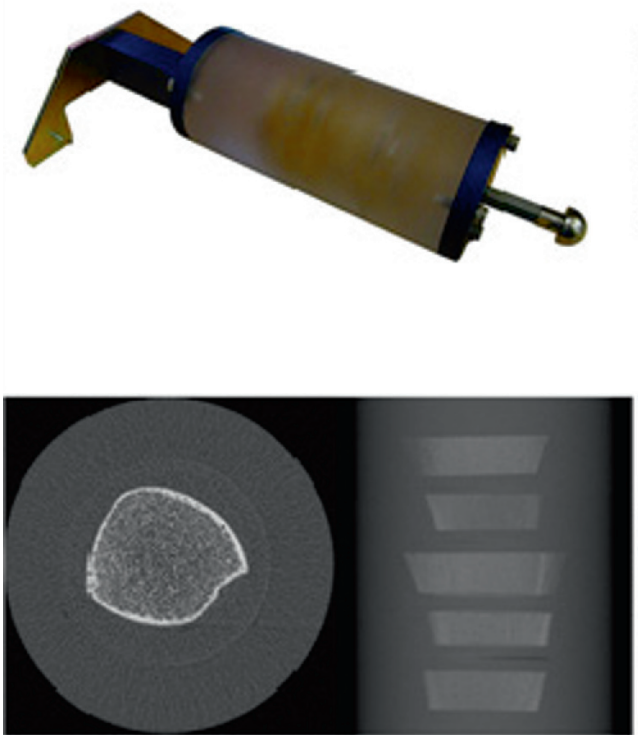
Aims: To assess intra- and inter-scanner reproducibility in the context of longitudinal and multi-center clinical studies of bone quality employing HR-pQCT. To that end we developed a set of phantoms with representative cortical and trabecular micro-architectural features.
Methods: A set of phantoms was constructed from multiple 1-cm sections of cadaveric distal radii and tibiae cleaned of soft tissue and embedded in 7-cm diameter cylinders of soft tissue equivalent poly-methylmethacrylate and a polyester resin (Fig. 1). The phantoms were imaged on 6 different HR-pQCT systems using an *in vivo*-equivalent protocol. A common density phantom was also scanned at each site to provide cross-scanner density calibration. In addition two sites performed short-term reproducibility measurements, and two sites performed long-term reproducibility measurements following hardware repairs (tube/detector replacement).
Results: Mean short-term reproducibility (CV-RMS) was 0.6% for density measures and 1.4% for morphometric measures. Long-term differences were somewhat greater (0.7% for density and 2.9% for morphometric measures). Inter-scanner reproducibility was 1.9% for density measures and 6.4% for morphometric measures (Fig 2), though individual sites had a large range of differences for specific bone inserts (-11.8% to +23.5% for Ct.Th,

-14.1% to 24.5% for Tb.N). Inter-scanner differences in cortical geometry measures were improved through calibrated thresholding (from 4.4% to 3.5% CV-RMS for Ct.Th). Cross-calibration with a common density phantom did not significantly change CV-RMS. The largest differences in Tb.N were associated with scanners with lower signal-to-noise (site B) or lower spatial resolution (site C).

Fig. 1

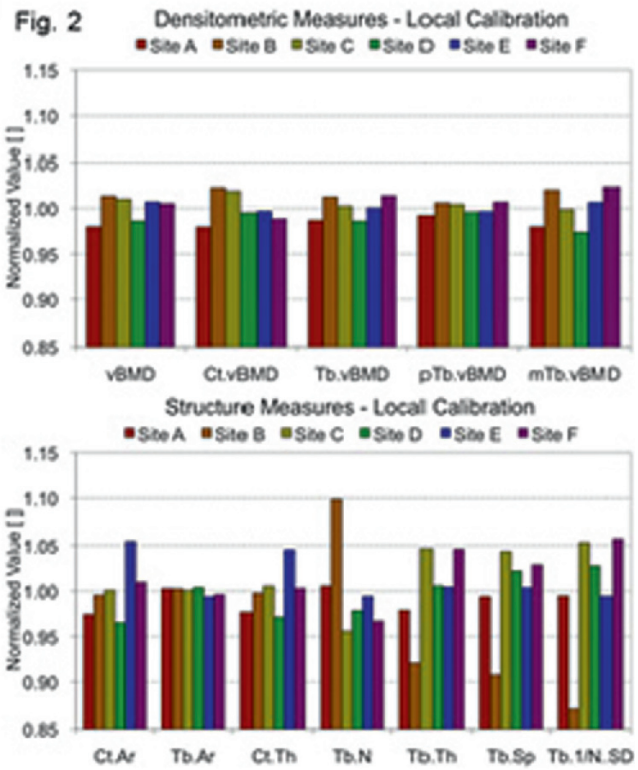


Conclusions: The inter-scanner reproducibility results indicate that inter-scanner differences are approximately equivalent to short-term *in vivo* reproducibility (*1-4*). Inter-scanner differences, which can exceed 20% individually, can be partially improved via calibrated thresholding. Finally, the results suggest that long-term intra-scanner reproducibility, including across hardware replacement, is moderately lower than short-term reproducibility.

References: 1. S. Boutroy et al., JCEM, 2005; 2. S. Khosla et al., JBMR, 2006; 3. GJ Kazakia et al., JBMR, 2008; 4. JA MacNeil et al., Med Eng Phys, 2008

Disclosure of Interest: None Declared

Fig. 2



P149 - THE INFLUENCE OF SERUM GHRELIN ON BONE MINERAL DENSITY AND BODY COMPOSITION IN SUBJECTS WITH RETT SYNDROME

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Aims: Rett syndrome, an X-linked neurodevelopmental disorder primarily affecting girls, is frequently characterized by osteopenia with a consequent increased risk of fragility fractures. Ghrelin, a recently discovered orexigenic peptide mainly secreted by the stomach, is able to stimulate bone formation. This study aimed to investigate whether there is any association between ghrelin levels, body composition and bone mineral density (BMD) in Rett patients

Methods: In 74 Rett girls (13.7±8.9 yrs) and in 33 age-matched controls, serum calcium, bone alkaline phosphatase, parathyroid hormone (PTH), 25-hydroxyvitamin D (25OHD) and serum ghrelin (Ghrelin RIA, Linco Research) were measured.

Whole body mineral density (WB-BMD), whole body bone mineral content (WB-BMC) as well as body composition (fat mass and lean mass) was assessed by using a DXA device (Hologic QRD 4500). QUS parameters at phalanxes by Bone Profiler-IGEA (amplitude dependent speed of sound: AD-SoS and bone transmission time: BTT) were assessed.

Results: The values of ghrelin were lower in younger Rett patients respect to the older subjects (1164.7±382.7 and 927.5±349.5 pg/ml, respectively). A significant correlation was found between

ghrelin and BMD-WB and BMC-WB (r=-0.42; p<0.05; r=-0.45; p<0.05, respectively) and between ghrelin and QUS parameters (AD-SoS r=-0.38; p<0.05 and BTT r=-0.48; p<0.05). Ghrelin showed inverse correlations with fat mass and lean mass which remained significant after adjustment for age and BMI (r= -0.43; p< 0.05 and r=-0.45; p<0.05, respectively). No significant correlation was found between ghrelin with 25OHD and PTH. By dividing the Rett patients in tertiles on the basis of ghrelin values, we observed that fat mass was greater in the lowest with respect to the highest tertile (36.9±8.1 vs. 33.3±6.4 ng/ml; p<0.05). The patients were divided into three groups on the basis of the ambulation level. Non ambulatory Rett patients showed the lowest serum ghrelin values respect to ambulatory and mild-moderate ambulatory subjects.

Conclusions: Our study seems to suggest that the influence of serum ghrelin bone status is mediated by lean mass and fat mass. Further studies are needed to elucidate the role of ghrelin on bone metabolism.

Disclosure of Interest: None Declared

P150 - RED COR STUDY: RELATION BETWEEN DXA AND BODY COMPOSITION IN OA AND RA

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Aims: To evaluate the relation between bone mineral density (BMD) assessed by dual-energy X-ray absorptiometry (DXA) and bone mineral content (BMC) assessed by bioimpedance analysis (BIA) of body composition in rheumatoid arthritis (RA) and osteoarthritis (OA).

Methods: Osteodensitometry of total hip and lumbar spine (LS) BMD (g/cm2), BMC(g) and T-score were performed by DXA (HOLOGIC QDR4500) scan; body composition was analyzed by octapolar BIA (InBody720), with accurate determination of lean muscle, body fat, water, mineral and bone content (BIA-BMC). Statistic analysis included Mann-Whitney, chi-square and Spearman correlation.

Results: This study included 78 patients, 96.2% female, where 33 (42%) had RA and 45 (58%) OA; mean age was 60,5±11,4 e 60,2±9,7 years, respectively (p>0,05). There were no significant differences in body composition components between RA and OA patients. The $OP_{(LS)}$ was present in 24% of RA and 16% of OA, while $OP_{(hip)}$ affected 9% and 2% (p>0,05). In OA patients, $BMD_{(LS)}$ was associated with age (r=-0.397; 0,008) and lean mass components; $DXA\text{-}BMC_{(LS)}$ was associated with lean compartments, body cell mass (r=0.306; 0,044) and BIA-BMC (r=0,300; 0,048). $T\text{-}score_{(hip)}$, $DXA\text{-}BMC_{(hip)}$ and $BMD_{(hip)}$ were both associated to body water (r>0.449; <0,002), with all lean mass compartments (r>0.437; <0,003), body cell mass (r=0.566; <0,0001) and BIA-BMC (r=0,473; 0,001). In RA patients, all previous referred components plus BMI and fat mass were associated to $T\text{-}score_{(LS)}$, including body cell mass, in exception to BIA-BMC; $DXA\text{-}BMC_{(LS)}$ and $BMD_{(LS)}$ were associated to age, water, lean and with body cell mass (r=0.377; 0,036) and BIA-BMC (r=0,406; 0,023). $T\text{-}score_{(hip)}$ had no relation to RA BIA analysis, while $DXA\text{-}BMC_{(hip)}$ was associated to all lean and body cell mass (r=0.486; 0,008) and BIA-BMC (r=0,444; 0,016); however, $BMD_{(hip)}$ was only related to lean mass and body cell mass.

Conclusions: Our results point to the presence of an interesting relation between the nutritional parameters evaluated by BIA and bone content determined with DXA. Lean body mass compartments, body cell mass and BIA-BMC were significantly correlated to DXA-BMC and BMD in OA and RA patients. A profound analysis of these results is suggested by the authors for clarification of these emerging issues, and in near future, BIA may be used as a technique applicable to daily screening and monitoring of these patients, with respect to bone mineral content and overall nutritional status.

Disclosure of Interest: None Declared

P151 - SOUL STUDY – SREENING OSTEOPOROSIS BY FRAX® AND ULTRASOUND

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Aims: The aim of this study was to determine the utility of screening tools like FRAX® and ultrasound T-score (QUS), in screening for low bone mass in a Portuguese women population-based sample.

Methods: A cross-sectional investigation of Portuguese women by application of a structured questionnaire was carried out. WHO fracture risk assessment tool (Spanish FRAX®) was used to identify high-risk individuals requiring medical intervention by calculating each individual's 10-year probability (%) of bone fracture based on clinical risk factors. Heal ultrasound (Hologic Sahara) was used to determine T-score.

Results: A total of 825 women were included with a mean age of 62±7 years old. History of previous fracture was present in 24.5% and family history in 27%, 17% had rheumatoid arthritis, 2% were under glucocorticoids and 1% were smokers. The QUS T-score identified 10.5% with osteopenia and 14.5% with osteoporosis, while FRAX® detected 9.5% with high-risk of bone fracture. Only 19% of those 14.5% classified with risk of osteoporosis by QUS, were at high-risk by FRAX®. QUS T-score and FRAX® score probability revealed a low but significant negative correlation (r=-0.31, p<0.0001).

Conclusions: Both methods can be useful for screening in population, however, the QUS identified a higher number of women with increased fracture risk than FRAX® tool. Their association was also relatively low. So, the development of an upgrade model that includes FRAX®'s clinical factors and the ultrasound evaluation should be interesting and is already in development, it will probably increase the ability to identify each individual fracture risk.

Disclosure of Interest: None Declared

P152 - BAD BONE QUALITY AND MUSCULAR ATROPHY: A POOR MUSCLE CAN'T MAKE A RICH BONE

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Aims: to assess the relationship between sarcopenia and reduction of bone mass, quality and strength.
Methods: We included 30 postmenopausal women aged 55-80 years who underwent total hip arthroplasty either for hip osteoarthritis (n=15) or femoral neck fracture (n=15). The patients underwent bone densitometry at the lumbar spine and at the femoral neck by Dual X-ray Absorptiometry (Lunar iDXA, GE Healthcare). Osteoarthritic patients also were clinically evaluated using Harris Hip Score (HHS). Subjects in both groups underwent blood withdrawal in order to measure blood levels of vitamin D, PTH, calcium, phosphorus, IL-6, TNF-α, C-reactive protein. Biopsies from Vastus Lateralis were obtained during surgical intervention for muscular tissue evaluation by cellular typifying through ATP-ase (pH 4.3). The morphometric study of the muscular fibers allowed the evaluation of muscular atrophy and of the prevalence of type I and type II fibers. Muscular atrophy was measured based on fiber diameter over a 1 mm2 area. Fiber diameter under 30 μm indicated muscular atrophy. These parameters were compared between the two groups and matched with age, blood analysis, bone mineral density.
Results: Data showed statistically significant atrophy of type II fibers in osteoporotic subjects ($p< 0.001$). In osteoarthritic patients muscular atrophy homogeneously involves both type I and type II fibers ($p<0,002$). Moreover in osteoarthritic patients atrophy seems to be related with aging, reduced mobility due to hip pain, lower HHS and duration of osteoarthritis. Blood analysis showed that there is a strong relationship between muscular atrophy and high blood levels of IL-6 and C-reactive protein in osteoporotic patients ($p<0,005$) and between muscular atrophy and high TNF-α levels in osteoarthritic patients ($p<0,005$). Muscular atrophy also proved significantly related to low BMD ($p<0,005$).
Conclusions: The present study showed a significant relationship between muscular atrophy and poor bone quality, supporting evidence about the importance of improving muscular mass in order to increase bone quality and strength.

Disclosure of Interest: None Declared

P153 - QUANTITATIVE ULTRASOUND OF BONE IN TYPE 1 AND 2 DIABETES MELLITUS

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Aims: This study aimed to investigate for any possible relationships of quantitative ultrasound of bone (QUS) parameters with metabolic control and with parameters indicative of diabetic complications, namely neuropathy and angiopathy, in patients with type 1 (T1DM) and 2 (T2DM) diabetes.
Methods: We studied 265 patients (145 males and 120 females) with T1DM (51 patients, 23 males and 28 females) and T2DM (214 patients, 122 men and 92 women) consecutively referred to a diabetic clinic from general practitioners. In all patients we checked anthropometric and serologic parameters including glycated haemoglobin (HbA1C) and lipid profile. Large-fiber sensory nerve function was quantified by vibration perception threshold (VPT) using a handheld BIO-Thesiometer at the medial malleolus and hallux. Autonomic dysfunction tests, including Beat-to-beat HRV, Deep Breathing, Expiration-To-Inspiration Ratio, Heart Rate Response To Standing, Systolic Blood Pressure Response To Standing and Cough Test were measured by clinical evaluation. QUS parameters at calcaneus (speed of sound, SOS; broadband ultrasound attenuation, BUA and QUI index) were assessed with Sahara device (Hologic).
Results: As expected, in all patients, QUS parameters showed an inverse significant ($p<0.001$) relationship with age. QUI and BUA resulted positively correlated with BMI and waist. QUI and BUA showed a stronger correlation with BMI, waist and also with Fat± (BIA, Tanita) after selecting women with T2DM. In all patients a significant correlation between BUA and HDL cholesterol, creatinine, uric acid and HbA1C was found. In the whole population SOS negatively correlated with VPT at the malleolus ($p<0.05$), hallux ($p<0.001$) and positively correlated with deep breathing ($p<0.05$) and lying to standing tests ($p<0.01$). A stronger correlation was observed between QUS parameters, namely QUI and SOS, and VPT, deep breathing, lying to standing and cough tests in male patients with T1DM. In male patients, QUI and SOS showed a significant inverse correlation with carotid intimal thickness, this relationship resulted stronger after selection of T1DM.
Conclusions: The complications of diabetes, such as peripheral and autonomic neuropathy, micro and macro angiopathy, were associated with reduced QUS parameters. Bone ultrasonography provides useful information in the skeletal assessment of patients with diabetes and may represent an additional method to evaluate the entity of the neuropathic damage in DM.

Disclosure of Interest: None Declared

P154 - PROXIMAL FEMUR GEOMETRY AND HIP FRACTURE RISK IN WOMEN WITH FRAGILITY FRACTURE: SHORTER IS BETTER?

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Aims: To assess how differences in the proximal femur geometry (PFG) can influence hip fracture risk.
Methods: We studied 180 postmenopausal women aged 55 – 85 years who had sustained a fragility fracture and who resulted osteoporotic either at the proximal femur or at the lumbar spine or both. Bone Mineral Density (BMD) was evaluated by Dual X-ray Absorptiometry (Lunar i-DXA, GE Healthcare) and in addition to the conventional densitometry measurements, structural vari-

ables were determined using the Hip Strength Analysis program, including hip axis length (HAL), neck-shaft angle (NSA) and the femur strength index (FSI) calculated as the ratio of estimated compressive yield strength of the femoral neck to the expected compressive stress of a fall on the greater trochanter. Patients were divided into two groups based on fracture site (hip fracture group, n=90; non-hip fracture group n=90). Non-hip fracture included vertebral, humeral, wrist and ankle fractures due to low-energy trauma. Age, height, weight, Body Mass Index (BMI), femoral neck BMD and structural variables were compared between the two groups using *t* test.

Results: Femoral neck BMD and PFG parameters (i.e. NSA, HAL and FSI) were different when groups were compared by *t* test. Differences regarding age and anthropometric parameters were not statistically significant. We found that patients in the hip fracture group had longer HAL than the non-hip fracture group (mean value 103.7 mm *vs.* 101.5 mm, p< 0.05) and wider NSA (mean value 129.7° *vs.* 127.5°, p< 0.05). The FSI was lower in the hip fracture group (mean value 1.2 *vs.* 1.3, p<0.05). Significant differences were also found in the hip fracture group between patients with lateral fractures and patients with medial fractures. In particular, HAL resulted greater in the lateral fracture group with respect to subjects with a medial fracture (mean value 105.9 mm *vs.* 101.4 mm, p< 0.05). Moreover, lateral fracture patients were generally taller than those with a medial fracture (mean body height 160.5 cm *vs.* 156.5 cm, p< 0.05) and showed lower BMI (mean value 24.4 g/cm2 *vs.* 26.9 g/cm2, p< 0.05).

Conclusions: These data indicate that differences in PFG parameters might have a role in predisposing to hip fracture instead of non-hip fracture following low-energy trauma in women of the same age. PFG and anthropometric parameters seem to also influence hip fracture type (lateral or medial).

Disclosure of Interest: None Declared

P155 - A COMPARISON OF VERTEBRAL TRABECULAR 3D MICROSTRUCTURE BETWEEN HUMAN AND MONKEY

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Aims: We compared age- and gender-related changes of the vertebral trabecular microstructure in Japanese macaques and humans to validate the relevance of Japanese macaque as nonhuman primate model to study skeletal diseases in human.

Methods: We used 58 third lumbar vertebral bodies (LVB) of 29 women and men (57-98 years of age) from a Japanese population. Both women and men were divided into 3 age groups: middle (57-68 years), old (72-82 years), and elderly (87-98 years) groups. Eighty one LVB of 38 males and 43 females (3-26 years of age) were obtained from Japanese macaques. Both male and female macaques were divided into 5 age groups: sub-adult (3-5.9 years), young adult (6-9.9 years), middle-age (10-14.9 years), advanced adulthood (15-19.9 years), and aged (20+ years) groups. All LVB were scanned continuously with micro-CT. Trabecular microstructural properties and bone mineral density (BMD) were calculated using 3D bone analysis software.

Results: In male and female Japanese macaques, trabecular bone volume fraction (BV/TV) and BMD increased from sub-adult, reached a peak around 9 years, and declined from young adult to aged by 14-15%. The change pattern of trabecular number (Tb.N) and connectivity density (Conn.D) was similar to that of BV/TV. There was no significant gender difference regarding BMD and BV/TV. In humans, BV/TV decreased between the middle-aged and elderly by about 20% for both women and men. BMD, Tb.N and Conn.D decreased, while structure model index (SMI) increased from middle-aged to elderly. As compared with women, men had higher Tb.N in old age group, and higher Conn.D in the middle-aged and old age groups.

Conclusions: The current study indicates that age-related changes of the vertebral trabecular microstructure in Japanese macaques are similar to those of humans. We conclude that Japanese macaque may be a useful model to study at least some aspects of bone loss during human aging.

Disclosure of Interest: None Declared

P156 - RATE OF PERIMENOPAUSAL BONE LOSS AND ITS PREDICTIVE FACTORS AMONG ASIAN FEMALES

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Aims: To examine the rate and predictors for bone loss in Asian females during menopausal transition.

Methods: A longitudinal study was conducted on 161 healthy Chinese female between 45 to 55 years old at baseline. Bone mineral density (BMD) at spine and hip, serum estradiol (E2) and follicular stimulating hormone (FSH) were measured annually for 5 years. Demographic characteristics, lifestyle habits and menstrual status were recorded every visit. The STRAW staging of the Practice Committee of American Society for Reproductive Medicine was used to classify these subjects into premenopausal(stage -4 and -3), perimenopausal (-2 and -1) and postmenopausal (0, +1 and +2) at each visit.

Results: Over the study period, 20 subjects remained in STRAW stage -4 or –3 throughout (group 1), 49 changed from -4 or -3 to -2 or –1 (group 2), 57 from -4 or -3 through -2 or -1 to 0 and beyond (group 3), 34 from -2 or -1 to 0 and beyond (group 4). 1 female entered the study at stage 0 and progressed to stage 2. Group 1 subjects experienced an annualized bone loss of 0.6% at femoral neck but no loss at lumbar spine and total hip. Group 2 subjects lost bone at a rate of 1% per year at lumbar, 0.8% at neck of femur and 0.5% at total hip. For group 3, they lost bone at a rate of 1.6% per year at spine, 1.0% at femur neck and 0.8% at total hip. Group 4 subjects had the fastest annualized rate of bone loss of 1.7% at spine(p<0.001 vs. all other groups), 1.6% at femoral neck (p<0.05 vs. groups 1 and 2) and 1.2% at total hip (p<0.05 vs. groups 1 and 2).

The overall annualized bone loss for 5 years at lumbar spine was 1.3%, total hip 0.7% and femoral neck 1%. Menopause age, body

weight, serum FSH level and menopausal transition category (i.e. group 1 to 4) all correlated with the overall annualized bone loss at all 3 sites. In the linear regression model, only menopause age (p=0.01 for total hip, p=0.03 for lumbar spine) and menopausal transition category (p=0.02 for femoral neck) were identified as independent predictors for overall rate of bone loss.
Conclusions: Women lose their bone mineral density most rapidly when they transit from perimenopause to postmenopause stage. Measures to prevent osteoporosis should be intensified at this period. FSH is not an independent predictor for bone loss but only symbolizes the rate of menopausal transition.
Acknowledgement: I would like to extend my sincere gratitude to all staff in the Osteoporosis Centre (The University of Hong Kong) for their dedicated involvement in this project.

Disclosure of Interest: None Declared

P157 - OSTEOPOROSIS – PARTICULARITIES OF EXPRESSION IN WOMEN POPULATION FROM SEASIDE AREA

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Aims: Evaluation of osteoporosis incidence and involvements of risk factors in postmenopausal women from a geographic area of Romania with a high level of sunny days by year. Evaluation of life style and secondary factors that involve osteoporosis in Dobrogea.
Methods: The study included 1032 postmenopausal women, hereupon was evaluated bone mineral density BMD by X-ray dual absorptiometry (DXA) and appreciated the T and Z score (by WHO criteria). In September it was evaluated the serum level of calcidiol (25-OH- Vitamin D). The patients answered to a questionnaire about menopause, risk factors and life style.
Results: Medium age was 61.5±8.2 years. 503 women (48.7%) were diagnosed with osteoporosis (T-score >-2.5), 414 with generalized osteoporosis (82%) and 89 with segmentary osteoporosis (18%). 491 patients (38%) were with osteopenia (T-score between -1/-2.5) and 38 women without osteoporosis (BMD normal). The age of menopause onset was 44.1±1.8 years at women with osteoporosis, 47.3±1.4 years at osteopenia and 49.4±1.4 years at women without osteoporosis.

The sun exposure was 25±4.1 days in women with osteoporosis and 29±9.6 day in women with osteopenia. 102 patients (20.2%) with osteoporosis taken calcium and D-vitamin and 46 (4.5%) had secondary causes of osteoporosis. The results of questionnaire denoted that only 97 patients (9.7%) of women with osteoporosis and osteopenia had physical activity after menopause, 353 patients (35.5%) made periodical investigations and 143 patients had fractures.
Conclusions: The incidence of osteoporosis and osteopenia is higher and underestimated, probably, at women from seaside area of Romania. The age of menopause onset is under the medium value from women of European Community. There is a negative correlation between Z score and years from beginning of menopause. The serum level of calcidiol (25-OH- Vitamin D) was slightly elevated although the number of sunny days was around 50% per year. Periodical medical investigations, medical access information and level of education were superior to women without menopause.

Disclosure of Interest: None Declared

P158 - PREDICTIVE VALUE OF SOFT TISSUE ON THE SKELETON ADOLESCENT GIRLS IN RELATION TO STAGE OF PUBERTY

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Aims: Two-photon X-ray absorptiometry (DXA) is commonly used for evaluation of bone density in children. Today's densitometers estimate bone mass as well as composition of soft tissue. The aim of our study was to measure bone mineral density (BMD) and evaluate its relation to muscle mass (lean body mass, LBM), and pubertal stage in healthy girls.
Methods: 58 healthy girls (9-15 yrs) were randomly selected from three urban schools. Written consents of their parents and data on history, diet and physical habits were collected. None of them had history of chronic illness or use of drugs, known to affect the bone. Study was approved by the Ethics Committee. Tanner's stages of puberty were determined. Spine + whole-body BMD and soft tissues were measured using GE Lunar Prodigy device with paediatric software. It allows separate assessment of bone, fat and muscle tissue. Yielded Z-scores were related to body height, weight and pubertal stage to eliminate inaccuracies of areal BMD measurement. The relationship between bone mineral content (BMC) and LBM with regard to the height and pubertal stage has been studied.
Results: We found a strong correlation between Z-score and stage of puberty as classified by Tanner. Both BMC and BMD correlate with Tanner stage, namely pubic hair growth. Regression analysis verified results using spine BMD as the dependent and Tanner's pubic hair stage as the independent variable. Just two factors account for 81.9% of the total variability within the data: The first one –maturity– shows as strong correlation with spine BMD and stage of puberty. The second one -body composition- strongly correlates with the BMD Z-scores, body mass index, and body fat content.
Conclusions: Our study shows significant relationships between BMD, pubertal stage and LBM. The latter is a good predictor of most measured bone parameters and an indirect indicator of the pubertal stage. Relations of height vs. LBM and BMC may be crucial for the bone development in girls. Evaluation of these parameters could help to identify children at risk of underachievement in bone mass and a broader diagnosis of skeletal diseases in children.
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P159 - EFFICACY OF FRAX® IN FRACTURE PREDICTION IN 501 OUTPATIENTS FOLLOWED FOR 11 YEARS

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Aims: FRAX® has been validated in extensive numbered studies, but one may not be certain whether data obtained from a mixture of various populations is suitable for a particular population. The aim of the work was to evaluate the efficacy of FRAX® in fracture prediction in patients of our Centre in 11-year observation.
Methods: A group of 501 women who attended our clinic between 1997-2000 and underwent DXA scans (spinal and/or femoral neck) together with a detailed questionnaire covering clinical risk factors was selected. The av. age of patients was 61 yrs (sd 5.86), av. BMD T-score spine was -2.13 (sd 1.43), BMD T-score of femoral neck: -1.27 (sd 1.11). Patients' mean BMI was 26.9 (sd 4.2). 10-year fracture risk was calculated using FRAX® for the English population both for BMI and BMD. All patients were interviewed by telephone after the average of 11 yrs (sd 1.01) and detailed information on fractures was collected.
Results: In 11-year observation period the percentage of patients with a fracture increased from 29% to 42%. 10-year risk of major osteoporotic fracture (FRAX®-BMI) was av. 8.0% (sd 6.14) and for the hip fracture – 1.4± (sd 2.4). Risk of major fracture based on neck BMD in 384 women was av. 10% (sd 8.3) and for hip fracture – 2% (sd 0.9). Individual analysis of risk factors shows a significant relation between fracture risk in patients with the history of fracture ($p<0.01$) and hip fracture in mother ($p<0.03$). The remaining factors did not show a significant relationship. 10-year fracture risk of major fracture differed significantly in patients with a history of fracture as compared to those without it: for BMI – 16.2% vs. 7.4%, and BMD – 15.4% vs. 7.9%, $p<0.0001$). Difference was also found between patients who sustained a new osteoporotic fracture during observation: for BMI major 11.8% vs. 9.6%; BMD – 12.4% vs. 9.7%, $p<0.0001$).
Conclusions: Previous fracture and fracture in mother are the strongest risk factors. We found FRAX® effective in fracture prediction among our patients in 11 yrs follow up.

Disclosure of Interest: None Declared

P160 - BONE MASS AND OTHER VARIABLES IN BODY COMPOSITION IN POST MENOPAUSAL WOMEN

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Aims:: Identify the influence of anthropometric variables on bone mineral content in post menopausal women.
Methods: A cross sectional study that included 154 women. 40 years and more referred by their physicians to the Jimenez Diaz Foundation, between September 2007 and February 2008. After receiving the consent from each woman, an interview was conducted to identify sociocultural, gynaecological, obstetric factors and body composition. In terms of body composition the following was determined: body mass index, Cormic index (height seated/height standing) humerus and trochanter diameter, hip, waist and arm circumference. Fat distribution estimated by plicometer and by bio impedance all the anthropometric variables were evaluates according to IBP norms. Densitometry was done in both lumbar column and waist regions allowing us to divide the women in 3 groups: normal bone mass, low bone mass and osteoporosis (using T-score according to WHO criteria). Statistical analysis Central measure tendencies. Pearson and Sperman correlations were used depending on type of variable being analyzed. A value of p<0, 05 to establish statistically significant differences.
Results: Twenty five± of the woman ha normal bone, 38% low bone mass and 35% osteoporosis. The women in the last group were: older with lower body mass index, femur and humerus diameter, hip, waist and arm circumference (p<0, 05) as well as lower total fat percentage, and by bioimpedance
Conclusions: We identified other variables of body composition that influence bone mineral content, but need more time before we are able to apply this measures to clinical practice.

Disclosure of Interest: None Declared

P161 - THE EFFECT OF THE EXERCISE ON BONE MASS FOR PEOPLE WITH DOWN SYNDROME

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Aims: The aim of the this study to investigate the effect of the resistant and jumping exercise to bone mineral density (BMD) and content(BMC) of people with Down Syndrome (DS)
Methods: DS and normal individuals aged 10-30 randomized exercise and control group. DS control group (n:15), exercise group (n:17), normal control group (n:18), exercise group (n:20) . Supervised 45 minute exercise was given to DS exercise group three times per week for 6 months. 6 monthly home exercise program was given to normal exercise group. Lumbar total, femur neck, total BMD(gr/cm2) and BMC(gr) was measured before and after 6 months exercise study with DXA. Hand holding strength (kg) was determined with hand dynamometer before and after 6

months exercise study. Mann-Whitney U test was used to determine the difference of normal and DS group. Analysis of covariance was used to assess group differences in BMD, BMC change adjusted for baseline BMD, BMC.
Results: At baseline four groups had similar weight age body mass index but DS control group had lower height than normal exercise and control group ($p<0.05$). DS group had 1.8% lower femur neck BMD before the exercise study ($p>0.05$).DS exercise group had similar height with three group($p>0.05$). At baseline DS group had 10%, 7.7%, lower BMD respectively at vertebra total, and femur total, 24%,40%,20% lower BMC at vertebra total, femur neck, total area ($p<0.05$). DS group had lower hand holding strength than normal group at baseline ($p<0.05$). The change BMD, BMC over 6 months did not differ significantly between the exercise and control groups($p>0.05$). Hand holding strength increased higher in exercise groups but did not differ significantly than the control group($p>0.05$). The BMD and BMC of DS exercise group decreased at vertebra and femur area over 6 months ($p>0.05$).
Conclusions: Resistant and jumping exercise study over 6 months did not lead to significantly greater change in vertebra total, femur neck, total BMD, BMC in patients of DS. The decrease of BMD, BMC over 6 months in DS exercise group is not predictable result. The reason of this result have to investigate with studies which had more time and participant.
References: Genetic defect causing Down Syndrome (DS) is the chromosomal abnormality which cause of lower bone mass. Sedentary life, other disorders are the predisposing factors of osteoporosis in adult age.
Fatima B, Osteoporosis Int 2005;16:370

Disclosure of Interest: None Declared

P162 - THE PREVALENCE OF OSTEOPOROSIS IN PATIENTS WITH PARKINSON'S DISEASE

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Aims: Parkinson's disease (PD) is a recognised cause of disability in the elderly. Patients with PD have a documented risk of osteoporosis and fractures. Fracture risk factors include postural imbalance, neurological impairment and reduced bone mass [1]. A pilot study was undertaken to ascertain Bone Mineral density (BMD) on the cohort of 59 PD patients attending one of the Geriatric Medicine Clinics at Sligo General Hospital, a 345 bed hospital in North West Ireland. Our catchment population is 125,000 approx.
Methods: To assess whether our PD patients demonstrate the documented increased prevalence of osteopoenia/osteoporosis [2], we have begun to measure BMD by dual energy X-ray absorptiometry scanning (DXA) (Lunar Prodigy scan) on patients attending the clinic on a sequential basis. Thus far, 30 subjects have had BMD measured at Sligo General Hospital. Data including demography, comorbidity and biochemical parameters were also collected.
Results: All patients were on L-Dopa therapy. The mean age of patients was 70 years and 60% were male. Of the full cohort, 26.6± were osteoporotic and 43.3% osteopenic. Mean values for BMD were; Lumbar Spine: 1.41 g/cm2, Left Femur: 0.993 g/cm2 and Right Femur: 0.987g/cm2. Mean age in osteoporotic patients was 76.5 (62-91) years. The ranges of their T-scores were; L1-L4: -0.10 to -3.2, Left Femur: -1.4 to -2.5 and Right femur: -1.4 to -4.3. Mean age in osteopenic patients was 71.5 (62.5-79.7) years. The ranges of their T-scores were; L1-L4: -0.2 to -1.17, left femur: 0.5 to -1.9 and right femur: 0.6 to -1.4. In patients with normal BMD, the mean age was 62 (45.2-80.6) years. Prior fragility fracture was identified in 30% of the osteopenic group only and in neither of the osteoporotic nor normal BMD groups.
Conclusions: In this pilot study, 69.9% of PD patients had a diagnosis of either osteopoenia or osteoporosis. It is clinically feasible to carry out BMD measurements on these patients. We now plan to measure BMD in PD patients attending all Geriatric Medicine clinics or wards.
References: 1. M. Invernizzi et al, Parkinsonism & Related Disorders 2009;5:339; 2. B. Wood & R. Walker, Mov Disord 2005;20:1636.

Disclosure of Interest: None Declared

P163 - CHANGES IN BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN IN RELATION WITH THE MENSTRUAL CYCLE LENGTH

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Aims: Evaluation of the menstrual cycle length and lumbar bone mineral density in postmenopausal women.
Methods: Three groups of postmenopausal women (each group n=50) were studied. The first group had history of menstrual cycle length of 27 days, second - 28 days and the third - 30 days. Mean age of the first group was 58.80±0.94 years; 60.36±5.12 years in the second group and 61.84±0.80 years in the third group. The age of the patients, age at physiological menopause, number of deliveries, duration of the lactation periods, age at menarche, the usual duration of the menstrual cycle and the menstrual bleeding, absence of alcohol and tobacco abuse, absence of fractures and BMD(L_2–L_4) of lumbar spine were recorded for each woman. BMD of the lumbar spine was measured by dual energy X-ray absorptiometry (DXA) in anterior-posterior projection on "LUNAR" apparatus and was presented as g/cm2.
Results: The women from the third group, with average menstrual cycle length of 30 days, reach menopause at a significantly later age, have longer menstrual cycle and higher lumbar spine bone density, compared to the other two groups.

Table 1. Mean values of the analyzed parameter

PARAMETER	Length of the menstrual cycle in days				
27 28 30					
n				**F**	
Age (years)	50	58.80± 0.94	60.36±5.12	**61.84± 0.80**	**= 0.001**
Age of menopause (years)	50	49.20± 0.54	48.02±4.53	**50.86±0.30**	**= 0.041**
Age of menarche (years)	50	14.40± 0.16	**13.70±0.99**	14.68± 0.22	**< 0.01**
Length of menstrual cycle (days)	50	27.00± 0.00	28.00±0.00	**30.00± 0.00**	**< 0.001**
BMD g/cm^2	50	0.997±0.019	0.971±0.143	1.001±0.027	**< 0.05**

S_X – standard deviation; **F**– One Way ANOVA

Conclusions: The data from our research show that women with history of average normal menstrual cycle length of 30 days reach menopausal period at a significantly later age, have shorter menstrual bleeding, and higher lumbar BMD compared to those with shorter menstrual cycle duration (27 and 28 days).

References: 1.Ouyang F et al. Osteoporos Int 2007;18:221; 2.Nicodemus KK et al. Am J Epidemiol 2001;153:251; 3.Cooper GS and Sandler DP. Am J Epidemiol 1997;145:804.

Disclosure of Interest: None Declared

P164 - EARLY MENOPAUSE INFLUENCES OSTEOPENIC OR OSTEOPOROTIC STATUS IN POSTEMENOPAUSAL WOMEN: PRELIMINARY RESULTS FROM PROF PROJECT

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Aims: There is evidence that demographic trends in Southern Apulia are characterized by a huge proportion of elderly people relative to general population, resulting in an ageing index which is higher than in other Southern Italian regions and/or sub-regions. Within the PROF (Prevention of Osteoporotic Fractures) project, aimed to foster synergic efforts between researchers and clinicians, we investigated the correlation between early menopause and osteopenic or osteoporotic status in postmenopausal women by quantitative bone ultrasonic evaluation (QUS).
Methods: In a period of 5 years (2004-2009), as many as 4912 postmenopausal women (mean age 55, ranging from 39 to 84) were screened by QUS either at heel or at hand phalanx anatomical level. Demographic and anamnestic data were recorded for all the patients, including BMI, nutrition, menopause, physical activity, previous fractures, parental fragility fractures. Three categories were identified: a) *Demineralization*, whenever any T-score value was <-1.0 SD; b) *Severe demineralization*, whenever a T-score <-2.0 was observed, corresponding to a higher risk of fracture; c) *Osteoporosis*, whenever a T-score values QUS<-2.5±0.2 (in case of heel) or T-score <-3.2±0.2 (in case of phalanx). Descriptive statistical analyses have been performed in order to assess the correlation between early menopause (<45 years of age) and the osteopenic or osteoporotic status of the patients.
Results: Out of 4912 overall examined subjects, demineralization was observed in 3839 subjects (78%), with severe osteopenia or osteoporotic status documented in 2300 women (47%) and frank osteoporotic status in 1656 (34%). In total, out of 885 women reporting an early menopause, 746 showed a demineralization corresponding to at least an osteopenic status (84%). In 464 of these patients (52%), there was a severe osteopenic or osteoporotic status, while 345 women experienced with an early menopausal were found to be frankly osteoporotic (39%).
Conclusions: The PROF dataset proves that an early menopause is closely associated with osteopenic or osteoporotic status in postmenopausal women, thus suggesting to implement preventive and regular follow-up strategies with quantitative bone ultrasonic testing.

Disclosure of Interest: None Declared

P165 - EROSIVE OSTEOARTHRITIS OF THE HAND AND BONE MASS ASSESSMENT BY PHALANGEAL RADIOGRAPHIC ABSORPTIOMETRY

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Aims: Osteoarthritis of the hand (HOA) can occur in two different types: erosive (EHOA) and common nodal OA (non-EHOA). OA often affects the hands of middle-aged women; the main EHOA characteristics are erosions and frequently aggressive clinical course. Aim of the study was to describe the prevalence of low bone mineral density (BMD) in EHOA and non-EHOA subjects who consecutively underwent phalangeal radiographic absorptiometry (pRA) in our outpatient clinic.
Methods: A total of 257 patients (252F, mean age 61.65±6.7, range 45-76) were analysed by pRA, 72 women satisfied the HOA Altman criteria: 20 with EHOA (mean age: 59,4±6,7 years, range 49-76) and 52 with non-EHOA (mean age: 65,8±6,2 years, range 53-77). Patients showing at least two erosions in interphalangeal (IP) joints were included in the EHOA group, while erosions in metacarpophalangeal joints were excluded. BMD (gr/cm2) of the middle phalanges of the 2nd, 3rd and 4th digits of the non-dominant hand was assessed with a self-contained single energy (60 kV) X-ray system (Alara Metriscan, Hayward, Ca, USA). A density is estimated in the three phalanges and, after averaging, expressed in mineral mass/area. T-scores were calculated using local reference data. All patients gave their informed consent to the examination. Chi square and Student's t test were used to test for significance.
Results: Osteopenia was found in 35%, 21% and 43% respectively in EHOA, non-EHOA, and normal (for osteoarthritis, N) population while osteoporosis affected 20%, 28%, and 20% (EHOA vs.

non EHOA: p=0.03). Accordingly, BMD was higher in EHOA group versus non-EHOA and versus N (p=0,025; and p=0,0004, respectively). T and Z scores were significantly higher in EHOA vs. N population (T: p=0.012 respectively; Z: p=0,0009).
Conclusions: In this preliminary study, we reported that phalangeal BMD is higher in EHOA patients with respect not only to normal population but also to non-EHOA subjects. The osteoreparative processes seem to be more pronounced in EHOA than in non-EHOA thus explaining the increased mineral density. On the other hand, local inflammation and erosion do not appear to determine sufficient bone loss to discriminate between EHOA and non-EHOA in terms of T and Z score. Further studies in a larger population are needed to clarify the association between EHOA and bone loss at the hand.
References: Punzi L et al. Best Pract Res Clin Rheumatol 2004;18:739; Boonen S et al. Osteoporos Int 2005;16:93; Marcelli C et al. Osteoporos Int 1995;5:382.

Disclosure of Interest: None Declared

P166 - LOW BODY MASS INDEX CORRELATES WITH OSTEOPENIC AND/OR OSTEOPOROTIC STATUS IN POSTMENOPAUSAL WOMEN: THE RESULTS OBTAINED BY BONE ULTRASONIC TESTING WITHIN THE PROF STUDY

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Aims: Being aware that osteoporosis affects about 4,7 millions of people in Italy leading to over 300.000 bone fractures per year and in order to implement preventive strategies to reduce the burden of fractures in Southern Apulia, PROF (Prevention of Osteoporotic Fractures) project was launched in synergy between academic/scientific and healthcare institutions. Within PROF, an informatic registry was built with demographic and anamnestic data for all patients, such as body mass index (BMI), nutrition habits, menopause, physical activity, previous fractures, parental fragility fractures, and other clinical/instrumental parameters considered capable to early recognize patients at higher risk of fractures. The present analysis aims to investigate the correlation between low BMI (<20) and osteopenic/osteoporotic status in postmenopausal women tested by bone quantitative ultrasonic (QUS) examination.
Methods: As many as 4912 people (mean age 55, range from 39 to 84) were screened with non invasive testing by quantitative ultrasound at heel and/or phalanx anatomic level. Three categories were identified: a) Demineralization, whenever any T-score <-1.0 SD; b) Severe demineralization, whenever a T-score <-2.0 was observed, corresponding to a higher risk of fracture; c) Osteoporosis, whenever a T-score values QUS <-2.5±0.2 (in case of heel) or T-score <-3.2±0.2 (in case of phalanx).
Results: Demineralization of various degrees was observed in 3839 cases (78±), with 1073 (22%) of overall examined subjects having normal parameters. Demineralization was found in 2300 women of the entire dataset and, in particular, 1656 of them were found to be frankly osteoporotic (33%).Out of the above 3839 cases with demineralization, there were 124 postmenopausal women with a BMI <20. At QUS testing, only 11 of them (9%) were about normal, 47 had either an osteopenic or severe demineralization status and 66 women were found to be frankly osteoporotic (53%).
Conclusions: These data confirm that a low BMI (<20) bears a clear-cut presence of demineralization status in postmenopausal women, almost doubling the risk of frank and dangerous osteoporotic status. As a matter of facts, only 10% of postmenopausal women with low BMI had normal QUS testing, either at heel or at phalanx level. Therefore, clinically wise, in menopausal state, a low BMI urges the need to undertake pro-active measures and clinical monitoring in order to implement strategies to increase the bone mineral density.

Disclosure of Interest: None Declared

P167 - TRABECULAR BONE LOSS AND INCIDENCE OF FRACTURES IN PRE-, PERI-, AND POSTMENOPAUSAL WOMEN – A PROSPECTIVE STUDY OVER 9 YEARS

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Aims: Accelerated bone loss already occurs in perimenopausal and/or early postmenopausal women. The purpose of this prospective study was to evaluate trabecular bone loss in pre-, peri- and postmenopausal women, as well as the incidence of pathological fractures. Risk factors and correlation of sex hormones and bone markers with accelerated bone loss were examined.
Methods: We prospectively followed 50 healthy pre-, peri-, and postmenopausal women aged 33-57 years at baseline over 9 years. Blood and urine samples for assay of hormones and markers were collected; standardized questionnaires were completed on 7 visits. Bone mineral density (BMD) of the lumbar spine was measured by quantitative computed tomography (QCT) on 4 visits (0, 2, 6 and 9 years).
Results: We found significantly accelerated trabecular bone loss in perimenopausal women (-28,9±). In perimenopausal women bone loss significantly correlated with follicle stimulating hormone (FSH), only in postmenopausal women bone loss was associated with low E2. Highest increase of bone markers occurred in perimenopausal women; however none of the markers could prospectively identify women with accelerated bone loss. Risk factors for low bone density were found to be low body weight (< 57 kg), low BMI<20 kg/m^2, and family history for osteoporosis. 7 pathological vertebral fractures, 2 low energy trauma fractures, and 8 high energy trauma fractures were recorded in the 50 participants. In both peri- and postmenopausal women fracture-rate was 3 times higher (35, 5% and 36,4±) compared with premenopausal women (12,5±).
Conclusions: Risk assessments including measurement of bone density, standardized questionnaires, as well as hormones and

bone markers can help to identify peri- and early postmenopausal women at higher risk for osteoporosis in time for preventive intervention.

Disclosure of Interest: None Declared

P168 - BONE MINERAL DENSITY AND DIAGNOSIS OF OSTEOPOROSIS IN A HEALTH MAINTENANCE ORGANIZATION: EVALUATE THE IMPLEMENTATION OF A CLINICAL GUIDELINE

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Aims: Evaluate the implementation of a clinical guideline for assessment of Osteoporosis, available in electronic format, and to all different levels of medical assistance (primary care, hospital care, geriatric support team).
Methods: In our daily clinical practice, we established a clinical guideline for the diagnosis and treatment of Osteoporosis that advises when to request a DXA for mineral bone density evaluation (BMD), considering the following risk factors: family history of fracture such us femur, previous fragility fracture, early menopause, long-term use corticotherapy, diseases or conditions related with bone loss and IMC <20. In order to verify if it was adequately used, we analysed the indications of test requests comparing with DXA diagnosis. We performed a retrospective study in a sanitary organization with a reference population of 120.000 inhabitants in Badalona (Barcelona, North). Epidemiological information, speciality of the medical solicitor, motivations for requests, fracture risk factors and densitometric diagnosis were registered. The results were evaluated also considering whether the indications were suitable or inadequate according to the recommendations of our clinical guidelines.
Results: 150 clinical requests of DXA were evaluated. 92.6± women were found. The average age was 62.7 years for females. In 65.3± of the cases, the request was coming from primary care, 13.3± from Rheumatology department, 6.1± from Internal Medicine, 7.4± from Gynaecology and 8± from other specialities- The indications of test requests found were the following: 17.3± pain, 17.3± menopause, 33.3± factors of risk and 32.1± other motives. Meanwhile more prevalent risk factors found were: 2.7± family femur fracture in father or mother, 17.3± fragility fracture, 10± early menopause, 6.7± long-term corticotherapy, 15.3± diseases or conditions related with bone loss, and 1.4± patients with IMC <20. The requests were considered satisfactory in 38.7± (58) and inadequate 61.3± (92). In the first case, the diagnosis of Osteoporosis was performed in 38± of the cases, whereas in the latter in 16.3± of the cases ($p<0.003$).
Conclusions: 1-The major number of DXA requests was coming from primary care.

2-The requests fulfilled, in majority, for motives different from the fracture risk

3-The fracture risk more prevalent in our series was the fragility fracture.

4-The implementation of our guide in the indications of densitometry studies was low (35.3±)

Disclosure of Interest: None Declared

P169 - ESTIMATED NUMBER OF WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS, BUT BMD MEASUREMENT IS NOT REPAID ACCORDING TO THE CRITERIA OF THE NATIONAL FRENCH HEALTH INSURANCE

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Aims: To determine the number of patients in France who had a T-score<-2,5 whereas they have no criteria for reimbursement. Since June 2006, the bone mineral density(BMD) measurement is an investigation reimbursed by the French National Health Insurance System only in patients with specific risk factor of osteoporosis which are defined by the French Health Authority(HAS)
Methods: we conduce a prospective study during 4 months including 536 postmenopausal women without treatment of osteoporosis. The BMD was measured on the lumbar spine and the hip. The FRAX® tool was calculated after each BMD measurement.
Results: Two thirds of patients (n=353) were reimbursed. In the group "reimbursed", 24,9% (n=88) were osteoporosis on at least one site and 53,5% (n= 189) were osteopenic. In the group "no reimbursed", 12,2% (n=22) were osteoporotic and 54,1% (n=98) were osteopenic. There is a significant difference between reimbursed and not reimbursed patients in terms of T-score and FRAX®
Conclusions: Two-thirds of not reimbursed patients have abnormal bone density requiring therapeutic treatment or monitoring.

Disclosure of Interest: None Declared

P170 - PARATHYROID HORMONE EXCESS AND DEFICIENCY ROBS PETER BUT PAUL GETS COUNTERFEIT DOLLARS

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Aims: Parathyroid hormone (PTH) excess is believed to produce cortical thinning by endocortical resorption while being anabolic for trabecular bone. However, the proposed anabolic effect may be spurious as high intracortical remodeling adjacent to the marrow causes cavitation in the cortex (trabecularization) leaving cortical remnants of trabecular appearance which may be erroneously measured as trabeculae of growth plate origin. Hence, determination of the effects of endogenous PTH excess requires separation of cortical remnants from trabeculae of growth plate origin.
Methods: We studied 11 patients with hypoparathyroidism (HypoP, age 60.4±13.3 yr); 12 patients with untreated primary hyperparathyroidism (HyperP, age 60.2±12.5 yr), and 11 patients

with treated HyperP, age 56.7±16.0 years. Images were acquired using high-resolution peripheral computed tomography (Scanco Medical) at the distal radius and tibia and analyzed using a new software (Strax1.0) which separates compact cortex from cortical remnants and quantifies porosity in the residual compact appearing cortex and the cortex including the cortical remnants. We determined the ratio of the compact cortex to the compact + trabecularized cortical mass (% compact cortex) which reflects the extent of trabecularization.
Results: At the tibia, patients with untreated HyperP had 20% thinner cortices than patients with HypoP (0.80 vs. 1.05 mm, p= 0.007) and a lower percent of compact cortex (74.98 vs. 77.09%, p=0.08) with higher intracortical porosity 21% (10.9 vs. 8.55%, NS). There was no difference in trabecular density between HyperP and HypoP (109.53 vs. 110.07 mgHA/cc). Treated vs. untreated HyperP had lower porosity in compact (2.90 vs. 7.89%, p=0.018) and trabecularized cortex (5.7 vs. 10.90%, p=0.02) but the thickness of the compact cortex was not increased (0.80 vs. 0.82 mm) and the percent compact cortex was unchanged (74.98 vs. 75.33%). Similar trends were observed at the distal radius.
Conclusions: PTH excess is associated with high intracortical remodelling and porosity with no detectable benefit on trabecular bone or cortical thickness. Surgical treatment partly reverses the deleterious effects of excess PTH.

Disclosure of Interest: None Declared

P171 - HOMOCYSTEINE AND VERTEBRAL FRACTURE RISK IN ASYMPTOMATIC MENOPAUSAL WOMEN

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Aims: Elevation of homocysteine is associated with an increased risk for bone fractures. Whether the risk is due to homocysteine or to the reduced levels of cofactors necessary for its metabolisation, such as folates or vitamin B12, is not completely clear. In this study we aimed to determine links of homocysteine, folates and vitamin B12 and prevalent asymptomatic vertebral fracture (VF) occurrence.
Methods: 188 consecutive apparently "healthy" menopausal women were recruited. Using a standard questionnaire, we assessed age, weight, height, body mass index (BMI). Levels of serum homocysteine, folates, vitamin B12, calcium and parathormone were evaluated. Bone mineral density (BMD) was measured and vertebral deformity was assessed by semi-quantitative methods using lateral vertebral assessment (LVA) by DXA (Lunar Prodigy).
Results: the mean age of the study population was 57.9 years±8.5. The mean BMI was 30.4 kg/cm^2±5.2. Seventy eight percent of vertebrae from T4-L4 and all of the vertebrae from T8-L4 were adequately visualized on VFA. Prevalence of osteoporosis was 30.8%. Twenty percent of patients had a vertebral fracture (grades 2 and 3) and 44.1% if grade 1 was included. Fractures were most common in the mid-thoracic spine and at the thoraco-lumbar junction. Age, spine and hip BMD and T-score, vertebral fractures were significantly correlated to homocysteine (r=0.32; r=-0.21; r=-0.23; r=0.21; r=0.25; r=0.23. p<0.001). Factors associated with osteoporosis and vertebral fractures (grades 2 and 3) were advanced age, lower weight, reduced BMD and T-score at lumbar spine, higher homocysteine levels. However, in the multivariate analysis, the presence of VFs (grades 2 and 3) were independently associated only with age (OR=1.12, 95%CI: 1.07–1.17); and weight (OR=0.95, 95% CI: 0.91–0.98).
Conclusions: our study shows that homocysteine is not an independant risk factor of asymptomatic vertebral fracture in a cohort of menopausal women. Plasma homocysteine is significantly related to aging. Its measurement provides information into the complex mechanisms leading to skeletal fragility but may be of limited clinical value in the assessment of fracture risk.

Disclosure of Interest: None Declared

P172 - PREVALENCE AND RISK FACTORS OF VERTEBRAL FRACTURES IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Aims: to calculate the prevalence and risk factors of vertebral fractures (VF) in patients with RA.
Methods: One hundred seventy seven patients with RA were enrolled in the study. Clinical, biological, immunological and functional status was assessed by number of tender and swollen joint, nocturnal awakening, morning stiffness duration, ESR and C-reactive protein (CRP), latex, Waaler rose, anti CCP rates and Health Assessment Questionnaire score (HAQ). Radiological damage was assessed by measuring Sharp score erosions and joint space narrowing. Bone mineral density (BMD) of the hip and spine was measured and vertebral deformity was assessed by semi-quantitative methods using VFA (vertebral fracture assessment) by DXA.
Results: The mean age of the study population was 50 years±7.2. The mean disease duration was 8.2 years±5.2. The percentage of unreadable vertebrae was 24.4%. General vertebral fracture prevalence was 34.5%. 56.8%, 17.9% and 23.1% of patients had respectively a VF with osteoporosis, osteopenia and normal BMD. Vertebral fractures were associated with advanced age, longer disease and morning stiffness durations, higher tender and swollen joint number, ESR and CRP, latex, Waaler rose and anti CCP rates, altered HAQ, deteriorated Sharp score erosions and joint space narrowing and reduced BMD and T-score at the lumbar spine and total hip sites. Multiple logistic regression analysis revealed that latex rate and lumbar spine T-score less than -1,5 DS were independently associated with vertebral fractures in RA (OR= 3.45, 95% confidence interval [CI] 1.02-16.79; 7.96, 95% CI 1.08-29,67).
Conclusions: Vertebral fracture is common in patients with RA and seems to be related to patients' immunological profile and low lumbar spine T-score.

Disclosure of Interest: None Declared

P173 - QUANTITATIVE COMPUTED TOMOGRAPHY DISTINGUISHES PATIENTS WITH OSTEOPOROSIS WITH OR WITHOUT VERTEBRAL COMPRESSIVE FRACTURES

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Aims: The aim of the study was to find out how Quantitative Computed Tomography may distinguish patients with osteoporosis with or without Vertebral Compressive Fractures (VCF).
Methods: One hundred and fifty nine patients aged 50 and above were diagnosed due to back pain and suspected osteoporosis with Computed tomography enhanced with Quantitative module. Semiquantitative radiographic assessment and vertebral bodies morphometric measurements were performed. Vertebral fractures were defined as minimum 20% loss of vertebral body height. Subjects underwent Computed Tomography (QCT) (GE BrightSpeed scanner; General Electric Medical Systems, Milwaukee, WI). The system used for quantitative analysis was QCTPro (Mindways Software Inc., Austin, TX.)
Results: Vertebral osteoporotic compressive fractures were confirmed in 77 cases (27 – single vertebra, 17 - two, 13 three and 20 - four or more vertebrae affected). One hundred eighty eight fractures was found in the whole study group, most frequently L1 and L2. Statistically significant differences were found among diagnosed groups. The average trabecular bone density in the group without confirmed compressive vertebral deformations characterized was 72, 57 mg/cm3 in contrary to 54,46 mg/cm3 for fractured patients.
Conclusions: Average values assessed among all diagnosed patients was below 80 mg/cm3 that confirms low volumetric density. Fractured patients presented almost 20 mg/cm3 lower values than non fracture group that shows the high influence of low QCT BMD on VCF occurrence.
Acknowledgement: The project is supported by the grant number NR13-0020-04/2008 from the Polish Ministry of Science and Higher Education.

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P174 - CAN ZOLEDRONIC ACID TREATMENT IMPROVE BONE STRENGTH PARAMETERS ASSESSED BY PQCT: A PILOT STUDY

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Aims: Bisphosphonates are known to reduce fracture risk but their mechanism of action is only partially explained by bone mineral density (BMD) changes assessed by dual-energy X-ray absorptiometry (DXA). Other potential mechanisms of action include inhibition of bone turnover or changes in bone strength via changes in material properties, geometry or cortical density, with the contribution of each unknown. Peripheral quantitative computed tomography (pQCT) allows measurement of different parameters of bone strength and fracture risk reduction with bisphosphonate treatment. This pilot study in a subgroup of postmenopausal women with osteoporosis from HORIZON-Pivotal Fracture Trial (PFT)[1] used pQCT to assess changes in BMD and parameters of bone strength with zoledronic acid (ZOL) treatment *vs.* placebo (PBO).
Methods: In this ancillary protocol of HORIZON-PFT, conducted at Ghent University Hospital, pQCT scans (XCT2000 Stratec, Pforzheim, Germany) were performed at the radius (4%, 33% and 66% from distal end). Rigorous quality control procedures were followed. Scans were conducted at baseline, 6, 12,36 months in 47 women treated with once-yearly ZOL 5 mg (n=24) or PBO (n=23). Mean age and BMI were 73 years and 25 kg/m^2, respectively.
Results: Baseline characteristics were comparable between treatment groups except for a slightly lower total bone density at the 4% and 33% site and a slightly greater endosteal circumference at the 33% site in the ZOL group. At 3 years, total bone density at the 4% and 33% radius sites was significantly improved in the ZOL group *vs.* PBO group (Table). Median± changes [min, max] of the endosteal circumference at 33% radius showed a contraction with ZOL *vs.* an extension with PBO (-0.6 [-5.9, 17.9] *vs.* 1.2 [-3, 19.1] respectively, p=0.01; at 3 years). The resulting trends to larger increases in cortical thickness in the ZOL group were non-significant (median± change [min, max]: 0.6 [-18.9, 8.7] *vs.* -0.9 [-14.3, 19.1], respectively, p=0.19), probably due to related changes in periosteal expansion (median± change [min, max] ZOL: 0.3 [-1.7, 7.7] *vs.* PBO: 0.4 [-0.8, 7.9], p=0.28). These trends were not seen at 66% radius site.

Table. Percent change from baseline in total bone density at 3 sites of the radius following 3 years of treatment with ZOL 5 mg or PBO

Total Bone Density at 3 years by site	ZOL 5 mg median (min, max)	PBO median (min, max)	*p* value*
4% radius,	5.5 (-14.2, 30.3)	-2.4 (-23.1, 40.1)	0.010
33% radius,	1.1 (-5.6, 3.7)	-0.9 (-10.2, 2.4)	0.003
66% radius,	0.8 (-10.6, 22.6)	0.9 (-14.9, 14.4)	0.624

*p values were calculated using a Wilcoxon median test; data are unadjusted

Conclusions: Despite the small number of patients in this substudy, ZOL-induced changes show the sensitivity of pQCT in un-

derstanding changes in bone quality beyond DXA BMD. A larger study using pQCT could clarify the relationship between bone strength parameters and fracture reduction in patients treated with bisphosphonates.

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P175 - DECREASED BONE MASS IN CHILDREN AND ADOLESCENTS WITH DOWN SYNDROME

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Aims: The aim of this study was to describe whole body, hip and lumbar spine bone mass in male and female children and adolescents with Down syndrome (DS) compared with age-matched subjects without DS (non-DS).
Methods: 64 children and adolescents (10-19 y) participated in this study; 32 (15 females) with DS and 32 (13 females) age- and sex-matched non-DS. Bone mineral content (BMC), density (BMD) and osseous area from whole body, lumbar spine and hip, and total lean mass were measured with DXA. Analysis of covariance was used to test the differences between BMC, BMD and osseous area between groups using height, sexual maturation and total lean mass as covariates.
Results: The DS group was lighter, smaller and had less lean mass than the non-DS group (all $p<0.05$). Raw values of whole body, lumbar spine and hip zone BMC, BMD and osseous area are presented in Table 1. After adjustment for height, sexual maturation and lean mass, DS females showed lower BMC in whole body and BMD in whole body and hip than the non-DS females (all p<0.05). DS males presented lower BMC in hip, femoral neck, trochanter and intertrochanteric zone and osseous area in femoral neck and trochanter than the non-DS males (all p<0.05).

Table 1. Raw values of bone mineral content, density and osseous area in male and female children and adolescents with Down syndrome compared with non-Down syndrome peers.

	Female		Male									
	DS (n=15)	Non-DS (n=13)		DS (n=17)	Non-DS (n=19)							
	Mean	±	SD	Mean	±	SD	Mean	±	SD	Mean	±	SD
Bone Mineral Content (g)												
Whole body	1172.81*	±	245.34	1773.83	±	**419.13**	1460.34	±	375.19	2037.25	±	510.87
Lumbar spine	32.96	±	10.36	45.29	±	13.61	40.87	±	11.56	49.46	±	16.18
Hip zone	16.83	±	3.27	25.15	±	7.09	23.78*	±	6.19	33.07	±	9.41
Bone Mineral Density (g/cm^2)												
Whole body	0.845*	±	0.086	1.014	±	**0.109**	0.928	±	0.127	1.049	±	0.128
Lumbar spine	0.762*	±	0.118	0.873	±	**0.154**	0.788	±	0.146	0.857	±	0.151
Hip zone	0.697	±	0.086	0.847	±	0.198	0.834	±	0.115	0.888	±	0.177
Area (cm^2)												
Whole body	1377.39	±	177.73	1727.29	±	233.11	1550.85	±	222.07	1917.12	±	291.19
Lumbar spine	42.35	±	7.60	50.86	±	7.88	50.89	±	6.27	56.39	±	9.86
Hip zone	23.07	±	2.67	28.89	±	3.85	29.06	±	4.27	34.56	±	6.52

* p<0.05 after adjustment for height, sexual maturation and whole body lean mass.

Conclusions: It can be concluded that children and adolescents with DS showed lower BMC, BMD and area in several skeletal key regions compared with age- and sex-matched non-DS subjects. The later may deal with increased risk of bone fragility or early osteoporosis development. Bone mass and its development should be specifically studied in this population.

Disclosure of Interest: None Declared

P176 - PHYSICAL ACTIVITY RECOMMENDATIONS DO NOT INFLUENCE BONE MASS IN ADOLESCENTS

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Aims: To study whether bone mineral content (BMC) and density (BMD) of adolescents is affected by the actual physical activity (PA) recommendations [1]
Methods: A total of 358 Spanish adolescents (177 males and 181 females; 12.5-17.5 years) from the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) cross sectional Study were included in our report. Subjects were scanned in order to obtain bone measurements of whole body, pelvis, hip, lumbar spine and upper and lower limbs using Dual energy X-ray Absorptiometry (DXA). Actigraph accelerometers were used to assess PA and it was classified according to the actual PA recommendations [60´or more of moderate-vigorous PA (MVPA) per day] [1]. ANCOVA was used to establish differences in bone mass between PA groups and sex, height, lean mass (total or extremities as appropriate), total percentage of fat mass, calcium intake and pubertal status were entered as covariates.
Results: No differences were found in the analyzed regions, except for lumbar spine bone mineral density (BMD) being higher in adolescents engaged in <60 minutes·day^{-1} of MVPA compared to those engaged in ≥60 minutes·day^{-1} of MVPA (table 1).

Table 1: Bone mineral content (BMC; g) and density (BMD; g/cm^2) by MVPA recommended levels.

		MVPA						
BMC (g)		< 60´ (n = 223)	≥ 60´ (n = 135)	p				
	Whole body	2008.71	±	14.47	1983.02	±	18.95	0.299
	Pelvis	227.47	±	2.87	224.27	±	3.76	0.514
	Hip#							
	Males	36.42	±	0.84	37.17	±	0.76	0.515
	Females	26.24	±	0.31	26.36	±	0.61	0.868
	Lumbar spine	51.25	±	0.59	49.89	±	0.77	0.177
	Upper limbs	119.01	±	0.96	116.34	±	1.25	0.102
	Lower limbs#							
	Males	437.91	±	5.89	440.29	±	5.33	0.769
	Females	340.08	±	3.05	341.9	±	5.95	0.787
BMD (g/cm^2)								
	Whole body	1.058	±	0.006	1.045	±	0.007	0.191
	Pelvis	1.075	±	0.008	1.059	±	0.010	0.225
	Hip	0.950	±	0.007	0.942	±	0.009	0.504
	Lumbar spine	0.917	±	0.007	0.886	±	0.009	0.01*
	Upper limbs	0.670	±	0.003	0.667	±	0.004	0.46
	Lower limbs#							
	Males	1.203	±	0.012	1.186	±	0.011	0.317
	Females	1.064	±	0.007	1.071	±	0.013	0.598

Adjusted results are given as mean±standard error; * p ≤0.05.
Interaction by sex was observed

Conclusions: Actual PA recommendations do not seem to have influence on bone mineral content (BMC) and BMD in adolescents. The higher BMD in the less active group might be influenced by other factors such as physical fitness or genetics.
References: 1. Strong WB, et al. J Pediatr 2005;146:732.

Disclosure of Interest: None Declared

P177 - FITNESS EFFECT ON ADOLESCENTS BONE MASS IS INDEPENDENT OF THE MODERATE TO VIGOROUS PHYSICAL ACTIVITY: THE HELENA STUDY

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Aims: To determine the independent relationship between bone mass and physical fitness according to the physical activity (PA) recommended levels.
Methods: A total of 373 Spanish adolescents (182 males and 191 females, 12.5-17.5 years) from the HELENA (Healthy Lifestyle in Europe by Nutrition in Adolescence) cross-sectional Study had valid data of bone mass and at least in one fitness test. Bone mineral content (BMC) and density (BMD) of the whole body was measured using Dual energy X-ray Absorptiometry (DXA). Fitness was assessed using some tests included in the Eurofit Battery. Subjects were classified by tertiles (T1, T2 and T3) according to their performance. Accelerometers were used to assess PA. ANCOVA and Bonferroni post hoc were used for the analysis with sex, height, total lean mass, calcium intake and pubertal status entered as covariates.
Results: Those adolescents having better fitness showed higher BMC (table 1) in the less active group in all PF tests. Similar results were obtained for BMD. An association was also found between BMC and BMD and the performance on 20m shuttle run and 30m speed tests in the active group.

Table 1: BMC by fitness performance and physical activity groups.

	Whole body BMC (g)					
PHYSICAL FITNESS	*< 60´*	*≥ 60´*				
SBJ (cm)						
T1	1895.42 [ab]	±	23.97	1990.24	±	32.75
T2	1978.74	±	25.68	2044.05	±	32.87
T3	2040.05	±	28.47	2061.86	±	33.11
SR (4x10m) (s)*						
T1	1996.43 [b]	±	24.59	2013.2	±	29.69
T2	1983.81	±	27.59	2070.06	±	34.23
T3	1906.65	±	26.31	2016.79	±	35.89
20m SR (stage)						
Males						
T1	2046.02 [b]	±	31.79	2069 [b]	±	28.58
T2	2135.80	±	52.54	2105.59	±	41.14
T3	2254.13	±	54.91	2198.47	±	40.12
Females						
T1	1854.01	±	21.73	1874.26 [b]	±	41.98
T2	1902.78	±	32.5	1913.65 [c]	±	57.81
T3	1931.34	±	38.99	1665.42	±	57.11
30m speed (s)*						
T1	2020.81 [b]	±	19.82	1985.4 [a]	±	27.35
T2	2001.24 [c]	±	32.29	2115.5	±	34.55
T3	1854.12	±	27.97	2015.86	±	46.5
Hand grip (kg)						
T1	1864.1[ab]	±	26.4	2007.7	±	34.34
T2	1999.1	±	24.41	2035.78	±	36.19
T3	2063.89	±	26.07	2064.57	±	37.42

SBJ (standing broad jump) and SR (shuttle run).* T1=best performance and T3= the worst
All values are mean and SE. Significant differences: **a** T1 and T2; **b** T1 and T3 and **c** T2 and T3.

Conclusions: Independently of the MVPA amount, those adolescents with better fitness showed higher BMC and BMD.

Disclosure of Interest: None Declared

P178 - EFFECTS OF METOPROLOL ON BONE METABOLISM IN MALE RATS

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Aims: Antihypertensive drugs are wide used agents for the treatment of hypertension. Beta-blockers have been postulated to affect bone metabolism but the detailed information is missing. Therefore, the purpose of our study was to evaluate the effects of metoprolol (selective β_1 receptor blocker without intrinsic sympathomimetic activity) on bone metabolism in male albino Wistar rats.
Methods: Adult rats (240±10 g; n=16) were divided into two groups. 1. control group was administered *aqua pro injectione* (0.2 ml/100 g BW; gavage), 2. metoprolol group with administration of metoprolol (0.5 ml in 0.2 ml *aqua pro inj.*/100 g BW; gavage) as a suspension daily for 8 weeks. Bone turnover markers were evaluated in serum: carboxy-terminal telopeptide of collagen I (ICTP), amino-terminal propeptide of procollagen I (PINP) osteocalcin (OC), and bone alkaline phosphatase (BALP) using enzyme immunoassay method (ELISA). Bone mineral density (BMD) was measured with dual energy X-ray absorptiometry (DXA). The study groups were compared using the unpaired t-test. All the data were expressed as mean±SD at significance level of $p<0.05$.
Results: This pilot study has shown that metoprolol administration significantly increased the concentration of OC to 144% ($p=0.002$) vs. control group. PINP, ICTP and BALP did not change significantly. The animals receiving metoprolol showed no change in BMD relative to the control group.
Conclusions: Our findings suggest that metoprolol at dose of 0.5 mg/100 g BW may have potentially beneficial effects on bone metabolism in adult male albino Wistar rats by increasing the concentration of OC.
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Disclosure of Interest: None Declared

P179 - SHOULD THERE BE A NATIONAL REFERENCE VALUE FOR THE DIAGNOSIS OF BONE MASS

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Aims: As Bone mineral density (BMD) differs among different ethnic groups, the use of same reference data for different populations may lead to under or over diagnosis of low bone mass. The aim of this study is to determine a Saudi women reference population data of Stiffness Index (SI) in Quantitative Ultrasound (QUS) for the diagnosis of low bone mass.
Methods: One-thousand healthy Saudi women between the ages of ≥22- 90 years were screened for the diagnosis of osteopenia and osteoporosis. Demographic data were recorded. Stiffness Index (SI) was measured using Achilles Insight ultrasonography of right calcaneus. Data was separated into seven Excel workbooks containing age and SI measurements. After the initial fit, points with residuals greater than 3 times the standard error of estimate were excluded.
Results: There were a total of 1000 measurements for ages ranging from 22 to 90 years. The average age was 59.32±24.6 years. The regression fit indicates that there is relatively little change in Stiffness Index with age until 50 years is reached. The young reference values on the statistics for ages 20-39 years of the SI was reference mean=92.2 (SD ±16.3). The Saudi values depart significantly from Lebanese values (Middle east Reference Value) and US reference values in retaining a high mean Stiffness to a much older age.
Conclusions: This study shows that Saudi Reference values for diagnosis of osteopenia and osteoporosis using QUS is different from the standard Middle East and US reference values.

Disclosure of Interest: None Declared

P180 - BONE MINERAL CONTENT AND DENSITY IN TUNISIAN ADOLESCENTS MALES PRACTITIONERS OF COMBAT SPORTS

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Aims: To investigate the effect of different combat sports exercise on bone mineral content and density in pubertal Tunisian boys who participated in competitive sports.
Methods: In this cross-sectional study, we compared 50 combat sports players aged 17.1±0.2 years to 30 non active volunteer subjects matched with age, sex and height. The group of combat sports practitioners was composed of 10 judokas (J), 10 karatekas (K), 10 boxers (B), 10 karatekas kyokuchinkai (KK) and 10 kung fu men. Training sport activity lasted for a mean of 5.8±1.48 years. The sample study was recruited from the three Sport Schools in Tunisian Sahel between July to September 2009. The control group subjects were recruited in the same region and during the same period from other schools and did not participate in any kind of sport other than occasional children games. For all subjects, the bone mineral content (BMC, g/cm^3), density (BMD, g/cm^2), bone area (BA, cm^2) of the total body, lumbar spine, dominant and nondominant humerus, legs and pelvis were measured by dual energy X-ray absorptiometry (Lunar Prodigy) in the Rheumatology department of Monastir Teaching Hospital. In addition, body fat and lean mass composition were assessed.
Results: Compared to controls, the mean BMC, BMD and BA in the different sites (total body, lumbar spine, dominant and nondominant humerus, legs and pelvis) were significantly higher in pubertal combat sport players ($p \leq 0.001$). In (B) group, BMD of the total body, dominant and nondominant humerus were significantly higher ($p \leq 0.05$) compared to control group. Comparison between sport groups showed higher total body BMD in (J) and (KK) groups (J: 1.3±0.1 g/cm^2; KK:1.3±0.06 g/cm^2) than in other groups (K:1.28±0.17 g/cm^2; KF:1.26±0.06 g/cm^2 and B:1.15±0.06 g/cm^2). In addition, BMC was significantly higher in J, KF and KK groups (J:357.5±482.9 g; KF:3322.24±321 g and KK:

3312.9±482.9g) than in other groups (K: 3068.81±394.82 g and B: 2688.78±257.29 g).
Conclusions: These results indicate that combat sport activity and especially judo and karate kyokuchinkai sport practice in pubertal Tunisian male were associated with more bone mineral content and density. This information is important to encourage these kinds of sport and to develop optimal exercise programs to enhance bone acquisition during growth.

Disclosure of Interest: None Declared

P181 - BENEFICIAL EFFECT OF COMBAT SPORT PRACTICE ON BONE MINERAL DENSITY IN ADOLESCENT TUNISIAN MALE

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Aims: During puberty, bone growth and mineralization as well as bone turnover increase dramatically. To assess the effect of combat sport practice on bone mineral density (BMD) during growth in pubertal boys.
Methods: Fifty combat sport male players aged 17.1±0.2 years [judokas (J, n =10), karatekas (K, n =10), boxers (B, n =10), karatekas kyokuchinkai (KK, n =10) and kung fu men (KF, n =10)] training for a mean of 5.8±1.48 years, were compared to 30 non active volunteers subjects matched with age, sex and height. The sample study group was recruited from 3 Sport Schools in Tunisian Sahel between July to September 2009. The control group subjects were recruited from the same region and during the same period, from other schools and did not participate in any kind of sport other than occasional children games. For all subjects, the bone mineral density (BMD, g/cm²) and Z-score of the total body and lumbar spine (L2-L4) were measured by dual energy X-ray absorptiometry (Lunar Prodigy) in the Rheumatology department of Monastir Teaching Hospital.
Results: BMD and Z-score of total body and lumbar spine (L2-L4) were significantly higher in combat sport practitioners than in non active control group as showed in table 1.

Table 1: Comparison of bone mineral density (BMD) and Z-score of total body and lumbar spine (L2-L4) between combat sport practitioners and non active control group.

	Sport practitioners N= 50	Non active control group N=30	p
BMD total body (g/cm²)	1.26±0.10	1.09±0.07	p<0.001
Z-score total body (SD)	0.92±0.67	- 0.82±0.80	p<0.001
BMD lumbar spine (g/cm²)	1.29±0.12	1.03±0.12	p<0.001
Z-score lumbar spine (SD)	0.58±0.75	- 1.31±0.89	p<0.001

Z-score of total body was more than 1 SD in 40% of combat sport players and Z-score of lumbar spine (L2-L4) was more than 1 SD in all the cases. Although, in control group, 60% of cases had a Z-score of lumbar spine less than -1 SD.
Conclusions: Findings indicate that combat sports activity had a beneficial effect on bone mineral density in Tunisian adolescent boys and this effect was more obvious in the lumbar spine. This would encourage the practice of this kind of sport to contribute to optimal bone development.

Disclosure of Interest: None Declared

P182 - AGE- AND GENDER-DEPENDENT CHANGES IN SPINE BONE-MINERAL-DENSITY (BMD): BMD MEASUREMENT IN JAPANESE SUBJECTS ON MULTI-DETECTOR ROW COMPUTED TOMOGRAPHY IMAGES

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Aims: The aim of this research was to investigate bone-mineral-density (BMD) of vertebral trabecular bones, and to show specific differences according to age and gender.
Methods: The study sample enrolled Japanese subjects with multi-detector row computed tomography (MDCT) images, which is included all thoracic and lumbar vertebrae, and were scanned for each subject using standard settings (120 kV, Auto mAs, 1.25-mm-thick slice). Some subjects were excluded because of normal variants, bone pathology, vertebral fractures, or reasons other than mild degenerative changes at vertebrae. As a result, the study subjects consisted of 848 individuals: 403 men and 445 women. The study subjects were then subdivided into four age categories in order to observe age differences; 41-50 (125 subjects), 51–60 (271 subjects), 61-70 (255 subjects), and 71-80 years (195 subjects). In the current research, central locations of the vertebral trabecular bones were measured and correlation] was computed by Tukey multiple comparison test.
Results: For females, trabecular BMD at the thoracic and lumbar vertebrae in 41-50 years category was significantly less deteriorated than that of elderly categories (51–60, 61-70, and 71-80 years old). We assumed that this result demonstrated the rate of bone loss accelerates for women for a period after menopause due to estrogen deficiency. On the other hand, there was no significant difference in trabecular BMD of the thoracic and lumbar vertebrae between the 41–50-year-olds and the 51–60-year-olds for males. However, there were significant differences between those aged 41–50 years and the elderly (61–80 years old). As seen in males 61–70 years of age, trabecular BMDs at the lumbar vertebrae had a tendency to deteriorate faster than did the thoracic vertebrae.
Conclusions: This research investigated trabecular BMD at thoracic and lumbar vertebrae in Japanese subjects, and specific differences in age and gender. Experimental results suggested that the acceleration of BMD deterioration with aging was different according to gender and vertebral level. Improved knowledge about vertebral trabecular BMD may help diagnosis for primary osteoporosis using MDCT.
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Disclosure of Interest: None Declared

P183 - BONE MINERAL DENSITY IN DUCHENNE MUSCULAR DYSTROPHY PATIENTS

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Aims: Duchenne muscular dystrophy (DMD) is a progressive X-linked muscle disease. In DMD limb-girdle muscle weakness progresses since early childhood, untreated boys lose ambulation around 10 years of age. There is no causal treatment. Glucocorticosteroids (GS) have been demonstrated to improve function and prolong time of independent ambulation in DMD boys, and are recommended in this disease. Fractures are more common in DMD than in general population, and GS further increase this risk. The aim of the study was to exam the bone mineral density (BMD) in DMD boys.
Methods: We retrospectively analyzed results of BMD of 35 DMD boys from a single center in the past 12 months, aged 8.6±3.6 years (3-16). DMD diagnosis was confirmed with genetic testing, demonstrating out of frame deletion of the dystrophin gene, or muscle biopsy. Twenty two boys were actually treated with prednisone in medium dose of 0.5 mg/kg b.w. every second day for 12-120 months (median 24) and 13 were not treated at all. Twenty nine boys were still ambulant and 6 were wheelchair-bound. The height was <3 centile in 3 boys. BMD was measured with the use of Discovery A (Hologic) densitometer in total body (without head; in 33 boys) and lumbar spine in all (L1-L4) and expressed as Z-score. Result of BMD was taken as decreased when Z-score<-2.0.
Results: BMD was deceased in total body in 15 boys (-1.81±1.45) and in lumbar spine in 4 boys (-0.88±1.19); $p<0.001$. There was no bone fracture in any patient. BMD of total body was lower in 6 non-ambulant boys than in the rest of group (-3.3±0.97 v -1.48±1.33; $p<0.01$) with no differences in lumbar spine. Five out of these 6 boys had decreased Z-score of total body; in other 1 Z-score=-2.0, and all of them had normal Z-score of lumbar spine. Eleven out of 15 boys with low BMD of total body and 11 out of 20 with normal BMD of total body were actually treated with GS (NS). There was no correlation of Z-score of total body and spine with the duration of GS treatment. There was significant negative correlation between Z-score of total body (not of lumbar spine) and age of DMD boys ($r=-0.8433$; $p<0.001$).
Conclusions: Boys with Duchenne muscular dystrophy have often reduced bone mineral density at total body but not in lumbar spine what suggests DXA examination of total body more practical than of lumbar spine in this group. We found the negative influence of deterioration of physical activity in DMD boys on bone mineral density with no clear influence of steroids treatment.

Disclosure of Interest: None Declared

P184 - BONE MINERAL DENSITY IN PATIENTS WITH ACTIVE RHEUMATOID ARTHRITIS, THE RELATION BETWEEN GENERALIZED OSTEOPOROSIS AND DISEASE ACTIVITY

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Aims: To determine the frequency of osteoporosis in a large cohort of women with rheumatoid arthritis (RA) Bone is a target in many inflammatory rheumatic diseases, such as rheumatoid arthritis (RA). The generalized effect of inflammation on bone may result in a decreased quality of bone and is associated with an increased risk of fractures and deformities. Osteoporosis has frequently been observed in patients with rheumatoid arthritis.
Methods: We enrolled for 2 years 258 women with RA, none of whom were taking osteoporosis medications. For each patient pre-registered demographic, disease, and treatment-related variables were collected. Patients underwent ultrasound bone densitometer at the calcaneus and completed a questionnaire. We measure SOS (Speed of Sound) & BUA (Broadband Ultrasound Attenuation), and applied them to calculate BQI (Bone Quality Index). T-score and Z-score represent. Osteoporosis was defined as a BMD > -2.5 T-score and reduced BMD as Z score <or=-1 SD.
Results: Two hundred and fifty eight women participated. The median age was 58 years. Median disease duration was 13 years. 160 women (62%) were rheumatoid factor (RF) positive. Osteoporosis and reduced BMD were found in 24% and 38%, respectively, of the patients. Osteoporosis was found in 48 patients with rheumatoid factor positive and 14 in patients with rheumatoid factor negative. BMD was lower in patients with longer disease activity. Further, postmenopausal status in women, familial osteoporosis was independently associated with osteoporosis and reduced BMD.
Conclusions: We found that in patients with rheumatoid arthritis, osteoporosis and reduced BMD were related to longer symptom duration and a positive RF.

Disclosure of Interest: None Declared

P185 - PREDICTION OF THE DEVELOPMENT OF POSTMENOPAUSAL OSTEOPOROSIS WITH THE HELP OF MATHEMATICAL MODELING

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Aims: Optimization of prediction methods and early diagnostics of postmenopausal osteoporosis (PMOP). Actuality of the prediction of the development of osteoporosis (OP) and its early diagnostics is stipulated by the fact that preservation of bone stock is an easier task than its renewal.
Methods: One held a questioning (detection of risk factors of the development of PMOP), clinical and laboratorial examination of 187 women at the age between 48 and 58 years old (medium age is 54,6+4,4) with the duration of menopause between 2 and 9 years

(5,0+2,8). One detected bone resorption marker – B-CrossLaps (CTx). For the diagnostics of the changes of bone stock mineral density one used ultrasonic densitometry. For the making of the mathematical model of prediction of the development of metabolic disorders and assessment of risk factors of the development of structural and functional changes of bone stock one used the notion of Information theory (R. Bellman, 1987).
Results: On the grounds of the results of complex examination it was worked out the mathematical model which allowed to prognosticate the probability of the development of metabolic disorders of bone stock by quantitative estimation of the factors promoting reduction of bone stock mineral density. Four categories of the patients with different degree of the risk of development of metabolic disorders of bone stock were defined, that gave the possibility of differentiated approach in prevention and treatment of PMOP.
Conclusions: Taking into consideration modern priorities in medicine which focus on prevention and not treatment of diseases the use of these methods will allow to carry out timely prevention of PMOP, to prescribe appropriate therapy during preclinical stage of the disease, to improve the quality of bone stock, to decrease the risk of fractures and to raise life quality.

Disclosure of Interest: None Declared

P186 - BONE MINERAL DENSITY MEASUREMENT AT HIP FOR DIAGNOSING OSTEOPOROSIS IN JAPANESE PATIENTS

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Aims: In Japan, spinal dual-energy X-ray absorptiometry (DXA) has been commonly performed for diagnosing osteoporosis, but scanning the proximal femur is not done widely. The latest Japanese guidelines for prevention and treatment of osteoporosis, revised in 2006, recommend bone mineral density (BMD) measurement at both spine and hip for diagnosing osteoporosis, although there have been no reports that proved the necessity of those measurements.
Methods: Fifteen hundred forty-one women and 485 men with clinical suspicion of osteoporosis were enrolled in this study, and DXA was performed at both spine and hip. The proportions of the patients who had inconsistency between diagnosis of osteoporosis from spinal DXA and that of hip were estimated.
Results: As a result, 22% of women and 15% of men had an inconsistency with the diagnosis of osteoporosis using DXA at each measurement site.
Conclusions: There was inconsistency in diagnosing osteoporosis using DXA at the spine and proximal femur measurement sites. Because spine and femoral DXA measurements complement each other in the diagnosis of osteoporosis, BMD measurement at hip should be also performed not only at spine for all Japanese patients who are suspected osteoporosis, regardless of age and sex.

Disclosure of Interest: None Declared

P187 - VERTEBRAL FRACTURES AND BONE MINERAL DENSITY IN RELATION TO VITAMIN D AND PARATHYROID HORMONE IN POSTMENOPAUSAL WOMEN

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Aims: Active vitamin D suppresses the secretion of parathyroid hormone (PTH) from the parathyroid gland in a negative manner. Increased PTH due to vitamin D insufficiency may increase bone turnover, bone loss and fracture risk. Therefore, the aim of this study was to establish the relationship between vertebral fractures (VF), bone mineral density (BMD), serum levels of 25-hydroxy-vitamin D (25OHD) and PTH in postmenopausal women.
Methods: A total of 94 postmenopausal women, average age 65.09 years (±9.1), were examined. BMD was measured by DXA in the lumbar spine (L1-L4) and hip. Vertebral fractures were diagnosed by X-rays of the thoracic and lumbar spine. 25OHD and PTH were measured using electrochemiluminiscence immunoassays (Roche Diagnostics, Elecsys 2010).
Results: BMD T-scores were found of -2.60±0.96 on the lumbar spine (L1-L4), -1.85±0.79 total hip, and -1.94±0.80 on the femoral neck. Thirty patients (31.9%) were diagnosed as having VF. In this group the average of 25OHD was 48.24±17.73 and PTH 49.75±16.86. The T-score at the level of osteoporosis (<-2.5SD) in the lumbar spine was 60.7%, total hip 32.1%, and femoral neck 33.3%. Osteopenia was found in 28.6%, 57.1% and 60% respectively. The T-score (>-1SD) was equal on the lumbar spine and total hip (10.7%), and on the femoral neck in 6.7% of patients with VF. The average of 25OHD was 51.15±21.5 nmol/L, while PTH was 58.14±28.76 pg/mL. Negative significant correlation between 25OHD and PTH ($r= -0.502$, $p<0.001$) was found. A decreased value of 25OHD (<75nmol/L) was found in 88.3% postmenopausal women (45.78±14.4). An elevated level of PTH (>65 pg/mL) was found in 31.08% of cases (91.2±28.9 pg/mL). In the group with increased PTH, the mean of 25OHD was 37.77±11.81 nmol/L. VF were diagnosed in 34.9% of postmenopausal women with 25OHD insufficiency, and in 26.1% with elevated PTH. In the group with VF, a significant correlation was found only between PTH and hip T-score ($r=0.411$, $p<0.05$).
Conclusions: Results showed a high prevalence of 25OHD insufficiency among postmenopausal women (88.3%) investigated in this study. In patients with 25OHD insufficiencies, elevated PTH varied individually, but was most often increased if 25OHD was about 37 nmol/L. High PTH and low 25OH D may be related to some but not all vertebral fractures.

Disclosure of Interest: None Declared

P188 - DIFFERENCES IN STRUCTURAL GEOMETRICAL OUTCOMES AT THE NARROW-NECK OF THE PROXIMAL FEMUR BETWEEN 2D DXA AND 3D QCT

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Aims: Bone strength is dependent on its material strength, structural geometry, as well as bone mass. While areal bone mineral density (aBMD) correlates moderately with bone strength, it does not completely describe structural or material strength. Structural geometry reflects the quantity of bone mineral and its placement within the whole bone. In recent years, there has been increasing interest in assessing bone strength via structural geometry. This is normally performed using DXA, but more recently quantitative computed tomography (QCT) has been utilised. An important question is "how similar are the structural outcomes derived from QCT and planar DXA".
Methods: 241 females mean age 77.7 (SD: 5.1) years, height 158.9 (6.0) cm, weight 66.0 (11.0) kg and BMI of 26.1 (3.9) kgm^{-2} had both DXA and QCT structural geometry assessments at narrow neck (NN) of proximal femur. All subjects were scanned on a Philips Brilliance 64 slice CT (QCT) and Hologic Discovery A (DXA) scanner. QCT structural geometrical variables (width (W), cross-sectional bone area (CSA), section modulus (Z), cross-sectional moment of inertia (CSMI) and aBMD) derived from (QCT) BIT software (Mindways Software Inc., USA) were compared with corresponding outcomes from (DXA) APEX version 2.3 (Hologic Inc, USA).
Results: Mean differences between DXA and QCT values were CSA $0.69cm^2$, 26.2% (diff/DXA); Z $0.33cm^3$, 24.8%; CSMI $0.89cm^4$, 36.1% and aBMD $0.25gcm^{-2}$, 28.9%. QCT values were significantly lower due to calibration differences. QCT values for W were higher than for DXA (-0.03cm, -0.9%) due to edge detection differences. R^2 linear correlation between QCT and DXA W, CSA, Z, CSMI and aBMD were 0.22, 0.58, 0.48, 0.59 and 0.69 respectively.
Conclusions: Observed measurement differences and relatively poor measurement correlation may relate to inconsistencies in the size and placement of the DXA and QCT areas of interest.

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P189 - ASSOCIATION OF BMD OF SPINE WITH BMI AND RIGHT NSA IN OSTEOPOROSIS

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Aims: It has been shown that Bone mineral density (BMD) measured by dual-energy X-ray absorptiometry (DXA) is predictive factor for osteoporosis, but its association with age, BMI, other BMD measurement and femoral neck shaft angle (NSA) is also important. The aim of this study was to investigate association of BMD of spine with age, height, weight, BMI, BMD measurements of the left and right hip, left and right femoral neck, and, left and right femoral neck shaft angle (NSA).
Methods: This retrospective, randomized study included 100 patients (93 patients or 90.3% were women and 7 or 6.7% men), average age 65.15±8.5 years, range of 44 to 87.3 years with diagnosis of osteoporosis. DXA measurement was performed on Advanced Prodigy Lunar device. Average value of BMI was 26.47±3.7 kg/m^2, BMD of spine 0.83±0.13 g/cm^2, BMD of left hip 0.79±0.11 g/cm^2, BMD of right hip 0.79±0.12 g/cm^2, BMD of left femoral neck 0.75±0.01 g/cm^2, BMD of right femoral neck was 0.77±0.1g/cm^2, left NSA 121.83° and right NSA 121.81°. 9 or 11.7 of patients were underwent to hip arthroplasty because of fracture of one of the hips. Linear regression was used to investigate association BMD of spine as dependent variable and age, height, weight, BMI, BMD of left and right hip, left and right femoral neck and left and right NSA as independent variables.
Results: Results of the linear regression showed that dependent variable (BMD of spine) was statistically significantly associated with predictors ($F=8{,}011$, $p<0.001$). BMD of spine was significantly associated with BMI ($t=3{,}494$, $p<0.001$) and right NSA ($t=2.54$, $p<0.05$), but was not with age, BMD of right and left hip, BMD of right and left femoral neck and left NSA
Conclusions: BMD of spine is important determinant of the clinical evaluation of osteoporosis. A lower BMD of spine was associated with lower BMI and lower right NSA in our study. These results can help in analyzing of results of DXA measurement in patients with osteoporosis.
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Disclosure of Interest: None Declared

P190 - COEFFICIENT OF BODY WEIGHT/BMC CORRELATES WITH THE RISK OF VERTEBRAL FRACTURE BETTER THAN BMD AND BMC IN PATIENTS WITH OSTEOPOROSIS

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Aims: The aim is see whether the use of body weight or BMI in combination with BMD or BMC could increase the reliability of predictions of the risk of vertebral fracture.
Methods: Measurement of body height and body weight, an x- ray of spine and a densitometry of BMD and T-score evaluation in L1-L4 segment and the hip was done. We investigated the correlation of age, height, weight, BMI, BMD, BMC, BMI/BMD, body weight/BMD, body weight/BMC and the frequency of vertebral fracture.
Results: A statistical evaluation using the t-test method showed the correlation of all parameters examined with vertebral fracture, apart from BMI and body weight. The most significant correlation with the vertebral fracture was shown by age (p=0,0000006) and body weight and BMC ratio (p=0,000026), while BMD and BMC have shown a significant, but weaker correlation with fractures (p=0,0014 and 0,00034). Body weight and BMC coefficient with cut-off value of 1.4 (kg/g/cm) had a 65.71%, sensitivity and 61,73% specificity and a positive predictive value of 0,1805 in predicting the occurrence of compressive vertebral fracture in patients with osteoporosis.
Conclusions: Using the body weight/BMC coefficient increases the reliability of predicting of vertebral fracture in female patients with osteoporosis.

Disclosure of Interest: None Declared

P191 - FAST AND SLOW BONE LOSS IN WOMEN: A LONGITUDINAL STUDY

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Aims: The aim of the present study was to explore which individuals have "fast" and which have "slow" rate of bone loss.
Methods: 130 women (22-75yrs old) visiting a public dental office participated in this 5-yrs prospective study. They underwent a DXA examination of the distal forearm twice five yrs apart. The mandibular coarseness of trabeculation was assessed on periapical dental radiographs as dense, alternating dense and sparse, and sparse trabeculation.
Results: Women with dense trabeculation had significantly higher BMD than women with alternating dense and sparse trabeculation, and the latter had significantly higher BMD than those with sparse trabeculation ($p<0.001$). Mean bone loss in premenopausal women was 1.5%±4.98% (n=74), and mean bone loss in postmenopausal women was 3.2%±5.6% (n=56). The difference was highly significant ($p<0.001$). In both pre-menopausal and postmenopausal women bone loss was largest in those women who had a dense trabeculation in the mandible and least in those with alternating dense and sparse trabeculation ($p<0.05$).
Conclusions: Though the highest BMD was found in women with mandibular dense trabeculation, the largest bone loss was also found in this group, probably because dense trabecular bone has the largest bone surface and consequently most bone cells.

Disclosure of Interest: None Declared

P192 - BONE MINERAL DENSITY MEASUREMENTS ARE NOT AFFECTED BY WEIGTH LOSS – A CASE STUDY

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Aims: Weight loss and variation of soft tissue composition has been suggested to affect bone mineral density (BMD) values determined with the dual energy X-ray absorption (DXA), and even mislead prospective studies due to imperfect soft tissue correction technique[1-5]. The aim of the present study was to investigate the influence of significant weight loss on BMD measurements at the spine (L_2-L_4) and proximal femur.
Methods: A 27 year old male bodybuilder volunteered for the investigation. During a 21 week follow up the bodybuilder had a special diet in order to reduce body fat content with minimal loss of lean tissue. The weight was measured every week in the morning with a digital scale. Total relative body fat (%), lean mass (kg), fat mass (kg) and trunk body fat (%) were determined with DXA (Lunar Prodigy, GE Medical, Wessling, Germany), every three weeks. Areal bone mineral density was determined from the lumbar spine (L_2-L_4) and proximal femur with DXA every three weeks. In addition, cortical and trabecular bone volumetric mineral density (vBMD) values were determined with peripheral quantitative computed tomography (pQCT, Stratec XCT 2000, Pforzheim, Germany) from the left tibia.
Results: During the 21 week diet the body weight reduced linearly from 91.6 kg to 75.1 kg (r^2=0.99, n=22). Total body and trunk fat (%) decreased from 21.5% to 4.7% and from 27.4% to 4.0%, respectively. Total body fat mass decreased from 20.0 kg to 3.7 kg. Femur and spinal areal BMD and vBMD values from tibia were not affected by the weight loss, or by reduced fat content of abdomen region or total body ($p > 0.05$). Standard deviation of the femur and spinal BMD measurements during the weight loss was 0.78% and 1.97%, respectively.
Conclusions: Significant changes in the amount and composition of soft tissue did not affect the areal BMD values. The present results indicate that DXA measurements suffered only minimally from the variation in soft tissue amount and composition during the weight loss. However, the bodybuilder is not a typical clinical patient suffering from low bone density (BMD of lumbar

spine=1.57±0.03 g/cm^2). In osteoporotic patient, the effect of soft tissue composition on DXA measurements may be more significant[3-5].

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Disclosure of Interest: None Declared

P193 - ADULT CYSTIC FIBROSIS PATIENTS WITH A LOW BMI ARE AT RISK FOR IMPAIRED BONE QUALITY

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Aims: With increasing life span osteoporosis becomes a more recognized problem in patients with cystic fibrosis (CF). Quantitative ultrasound (QUS) is a recently developed technique to assess the bone quality and the risk for postmenopausal osteoporosis. Experience with this technique in adult CF patients is limited, despite its many advantages, such as low cost and absence of irradiation. We hypothesized that male CF patients and especially those with a lower body mass index (BMI) are at higher risk for a lower bone quality as assessed by the speed of sound (SOS) than patients with a normal BMI. To evaluate whether SOS is comparable between adult CF females and males and whether associations exits between radial SOS measurements and anthropometric variables.
Methods: In 60 adult CF patients (35 males and 25 females), aged between 18,1 to 52,9 (median 26,0), without any other significant disease influencing bone mineralization and not at an end-stage of their disease, QUS examination (Omnisense 7000, Sunlight Medical Ltd, Tel-Aviv, Israel) of the distal radius of the non-dominant arm was performed. SOS was expressed as Z-score for age, using the manufacturer's provided reference values. BMI Z-score for age was calculated using a national working population reference.
Results: Mean (SD) SOS was 4051±100m/s (95% confidence interval (CI): 4025 to 4076m/s), while mean Z-score for SOS was -0,32±0,76 (95% CI: -0,52 to -0,12). Only one male and none of the female patients had a Z-score below -2. There was no significant gender difference in Z-score. No significant correlation between SOS Z-score and age was found. Mean absolute BMI was 20,48±2,22 kg/m² (95% CI: 19,90 to 21,05), while BMI Z-score was -0,87±0,71 (95% CI: - 1,06 to -0,69). The SOS Z-score was positively correlated with BMI Z-score (r=0,403; p=0,0014), both in females (r=0,460; p=0,02) and in males (r=0,376; p=0,03).
Conclusions: In CF adults, both in females and males, nutritional status has an influence on radial QUS results. The value of radial QUS in predicting fractures in this population at risk needs further study.

Disclosure of Interest: None Declared

P194 - FOREARM ENDOTHELIAL FUNCTION AND BONE MINERAL LOSS IN POSTMENOPAUSAL WOMEN

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Aims: Recent research suggests that bone loss and cardiovascular disease are functionally interwoven. Endothelial dysfunction is thought to be one of the initial stages in the development of atherosclerosis. We investigated the relationship between forearm endothelial function and bone mass in the hip and the lumbar spine in postmenopausal women.
Methods: We studied the forearm resistance artery endothelial function in 113 women: 38 postmenopausal women with normal bone mineral density (BMD) and 75 osteoporotic postmenopausal women. Forearm blood flow during three subcutaneous injections of acetylcholine (dependant endothelium response: DER) and after hyperthermia induction (non dependant endothelium response: NDER) was measured by strain-gauge plethysmography. BMD of the hip and lumbar spine (L2–L4) was measured by dual-energy X-ray absorptiometry.
Results: Age and years since menopause were significantly greater in the osteoporosis group than in the normal BMD group (both $p<0.0001$). The body mass index (BMI) was significantly lower in the osteoporosis group than in the normal BMD group ($p<0.001$). After adjusting for age, BMI and years since menopause, women with osteoporosis at spine had significantly lesser DER than those with normal spine BMD ($p<0.001$). The univariate linear regression analysis revealed that DER was significantly positively correlated with BMD at the spine and hip ($r=0.43$, $p<0.001$ and $r=0.33$, $p<0.001$ respectively), but showed no significant association with other clinical variables. In multivariate regression analysis, the DER was significantly positively correlated with only spine BMD ($p<0.01$), but not with other variables.
Conclusions: The present findings suggest that postmenopausal women with low spine BMD, especially those with osteoporosis, have impaired endothelial function in the forearm resistance arteries.

Disclosure of Interest: None Declared

P195 - LOW BONE MINERAL DENSITY IN THE SPINE AS A MARKER OF ADVANCED ATHEROSCLEROSIS IN POSTMENOPAUSAL WOMEN

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Aims: Previous studies indicate that low bone mineral density (BMD) in the spine is a useful predictor of cardiovascular mortality among the elderly. The objective of this study was to investigate whether low spine BMD is directly associated with the severity of atherosclerosis.
Methods: The per-protocol population consisted of 113 postmenopausal women aged 50-80 years. Study variables were aortic

calcification (AC) graded on lateral lumbar radiographs; BMD at various anatomic sites (lumbar spine, proximal femur) measured by DXA, information on various risk factors, and medical history.
Results: After adjustment for age, BMD at spine, but not at the proximal femur, showed statistically significant association with the severity of AC (P=0.012)**.** Age, years since menopause, BMI and weekly fitness activity were significant common risk factors (all P<0.05) with contrasting influence on AC and hip BMD. In a multiple regression model, AC contributed significantly and independently to the variation in spine BMD (β=-0.10, P=0.014). More else, after adjustment for age, fracture at the lumbar spine, but neither at the proximal femur nor at the wrist, showed statistically significant association with the severity of AC (P=0.02)**.**
Conclusions: Severe osteoporosis in the spine may indicate advanced atherosclerosis and thereby an increased risk for not only vertebral fractures but also for coronary heart disease. The results further emphasize that osteoporosis in the spine and peripheral vascular diseases are linked by common risk factors and pathomechanisms.

Disclosure of Interest: None Declared

P196 - THE RELATIONSHIP BETWEEN OBESITY AND OSTEOPOROTIC FRACTURES IN A GROUP OF TUNISIAN POSTMEOPAUSAL WOMEN

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Aims: Osteoporosis represents a major public health problem through its association with fragility fractures. There are several risk factors implicated in the genesis of osteoporosis. A body mass index (BMI) weak is one of these factors. The aim of our work is to investigate the impact of BMI on bone mineral density (BMD) in postmenopausal women.
Methods: 1000 patients from central Tunisia were referred to our Center for DXA scan from December 2006 to October 2009. BMD was measured on the hip and lumbar spine using X- ray absorptiometry (DXA). All patients were interviewed by physicians.
Results: It is 1000 postmenopausal women, divided into 3 groups, group 1 (obese with BMI> 30 kg/m2, n=505), group 2 (underweight with BMI <19 kg/m2, n=11) and group 3 (BMI between 19 and 30 kg/m2, n=482) The mean age of our patients is 62.6 years, 67.8 and 63.3 years respectively in the three groups 1, 2 and 3 (p=0, 2). The mean weight was 80,7 Kg, 42,7 Kg and 62,7Kg ($p<10^{-3}$) and mean BMI was 34,78 Kg/m^2 and 17,92 Kg/m^2 and 26,58Kg/m^2 (p <10-3) in the three groups 1, 2 and 3. Family history of fractures were found in 8.9%, 9% and 12.44% (p=0.194). The fracture risk is lower in obese women, personal history of fracture are rated 23.9%, 36.3% and 35.26 (p=0, 0003) in groups 1, 2 and 3. Osteoporosis was noted in 36.8% in group 1; 81.8% in group 2 and 59.12% in group 3 ($p <10^{-3}$). Osteopenia was found in 43.36%, 9% and 32.78% and a normal BMD in 0.2%, 9% and 8.09% ($p <10^{-3}$) respectively in the three groups 1, 2 and 3.
Conclusions: Our study shows the high prevalence of obesity in postmenopausal women and its protective effect in osteoporosis. Obese postmenopausal women have lower risk of fractures. There is a significant difference between the incidence of osteoporosis in postmenopausal women compared with obese women and normal BMI.

Disclosure of Interest: None Declared

P197 - RETROSPECTIVE STUDY ON THE STATISTICAL ASSOCIATION BETWEEN OSTEOPOROSIS AND BODY MASS INDEX (BMI) IN WOMEN

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Aims: Osteoporosis is highly prevalent in India. An estimated 61 million people in India are reported to be affected by it. Recent data indicate that Indians have lower bone density than their North American and European counterparts. Data obtained by other Indian investigators showed that BMD values in our population were approximately 15% lower than those in Caucasian women. Our aim was to determine the statistical association between Body Mass Index (BMI) and osteoporosis in women; If existing, the strength of the association.
Methods: Data was collected from 564 patient files obtained from the Kasturba Hospital Osteoporosis Registry. A case control study was carried out. Cases included those with Bone Mineral Density (BMD) 2.5 or more standard deviation below the peak bone mass (T-score). BMD was measured using Ultrasound based technique (Sunlight Omnisense 7000, right distal radius). Controls were those with normal BMD.
Results:

	Cases (with osteoporosis)	Controls (without osteoporosis)
Low BMI (BMI below 18.5 kg/m2)	30	17
Normal BMI (BMI between 18.5 kg/m2 to 25.5 kg/m2)	168	157
High BMI (BMI above 25.5 kg/m2)	142	50
Total	340	224

In the Osteoporotic group, 8.8% had a low BMI and 41.8% had a high BMI & in the non osteoporotic group 7.6% had a low BMI and 22.3± had a high BMI.

Conclusions: Although there seems to be an inverse relationship between BMI and incidence of osteoporosis, the results suggest that BMI cannot be used as the only factor to predict the incidence of osteoporosis. Other clinical risk factors need to be taken into consideration. Having a high BMI cannot be said to be protective against osteoporosis.

References: 1. Kofi A al, J Women's Health. November 2006; 2. Morin S et al., Osteoporos Int, March 2009; 3. Van Der Voort DJM Osteoporos Int, 2000.

Disclosure of Interest: None Declared

P198 - CHARACTERIZATION OF THE CLINICAL ASSESSMENT AND MANAGEMENT OF VITAMIN D LEVELS IN CANADIAN OSTEOPOROSIS PATIENTS THROUGH A CHART REVIEW INITIATIVE

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Aims: The aim of this chart review initiative was to gain a better understanding of how vitamin D levels are assessed and managed in Canadian osteoporosis patients.
Methods: Using either a secure online tool or paper forms, specialists and primary care practitioners from the Canadian provinces of Ontario and Quebec completed a practice profile questionnaire, as well as profiles for each of approximately 20 patients in their practice who were being treated to prevent fractures and whom they had last seen between November 2008 and April 2009. Information collected included demographic data, bone mineral density and other fracture risk factor information, availability and level of serum vitamin D measurements, and information on current osteoporosis medications and calcium and vitamin D supplementation. Participants were also asked to evaluate patients' current regimens and detail any proposed changes, if applicable.
Results: Invitations to take part in this initiative were sent by fax and e-mail to 161 specialists (101 from Ontario and 60 from Quebec) and 567 primary care practitioners (367 from Ontario and 200 from Quebec). Overall, 9.9% of specialists and 6.3% of primary care practitioners agreed to participate in the initiative, for a total of 52 participants. Most participants (63.5%) had more than 10 office visits by patients with osteoporosis per week. Approximately half the participants (48.1%) opted to complete the questionnaires online, rather than on paper. The participants completed an average of 18.9 patient profiles each and information was collected on 983 patients with osteoporosis.
Conclusions: The data collected through this chart review initiative will provide a snapshot of current Canadian clinical practice in terms of vitamin D assessment and management in osteoporosis.
Acknowledgement: This initiative was made possible through the support of Merck Frosst Canada Ltd.

Disclosure of Interest: J. Adachi Consultant / Speaker's bureau / Advisory activities with: Amgen, AstraZeneca, Bristol-Myers Squibb, Eli Lilly, GSK, Merck, Novartis, Nycomed, Pfizer, Proctor & Gamble, Roche, sanofi-aventis, Servier, Wyeth, Other: Clinical trials: Amgen, Bristol-Myers Squibb, Eli Lilly, GSK, Merck, Novartis, Pfizer, Proctor & Gamble, sanofi-aventis, Wyeth, J. Brown Consultant / Speaker's bureau / Advisory activities with: Various companies

P199 - EFFECT OF 2 DIFFERENT DOSES OF ORAL VITAMIN D ON 25 (OH) VITAMIN D LEVELS IN APPARENTLY HEALTHY POSTMENOPAUSAL INDIAN WOMEN

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Aims: To study the effect of 2 different doses of oral vitamin D on 25 (OH) vitamin D levels in apparently healthy postmenopausal Indian women.
Methods: This non blinded study was conducted at Indraprastha Apollo Hospitals, New Delhi. 92 otherwise healthy postmenopausal women (mean age 56 yrs) were enrolled. Serum calcium (and albumin), phosphorus, alkaline phosphate, and 25(OH)D were measured at induction. The subjects were randomly assigned to one of the three groups according to the supplementation given. Group A (n=31) received 1000 mg of calcium carbonate and 500 IU of vitamin D, group B (n=31) received 1000 mg of calcium carbonate and 1000 IU of vitamin D, and group C (n=30) served as control who received only calcium carbonate 1000 mg daily without any vitamin D for 3 months. The subjects were followed up telephonically at frequent intervals to ensure compliance, and the tests were repeated 3 months after initiation of supplementation. Data for 67 subjects who presented at the end of 3 months was used for analysis.
Results: The mean corrected serum calcium (mg/dl) at baseline was 8.43±0.62 and serum 25(OH)D (ng/ml) was 12.97±9.17. The mean±SD of 25 (OH) D in groups A, B and C were 12.46±8.76, 14.94±12.37 and 11.90±6.11 respectively at baseline and 13.34±9.52, 23.71±11.71 and 8.07±5.28 respectively at 3 months. The percentage change in 25(OH)D levels in the control group was -30.53±5.27, in group A was 8.93±19.72 and in group B was 97.79±53.26. The percentage change in the three groups was significantly different (p-value .000) maximum being in group B. The percentage change in corrected serum calcium was not significantly different in the three groups (p-value .786).
Conclusions: 1. Vitamin D deficiency was common in the population studied, consistent with the prevalent vitamin D deficiency in India.

2. Standard dose of vitamin D available in calcium tablets (250 IU per 500 mg calcium carbonate) is not adequate for achieving optimum 25(OH)D levels. Higher dose of vitamin D supplementation with 1000 IU/day (500 IU per 500 mg calcium carbonate) daily was superior to the standard dose therapy and resulted in 25(OH)D values > 20 ng/ml in postmenopausal women in our study. For achievement of optimum 25(OH)D levels (>30ng/ml), still higher doses of vitamin D are likely to be required.

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P200 - RISK FACTORS FOR OSTEOPOROSIS LINKED TO HYPERCALCIURIA IN MEXICAN WOMEN WITH LOW BONE MINERAL DENSITY

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Aims: Identify the risk factors for osteoporosis that cause hypercalciuria in Mexican women of 35 to 55 years old with bone mineral density low (LBMD).
Methods: Comparative and cross-sectional descriptive study of 196 Mexican women with LBMD from a total sample of 816, selected according to the WHO criteria for DXA. Hypercalciuria was determined by the Ca/Cr coefficient (> 0.16 mg/dl, with calcium and creatinine in matinal urine collection during for two hours). Included family history, gynecological factors, risk of osteoporosis (IOF), anthropometric measurements (weight, height, IMC, waist/hip coefficient) and lifestyle (cigarette, alcohol, cigars, caffeine, physical activity). The population in study was divided in two groups: Normocalciuria and Hypercalciuria.
Results: 37% were Hypercalciuric, the tendency was higher in women with menopause (P=0.06). The variables with significant negative correlation regarding calciuria were: DMO (r=-0.221, p=0.002); exercise (r=-0.146, p=0.042). Cigars consumption was a positive and statistically significant association (r=0.145, p=0.042), one cigarette plus per day increases calciuria by 0.007(g/cm^2). Finally the high cardiovascular risk (> 0.80), was 1.88 (CI95% 1.003-3.515) and history of previous fracture was 3.51 (CI 95% 1.205-8.058) greater in hypercalciuric women.
Conclusions: Smoking, high cardiovascular risk and previous fracture are risk factors for hypercalciuria in 35 to 55 year old Mexican women with LBMD.
Acknowledgement: Consejo Nacional de Ciencia y Tecnología

Disclosure of Interest: None Declared

P201 - BODY COMPOSITION AND 5Y INCIDENCE OF OSTEOPOROSIS IN CHILEAN ELDERS

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Aims: To study the risk of osteoporosis and its association with nutritional status and body composition in community-living Chilean elders.
Methods: Follow up of the Santiago SABE survey done in 2000 in 1202 subjects aged 60 and older residing in Santiago Chile. At baseline home interviews including history of chronic diseases, self reported disability/functional limitations, physical performance, anthropometry, dynamometry and blood pressure were done. All the available people free of self reported osteoporosis or hip, wrist or spine fractures in 2000 were evaluated in 2005 to determine the RR of having osteopenia/osteoporosis. 390 subjects, 135 men, mean age 73.9(DS 6.3)y and 255 women, mean age 74.3 (DS 6.7)y, underwent DXA scan, biochemical exams, vitamin D levels, dynamometry and complete anthropometry. WHO standards for BMI classified people in normal (21.8%), overweight (44.9%) and obese (33.3%). WHO standards for Bone Mineral Density (BMD) classified them in normal, osteopenia and osteoporosis. Being under p25 of baseline value was defined as low dynamometry.
Results: The 5y risk for osteoporosis was 35.6± for women and 11.8% for men. Osteoporosis was lower in the obese (14%) than in the normal nutritional status (41.4%) Baseline BMI and dynamometry were inversely associated with 5y BMD (p<0.01). Bone mass was highly correlated with lean mass (men r=0.60, women r=0.54), fat mass (men r=0.34 women r=0.63) and dynamometry (men r=0.37, women r=0.38) but not with plasma vit D. After logistic regression adjustment the RR of having osteoporosis was inversely associated with lean body mass (RR= 0.99 95%CI 0.998-0.999, p=0.013), and low dynamometry (RR:4.69; 95%IC:1.28-17.28) but not with fat mass neither vit D plasma levels. Being male was slightly protective (RR:0.32; 95%IC:0.92, 1.09, p=0.068)
Conclusions: The results confirm that obesity is an independent protector factor for osteoporosis in the elderly, This is probably related to the amount and quality of muscle mass with excess weight but high values of lean mass and handgrip strength in contrast to the "sarcopenic obesity" described by the literature.
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Disclosure of Interest: None Declared

P202 - AGE AT NATURAL MENOPAUSE AND MENOPAUSAL SYMPTOMS AMONG SAUDI ARABIAN WOMEN IN AL-KHOBAR

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Aims: The aims of the study are (1) to assess the mean and median age at natural menopause;(2) to detect factors that might contribute significantly to a more rapid decline to ovarian function;(3) to determine the factors that significantly affect the prevalence of menopausal symptoms that Saudi Women's experience; and (4) to assess the relationship between women's perceptions and attitudes toward the menopausal event.
Methods: The research is a cross-sectional analysis that is based on a confidential survey that distributed randomly across women whose median age is between 40-55 years. The empirical data was collected based on a face-to-face administrated questionnaire, and its focus on the participant's health, reproduction history, menopausal symptoms frequencies, and daily life style. Anthropometrics measures have been taken on each participant. Age at menopause was estimated from responses to the question "have you had a menstrual period in the last 12 months? " Women were asked which symptoms had been experienced "recently" that were unusual or discomforting
Results: age at natural menopause varied within and among the menopausal factors (anthropometric measures, sociodemo-

graphic status, reproductive history, and life style); the only factors that were significantly associated with age at natural menopause were women's weight, marital status, and employment status. The finding also indicated that the respondent's martial status and number of children were significantly associated with the prevalence of menopausal symptoms .Women's attitudes toward menopause varied based on their menstrual status and ethnicity. And there was a significant association between the respondents' total menopausal symptoms reported and their attitudes toward the menopausal event and the women's educational level.
Conclusions: As the previous conducted researches on menopausal factors and symptoms cross-culture, this study is consistent with their finding and statement that menopause is a complex event that portrays the interaction between multi-factors and these factors are varied depending on their vitality between population.

Disclosure of Interest: None Declared

P203 - ARE HIP FRACTURES MORE COMMON IN THE LESS EDUCATED?

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Aims: The relation between education and bone health is not clear (1). We have previously reported a positive association between level of education and distal forearm BMD in women (2). The aim of this study was to examine the association between education and hip fracture.
Methods: The population based Oslo Health Study (HUBRO) was carried out in 2000-2001 – and 18,770 (46%) attended. In the current study we have included men and women born in 1924-25 (75/76 years, n=3252) and 1940-41 (59/60 years, n=3887). Years of education were assessed by questionnaire. Hip fractures were identified in the participants by linkage to the hospitals' electronic patient administrative systems for the period 2000-2007 by the unique personal identification code, and a total of 229 hip fractures were identified in the follow-up period. Data were analysed by logistic regression in age specific groups, and gender and body mass index were adjusted for.
Results: Persons 59/60 years at baseline with more than 12 years of education had an OR of hip fracture of 0.44 (95% CI 0.20-0.98) compared to those with less education. In the same age group the OR of hip fracture per year education obtained was 0.91 (95% CI 0.82-1.00). In persons 75/76 years at baseline there was no association between education and hip fracture.
Conclusions: A relation between education and hip fracture was found in persons aged 59/60 years but not in older persons.
References: (1) Brennan SL et al, Osteoporos Int 2009;20:1487; (2) Alver K. Meyer HE, Søgaard AJ, Osteoporos Int 2007;18(S3): S290.

Disclosure of Interest: None Declared

P204 - DETERMINING FACTORS AFFECTING BONE MINERAL DENSITY IN MEXICAN PEOPLE LIVING IN QUERETARO

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Aims: The objective of this study was to elucidate the factors related to the bone mineral density (BMD) of Mexican men and women.
Methods: This cross-sectional study was carried out in urban and peri-urban area of the city of Queretaro, which is located to in central Mexico, to the northwest of Mexico City. A total of 358 women and 114 men with ages between 40 and 80 years were recruited in the study. Data collected included age, weight, height, body mass index (BMI), clinical history, physical activity and life style. Dual absorptiometry X-rays was conducted in whole body, as well in both lumbar and femoral regions as well in order to diagnose osteoporosis and osteopenia.
Results: Mean age was 52.8±9.3 years, with no significant differences by sex (52.6±9.5 for women and 53.5±8.6 y for men). No significant differences were also observed for the BMI of the participants. Average BMD was statistically higher in men than women ($P<0.0001$), 1.03±0.01 g/cm^2 vs. 1.1±0.02 g/cm^2, respectively. Prevalence of osteoporosis in femur was 2%, but in column increased up to 15%. Osteopenia in femur affects to 18% of the participants and to 41% of the participants if lumbar area was considered for diagnoses. Osteopenia was observed in women at the early age of 40 years. On the other hand, osteoporosis was presented at aged of 50 years. Lumbar vertebrae that were mostly affected were L3 and L4, with a mean T-score value of -1.3 and -1.4, respectively. The risk of hip fracture in men was 15% and in women was 23%. In addition 62% of women presented risk of fracture in column and 44% of the men. Age and practice of exercise were inversely associated to BMD ($P<0.0001$). In contrast, BMI was directly associated to BMD in both women and men. Menopause was the main factor contributing BMD losses (0.963±0.11 vs. 0.901±0.13 g/cm2). Only in men, time of sun exposition was positive correlated to total BMD.
Conclusions: Prevalence of osteoporosis and osteopenia were higher in women than in men. Determining factors of BMD losses were observed due to sex differences.
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Disclosure of Interest: None Declared

P205 - THE ACTUAL SURVIVAL OF THE INITIAL HIP FRACTURE WITH AND WITHOUT SUBSEQUENT MAJOR BONE FRACTURES

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Aims: Survival of second hip fracture patients is worse than initial hip fracture patients. However, previous studies included in-hospital mortality. The actual survival of initial hip fracture patients with subsequent fracture as second hip or major long bone of extremity or vertebral body fracture by exclusion of in-hospital mortality patients have not been studied. We aim to study a comparison of actual survival between initial hip fracture patients with and without subsequent fracture in different types.
Methods: In 2000-2008, 1038 initial hip fracture patients were reviewed and divided into four groups. Group I, II, III, and IV were initial hip fracture patients with second hip, subsequent major long bone of extremity, vertebral body fracture, and without any subsequent fractures, respectively. Age, gender, mobility-status, co-morbidity, causes-of-death, and survival-years after hospitalization of last fracture treatment of each group were recorded.
Results: There were 34 (3.3%), 71 (6.8%), 160 (15.4%), and 773 (74.5%) subjects in group I, II, III, and IV respectively. At one-year and one-to-five year mortality of group I were 8.8% and 5.9%, group II were 5.6% and 1.4%, group III were 1.3% and 1.9%, and group IV were 4.7% and 1.4% respectively. Statistical analysis by using Chi-square test of one-year mortality and one-to-five year mortality rate showed no significant difference among four groups ($p>0.05$).
Conclusions: Actual survival of initial hip fracture patients with second hip or other subsequent fracture were not different from patients who have only one hip fracture.
References: 1. Berry SD, Samelson EJ, Hannan MT. Arch Intern Med 2007;167:1971. 2. Angthong C, Suntharapa T, Harnroongroj T. Acta Orthop Traumatol Turc 2009;43:193.

Disclosure of Interest: None Declared

P206 - REFERENCE VALUES FOR GRIP STRENGTH AND LEAN- AND BONE MASS OF THE DOMINANT ARM BY DXA AND THEIR CORRELATION IN MALES AGED 20-40 YEARS

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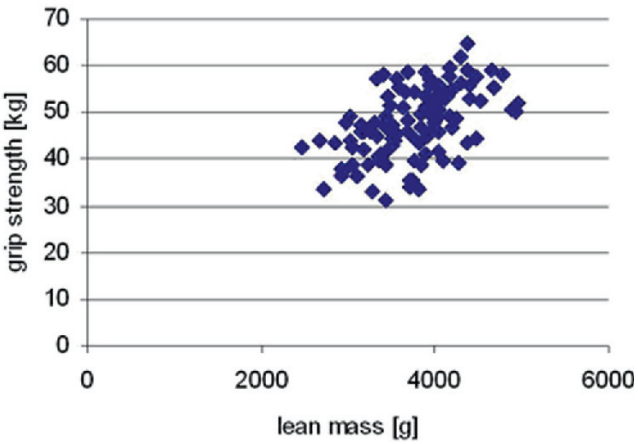
Aims: To collect reference data on grip strength, lean mass and bone mass of the dominant upper extremity and assess its correlation in young healthy males.
Methods: An age and sex stratified cross-sectional, population based epidemiological study was performed to receive reference values for several muscle and bone parameters. Here, we present data from 110 males aged 20 to 40 (mean 29.8) years. Hand grip (best out of three) of the dominant hand was measured using a Takai hand grip dynamometer. Lean mass and bone mass of the dominant hand were measured by DXA whole body composition (GE Lunar Prodigy Advance). Measurements were performed according to the manufacturer's manual. Mean values and standard deviation (SD) by age groups and Spearman correlation between parameters were assessed
Results: Table 1: max. grip strength, lean mass and bone mass of the dominant hand by age groups

Males	age 20-24 (n=21)	age 25-29 (n=29)	age 30-34 (n=31)	age 35-39 (n=29)
Max. grip [kg] (SD)	46,2 (± 7.4)	47,7 (± 6.1)	48,0 (± 7.5)	48,3 (± 8.2)
Lean mass [g] (SD)	3703 (±512)	3755(± 563)	3803 (±430)	3735 (±577)
Bone mass [g] (SD)	226 (±34)	232 (±38)	234 (±30)	241 (±38)

No significant differences for all three parameter were found between the age groups 20 to 40. Correlation coefficient by Spearman was 0.48 for grip strength vs. bone mass, 0.53 for grip strength vs. lean mass and 0.70 for lean mass vs. bone mass.



Conclusions: Grip strength, lean mass and bone mass of the dominant hand are not influenced by age between 20 and 40 years of age. Only moderate correlations were found between grip strength and bone and lean mass. Measurement of grip strength is only of limited use to estimate lean and bone mass of the arm in young healthy males.

Disclosure of Interest: None Declared

P207 - REFERENCE VALUES FOR GRIP STRENGTH AND LEAN- AND BONE MASS OF THE DOMINANT ARM BY DXA AND THEIR CORRELATION IN FEMALES AGED 20-40 YEARS

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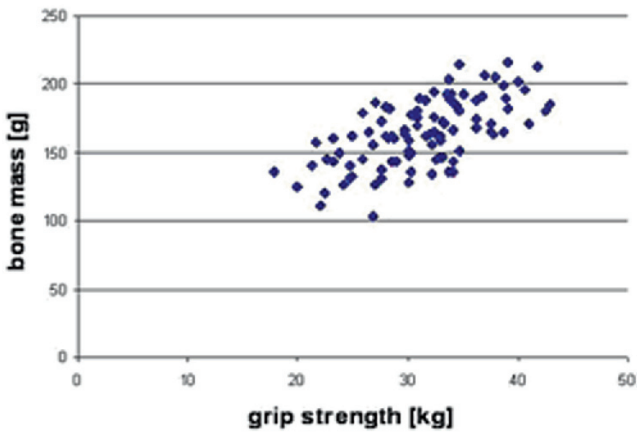
Aims: To collect reference data on grip strength, lean mass and bone mass of the dominant upper arm and to asses their correlations in young healthy females.

Methods: An age and sex stratified cross-sectional, population based epidemiological study was performed to receive reference values for several muscle and bone parameters. Here, we present data from 99 females aged 20 to 40 (mean 29.3) years. Hand grip (best out of three) of the dominant hand was measured using a Takai hand grip dynamometer. Lean mass and bone mass of the dominant arm were measured by DXA whole body composition (GE Lunar Prodigy Advance). Measurements were performed according to the manufacturer's manual. Mean values and standard deviation (SD) by age groups and Spearman correlation between parameters were assessed

Results: Table 1: max. grip strength, lean mass and bone mass of the dominant hand by age groups

Females	age 20-24 (n=21)	age 25-29 (n=28)	age 30-34 (n=28)	age 35-39 (n=22)
Max. grip [kg] (SD)	29,9(± 6.1)	31,6 (±4.8)	31,0 (±5.2)	32,7 (±5.6)
Lean mass [g] (SD)	2136 (±356)	2174 (±287)	2196 (±285)	2265 (±323)
Bone mass [g] (SD)	156 (±25)	167 (±21)	165 (±26)	170 (±22)

No significant differences for all three parameter were found between the four age groups. Correlation coefficient by Spearman was 0.65 for grip strength vs. bone mass, 0.72 for grip strength vs. lean mass and 0.82 for lean mass vs. bone mass.



Conclusions: Grip strength, lean mass and bone mass of the dominant arm are not influenced by age between 20 and 40 years of age. Good correlations were found between all three parameters, suggesting that measurement of grip strength is an easy to perform and cost effective parameter to estimate lean and bone mass of the arm.

Disclosure of Interest: None Declared

P208 - GENDER ISSUES AND THE HIV/AIDS EPIDEMIC: THE KUWAITI WOMEN EXPERIENCE

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Aims: In Kuwait in particular, the number of Kuwaities with HIV/AIDS is ignored. Little information concerning morbidity and mortality rates of this available, and the perception is, as in most Arab countries, that AIDS is an imported infection that comes mainly from foreigners. A statement issued by the Arabian Gulf University asserts, however, that the Middle East is no longer immune to HIV/AIDS, and health officials admit that they no longer can rely on closing drawbridges. The latest World Health Organization Report estimates that 70 percent of the cases in the Arab world are sexually transmitted through heterosexual contact. HIV/AIDS is a biological condition but is also a social, political, and a cultural problem. Explanations for the rapid increase and vulnerability to HIV/AIDS in women are a complex mix of biological, sociocultural, and economic related factors. The authors examine these recognized factors and use them as a conceptual framework in exploring Kuwaiti women's awareness, knowledge, and, to a certain extent, experience with HIV/AIDS. Results enlighten levels of understanding of HIV/AIDS among Kuwaiti women, and help in dismissing generalized perceptions and misconceptions of Kuwaiti women as detached from HIV/AIDS issues. Based on the results, designs of scientifically informed policies and development of programmatic gender sensitive strategies for education and prevention are offered.

Methods: A snowball sampling techniques was utilized and 360 women were interviewed. The authors used the method of interviewing to collect data that would provide examples to illustrate Kuwaiti women's diverse levels of awareness, perceptions, and of knowledge about HIV/AIDS. The data collection instrument was developed by the researchers and contained 18 qualitative open ended questions in an interview schedule..

Results: Quantitative and qualitative results would be included.

Conclusions: The Kuwait society is a conservative, religious society. Kuwaiti women's knowledge, perceptions, and awareness about HIV/AIDS were not as limited as expected by the researchers. However, Kuwaiti women still feel threaten by culture and tradition when addressing the issue, and cannot ask their partners to be tested for HIV.

Disclosure of Interest: None Declared

P209 - WHAT WAS YOUR FRAX™ THE DAY BEFORE YOUR HIP FRACTURE?

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Aims: FRAX™ is a new tool, to calculate the probability of osteoporotic fracture at 10 years combining bone mineral density (BMD) and clinical risk factors (CRF). A simplified version of FRAX™ is also available excluding BMD (FRAX™ BMI). Using the Lausanne cohort of inpatients, the aim of the study is to deter-

mine how many patients have had a normal FRAX™ value the day before their hip fracture.
Methods: We have calculated both FRAX™ BMI (F-BMI) and FRAX™ BMD (F-BMD) for all inpatients with new hip fracture between November 1st 2008 and December 1st 2009. Patients with specific treatment of osteoporosis prior the fracture were excluded. DXA measurements were performed within 5 days of the fracture. FRAX™ thresholds of 3% and 20% for hip (HF) and all major osteoporotic (OPF) fractures respectively were selected. The number of inpatients above and below these thresholds were compared each other.
Results: Taking into account the inclusion / exclusion criteria, we calculated FRAX™ BMI on 123 inpatients (95 women - mean age 80 yrs). We also calculated FRAX™ BMD in a subgroup of 47 inpatients (34 women, mean age 76 yrs). For the 123 inpatients, the mean F-BMI was 19.17% (0.5% - 76%) and 31.43% (4.8%>80%) for HF and OPF respectively. Ten were below both thresholds. For the 47 inpatients who has both F-BMI and F-BMD, the mean HF F-BMI and F-BMD values were 16.30% (0.5%>76%) and 10.3% (0.3%>80%) respectively, and the OPF F-BMI and F-BMD were 29.79% (4.8%>80%) and 23.8% (4.7%>81%) respectively. In this sub-group, 7 and 11 patients had HF F-BMI and F-BMD values <3% respectively whereas 16 and 23 had OPF F-BMI and F-BMD values <20% respectively. Only 3 (6%) of inpatients had both FRAX™ values less than the defined thresholds.
Conclusions: In our population, the mean age was high, and the result of the DXA better than other result observed in Switzerland. These two observations can probably explain why we have found a significantly difference between the two FRAX™ tools. In our population, only 6% of inpatients didn't have to be assessed by the combination of the two FRAX™ models (BMI and BMD) the day before their hip fracture. If we had calculated the FRAX™BMI alone, only 8% of inpatients would have not been detected by this tool. FRAX™ Switzerland is a new tool which still needs to be validated in clinical practice.

Disclosure of Interest: None Declared

P210 - VITAMIN D DEFICIENCY PREVALENCE IN THE RHEUMATOLOGY POPULATION: RESULTS OF A SYSTEMATIC SCREENING

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Aims: Vitamin D deficiency has a higher prevalence than previously assumed and is often not recognized. It is an important factor for bone metabolism and neuromuscular function. Its deficiency has also been associated with an increased incidence of other illnesses. Vitamin D deficiency is also related to non specific symptoms such as pain and fatigue. Supplementation with vitamin D is effective to lower the risk of fall and fracture.We aimed to evaluate the prevalence of vitamin D deficiency in a rheumatology outpatient clinic.
Methods: From the 1st to the 30th of November 2009, systematic dosing of 25-OH vitamin D level was proposed to the patients attending our rheumatology outpatient clinic. We classified the results in three groups: 1. Severe vitamin D deficiency: <10mcg/l. 2. Vitamin D deficiency: 10mcg/l to 30mcg/l. 3. Vitamin D sufficiency: >30mcg/l. Patients were asked about their calcium and vitamin D supplementation.
Results: 294 patients were screened (women 71%, mean age 53 y). 216 (74%) had an inflammatory rheumatologic disease, 49 (17%) were treated for osteoporosis and 29 (10%) had a diagnosis of degenerative rheumatism (mean age 50, 70, and 55 respectively). The majority was Caucasian (86%). Of the 291 patients, 20 (6.8%) had severe vitamin D deficiency, 224 (77%) deficiency and 47 (16.2%) normal results. In the group of patients suffering from inflammatory rheumatic diseases, the mean level of vitamin D was 20.8mcg/l (4.3-52.2) with severe deficiency in 8.8%, deficiency in 78.7% and normal levels in 12.5%. In the group of patients known and treated for osteoporosis, the mean level of vitamin D was 27.2mcg/l (1.5-51.4), with severe deficiency in 6%, deficiency in 57%, and normal levels in 37%. In the group of degenerative diseases, the mean level of vitamin D was 22mcg/l (12.1-40.8) with no severe deficiency, 76% deficiency and normal levels in 24%. 84/291 patients were on oral daily supplementation of calcium and vitamin D. 3 of them had severe deficiency, 53 deficiency and 29 normal results. 17/291 patients had already received a single dose of 300000 IU of 25-OH vitamin D in the last 6 months. 8 of them had deficiency and 9 normal results.
Conclusions: Vitamin D deficiency prevalence is extremely high in a population of rheumatology patients (84%) and under recognized. Only one third of patients on oral supplementation of calcium and vitamin D have normal value of vitamin D. It may be due to poor adherence or insufficient supplementation.

Disclosure of Interest: None Declared

P211 - SOCIAL DEPRIVATION: DOES IT INFLUENCE HIP FRACTURE CASE-FATALITY?

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Aims: To assess if the social deprivation index of the Mexican municipalities where ministry of health hospitals are located is associated to in-hospital hip fracture case-fatality
Methods: The 2004-2006 ministry of health hospital discharge databases were used to identify hospital discharges in persons aged 50 and older with any of the following ICD10 codes in primary or secondary diagnosis: S72.0, S72.1 and S72.2. A 2005 social deprivation index for Mexican municipalities was obtained from the Mexican National Population Council (CONAPO). This index considers population access to clean water and sewage disposal in the household as well as the type of materials used to build the households and the educational level of the population and the type of economic activities in which they are engaged

Results: During 2004-2006 there were 609 hip fracture hospital discharges ending in death in Mexico's Health Ministry Hospitals with 68% of them occurring in women. Women dying were older than men ($p<0.01$). 14.4% of those dying had pneumonia and 13.3% were diabetic. On a multivariate logistic regression model age, gender, hospitalization days and the social deprivation index used were independent predictors for mortality
Conclusions: Each additional year of life was found to increase mortality by 3%, whereas each additional day of hospital stay increased mortality by 1%. Additionally men showed a 23% higher mortality than women and hip fracture patients seen at health ministry hospitals located in municipalities with very high social deprivation had a 35% increase in their risk of dying compared to patients seen at hospitals located in municipalities with very low social deprivation. Pneumonia and Diabetes Mellitus were the most frequent co morbidities in patients dying from hip fracture during hospitalization.

Disclosure of Interest: None Declared

P212 - LOWER LIMB MUSCLE STRENGTH AND ITS RELATIONSHIP WITH FUNCTIONAL PERFORMANCE IN PATIENTS WITH KNEE OSTEOARTHRITIS

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Aims: To investigate the relationship between (reduced) lower limb muscle strength and objective and subjective functional performance in women with knee osteoarthritis (KOA).
Methods: Isometric muscle strength around hip, knee and ankle joint and isokinetic muscle strength around the knee were measured on an isokinetic dynamometer in 25 women with symptomatic KOA and 33 women of similar age, length, body weight and body mass index with asymptomatic and clinically normal knees. Objective functional performance was assessed by a Stair Climbing Test (SCT) and a Timed Up and Go test (TUG). Subjective functional performance was assessed by the Knee Injury and Osteoarthritis Outcome Score (KOOS), namely the subscores Activities of Daily Living, Sport and Recreation Function and Knee-related Quality of Life. Pain was assessed by the KOOS subscore pain.
Results: Patients with symptomatic KOA had significant weaker muscle strength (adjusted for body weight) of quadriceps ($p<0.0004$), hamstrings ($p<0.003$) and ankle evertors ($p=0.007$) as well as significant lower objective and subjective functional performance ($p<0.011$) compared to controls. Within the symptomatic KOA group, objective functional performance was significantly correlated with strength of most lower limb muscles ($p<0.05$), except for hip abduction with SCT and for ankle plantar flexion with TUG. In contrast, no correlations were found between subjective functional performance and lower limb muscle strength. Subjective functional performance was significantly correlated with pain ($p<0.05$) whereas objective functional performance and lower limb muscle strength were not ($p>0.05$).
Conclusions: Women with symptomatic KOA have lower strength of knee flexors and extensors compared to controls, but no strength impairments were noticed around hip and ankle (except for ankle evertors). Both objective and subjective functional performance were impaired. Results indicate that lower limb muscle strength has a significant role in the reduction of objective functional performance, whereas it is pain that is associated with the decrease in subjective functional performance. The results indicate that interventions that target strengthening of knee muscles are warranted to improve functional performance of patients with knee OA. Controlling the pain of the subjects however is important as pain determines their activity level and quality of life more than the impaired strength.

Disclosure of Interest: None Declared

P213 - FACTORS OF RISK ASSOCIATED TO OSTEOPENIA AND OSTEOPOROSIS IN SPANISH POSTMENOPAUSAL WOMEN

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Aims: To analyse the prevalence factors of risk, in greater women of 45 years and menopauses, and to correlate it with BMD diagnostic of osteopenia or osteoporosis (according to the WHO), with the purpose of improving the possible suitable medical intervention.
Methods: 5476 women have studied who have gone to consultations of menopause of sanitary centres public who reunited the requirements. She has been put under a questionnaire that contains, among other parameters, questions on the existence or not of risk factors (18 possible factors of risk) and to which them densitometries DXA has practiced.
Results: The patients have an average of age of 63.0 years (rank of age of 45-86) and OF 6.9; We were with 2714 (50%) osteopenia and 2614 (48%) osteoporosis's ones. Between the osteopenia were 3 or more factors of risk (medium) and equal number between the osteoporosis. The prevalence's factors were: BMI<20 in 18,68±; fractures previous in a 18,26%; sedentarisme in a 30,05%, familiar previous osteoporosis in 12.4± and steroid consumption and inmunosupressors in 9.7%; but also in 20.84% of them without risks factors.
Conclusions: It is important to value data of factors of risk at the time of taking determinations on the intervention to follow in these patients with these bony pathologies, but in a number of patients they had a loss of bone mineral density without these risks factors.

Disclosure of Interest: None Declared

P214 - AN ASSESSMENT OF THE BONE MASS INDEX IN PROFESSIONAL CYCLISTS

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Aims: Is aimed at determining the rate of bone mass in professional cyclists and the sport influence on the bone mineral structure
Methods: The study was conducted in 27 professional cyclists of high competition in road route an average of 60.000 Km per year in training and competition and have the covered the Tour de France, Giri d'Italia and Tour of Spain in the season. The average age is 26.92+- 3.2 years, mean weight 71.6 DS 5.4, average size 181.1 Ds 6.5 body surface 1.9 m2 DS 0.1, VO2 ml/min 81 DS 0.5, fat percentage 9.55±. There have been hip and spine densitometry with a Norland T-46 densitometer.
Results: Was found 1.87% of osteoporosis and a 7.40± osteopenia. Was not detected any cases of osteoporosis in the hip although a 1.85± of osteopenia, locates primarily in the femoral neck, being virtually nonexistent in trochanter and ward's triangle. The 33.3± of cyclists have tested values of T-score less than -1 in locations in the lumbar spine L2L4, while 29.6± also have T- scores bellow -1 in femoral neck, which are normal values both un the trochanter and in ward's triangle.
Conclusions: Compared with control groups of the same age, professional cyclists studied show increased bone loss. It is possible that the especial characteristics of cycling, without charge against the land compared to the other sports such as athletics can directly influence in the rate of body mass. It is curious that 30% of cyclists studied with T-scores bellow -1 at locations in femoral neck or lumbar spine. Unfortunately the number (n) of cyclists in study should be expanded, because we have obtained similar results for three seasons followed from different teams of high competition. Could it be that specifies biomechanics of cycling may have some influence on this decrease in bone mass that we are now looking at other sports.

Disclosure of Interest: None Declared

P215 - INDEX OF BONE MASS IN MENOPAUSAL PATIENTS ACTIVE VERSUS SEDENTARY

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Aims: It is well known for many years that moderate physical activity is useful for the treatment of osteoporosis, specially in the initial state and also where moderate or severe osteopenia. Certainly the exercise load, unlike the anti gravity exercises, are great importance for bone mass does not decline after menopause or in patients who have risk factors for osteoporosis, both post menopausal and secondary.
Methods: Was performed DXA densitometry in hip and spine with a densitometer Norland model XR- 46. T-score was determined in 85 women aged between 50 and 80 years practitioners of physical activity for 45 minutes, three times a week, in standing position controlled through health programs by specialized monitors. This group was compared with another 85 sedentary women in the same age doing manual labor craft and remain seated during most of the day without making physical activity.
Results: In physically active patients 54.12% had bone mass within the limits of normal for they age, where as the percentage of sedentary normal patients is only 50%. Osteopenia was found in 26.50% of active women and 32.13± for sedentary, wile levels of osteoporosis in hip and spine are almost similar, 19.4± active and 19.1± sedentary. As is normal, have been most affected hip in patients over the age of sample studied. In both groups of patients were not included more than 80 years so it is normal that the rate of osteoporosis in the hip is not very high.
Conclusions: During early post-menopause, when osteoporosis is not fully established and are detected osteopenia than in many cases is not treated pharmacologically, physical activity is a good resource for patients who have a general state of health that allows then regular exercise. Undoubtedly will be a practical adjunct to other treatment and should be included in the medical of osteoporosis protocols.

Disclosure of Interest: None Declared

P216 - OSTEOPOROSIS AND OSTEOPOROTIC FRACTURE IN SERBIA, FROM THE NATIONAL REGISTER FOR OSETOPOROSIS

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Aims: Determining the clear picture of frequency osteoporosis and osteoporotic fractures in Serbia, analysing the data obtained from the National Registry of osteoporosis.
Methods: Information was collected by doctors from several centres in Serbia. Based on data taken from the registry, the following issues were analyzed: demographic data and information about the existence of osteoporotic fractures after 40 years of age and their localization. The patients were diagnosed with osteoporosis, central densitometry (DXA) and /or the existence of fractures in small force and /or x-ray findings of vertebral fractures. Data referring to the latest central densitometry (DXA) were taken into consideration, as well.
Results: In total, 824 of the patients have been registered, 808 women and 16 men, aged from 26 to 85 years of age, out of which 75% older than 50 years. Based on the central densitometry (DXA) findings, 758 (92%) patients had reduced bone mineral density (BMD) at the level of osteoporosis, 58 (7%) had osteopenic, and only 7 (1%) patients had normal findings. In total, 315 (38%) patients had a fracture (one and / or more), with a break in location: spine in 150 (35%) patients, followed by wrist fractures in 133 (31%), and in 57 hips (13±) patients. Relationship osteoporotic fractures and DXA findings show that a total of 315 (35%) patients had osteoporotic fracture, where by 249 (79%) have reduced bone mineral density (BMD) at the level of osteoporosis, 58 (18%) patients have osteopenic, while 8 (1%) patients have normal BMD findings.
Conclusions: According to data obtained from the National Registry for osteoporosis, we found:

- Most of the analyzed patients (92%) had reduced bone mineral density (BMD) at the level of osteoporosis.

- Bone fractures is most often present in patients with reduced bone mineral density (BMD) at the level of osteoporosis (79%), the most frequent localization on the spine (35%).

- Bone fractures is a rare finding in patients with normal bone mineral density (3%)

Disclosure of Interest: None Declared

P217 - TROCHANTERIC HIP FRACTURES ARE MORE COMMON THAN CERVICAL FRACTURES IN VERY ELDERLY PATIENTS

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Aims: Review of results published in the past few years indicates that there are several differences between women sustaining trochanteric fractures or cervical hip fractures. Our aim was to investigate the association of hip fracture type and age.

Methods: Internal Medicine Service conducts medical care to patients with hip fracture during admission, mainly focused on the detection and treatment of acute medical disorders. We have collected and analyzed data on hip fracture in patients admitted from the year 2006 to 2008. For comparison between age groups, we used the chi-square test.

Results: General characteristics. Number of patients: 997. Sex: 726 women (72.8%) and 271 men (27.2.%). Age: 47-100 years, mean 81.4±8.2 years (women, 81.8±7.8 yr; men 80.2±9.0 yr). The types of fracture was cervical in 450 cases (45.1%), trochanteric in 471 (47.2%) and subtrochanteric in 76 (7.6%). The mean age by type of fracture was 80.8 ±7.6 yr in cervical, 82.1 ±8.5 yr in trochanteric and 79.4 ±8.9 yr in subtrochanteric. The age-specific incidence of hip fracture was:<70 yr, 80 (8.0%); 70-79 yr, 275 (27.6±); 80-89 yr, 505 (50.7%) and 90-100 yr, 137 (13.7%). In patients aged 90 years or over, there were 86 trochanteric fractures and 43 cervical fractures, with difference from other age groups ($p<0.001$).

Conclusions: 1 - The overall rate of trochanteric fractures was slightly higher than cervical fractures. 2 - In very elderly patients trochanteric fractures were significantly more frequent than cervical fractures. 3 - This data, already known in previous studies, should be considered for to increase the knowledge and the possibilities of preventing hip fractures.

Disclosure of Interest: None Declared

P218 - THE RELATIONSHIP BETWEEN TIMED UP & GO TEST, CALCIDIOL LEVELS, AND HISTORY OF FALLS AND FRACTURES IN OSTEOPOROTIC POSTMENOPAUSAL WOMEN

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Aims: To evaluate the relationship between Timed up and Go test (TUG), calcidiol levels and history of falls and fractures in a cohort of osteoporotic postmenopausal women (OPW) from RETOSS study in Spain (Rheumatology and Osteoporosis).

Methods: An observational, transverse and multicentric study was conducted on 629 OPW previously diagnosed from June to September 2008 in 63 rheumatology divisions in Spain. Every physician had to choose only one patient per day who was the first woman to come and to fulfil with the inclusion and exclusion criteria. By a questionnaire especially designed patients calcidiol levels, falls at last year and history of fractures were recorded. TUG test[1] was performed. Univariate logistic regression was used to identify the relationship between patient-provided falls and fractures history and TUG test. Proportions, likelihood ratios, and receiver-operating-characteristic (ROC) curves for prediction of previous fractures were calculated.

Results: Mean age and TUG test of included women was 66.6±9.2 years and 16.3±11.3 seconds (95% CI, 15.3-17.3), respectively. Mean TUG test time showed significant differences between women with history of falls and fractures (18.1s and 19.0s) and others non fallers and without fractures (15.6s and 14.4s) ($p=0.024$ and $p<0.001$), respectively. TUG test showed a linear trend to an increased probability >20 seconds in relationship with the age ($p<0.001$) and with an increased estimated risk of falls (OR:1.72; 95% CI, 1.13-2.63) and fractures, too (OR:2.54; 95% CI, 1.69-3.80). The area under the ROC curve was 0.60 (95%CI, 0.55-0.65). 31.2% of patients fell during the last year and 51.5% had a consequence fracture. It was found a significant association between falls and TUG test >20 seconds in patients older than 70 years ($p=0.025$; OR: 2.90; 95% CI, 1.13-7.45). Mean calcidiol level was 27.9±18.5 ng/mL in all group (95% CI, 24.7-31.1). There was a significant inverse association between history of fractures and calcidiol level age independent. Patients who had calcidiol <20ng/mL sustained more falls ($p=0.033$) and fractures ($p=0.006$) than women with calcidiol >20 ng/mL.

Conclusions: TUG test is statistically associated with a history of falls and fractures in osteoporotic postmenopausal women. TUG is quick, requires no special equipment or training, and may also be useful to include as part of the routine medical examination in old patients.

References: **1**Podsiadlo D, Richardson S. J Am Geriatr Soc 1991;39:142.

Disclosure of Interest: None Declared

P219 - EVALUATION OF VITAMIN D STATUS IN A POPULATION OF POSTMENOPAUSAL WOMEN FROM NORTHERN ITALY AT OSTEOPOROTIC RISK

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Aims: Hypovitaminosis D may contribute to the pathogenesis of osteoporosis and fragility fractures, moreover low levels of cholecalciferol has been linked to a poor response to anti-resorptive agents in osteoporotic patients. Vitamin D insufficiency is widespread, accordingly to the recent literature, the desirable values of vitamin D should never be below 30 ng/ml (75 nmol/l). The percentage of hypovitaminosis D is high in most European countries and serum 25(OH)D levels were reported to be lower than 25 nmol/l in about 30% of Italian elderly women. We studied the vitamin D status in a selected population that was already at osteoporotic risk, in order to evaluate the prevalence of "non optimal" vitamin D levels and to better identify women will have to resort to supplementation in "early" postmenopause.
Methods: The study was carried out on 181 postmenopausal women from Emilia-Romagna region. Mean age was 62,3 yr±8,02 SD (range 45-82), mean time since menopause 164 months. Patients were classified, on the basis of 1994 WHO densitometric criteria, as osteoporotic or osteopenic with an excessive age-related bone loss (Z-score values <-1,5 SD in at least one skeletal site). Causes of secondary osteoporosis were excluded. Serum 25(OH)D levels were evaluated using test LIAISON® 25 OH Vitamin D, CLIA technique.
Results: Levels of Vit D found in our sample population, if compared with actual literature's suggestion, were: 22% optimal (above 30 ng/ml), 33% insufficient (between 20 and 29 ng/ml) and 45% deficiency (below 20 ng/ml). We found a statistically significant correlation between 25(OH)D levels, months since menopause and age (r=-0,251; p=0,001 and r=-0,187; p=0,012 respectively).
Conclusions: Data obtained showed that in a selected population, at high skeletal risk, the insufficiency or deficiency of Vit D can be found in the majority of cases, even in early postmenopausal women aged 60 yr or below. Furthermore our data confirmed the higher prevalence of deficit in women above 60 yr old and in the osteoporotic group. These data are in agree with the current hypothesis about the pathogenetic role of hypovitaminosis D, not only in the senile osteoporosis, but even in early menopause, in overlapping with estrogen deficiency and suggest the evaluation of Vitamin D status in women at osteoporotic risk to better tailoring vitamin D supplementation in the prevention strategy of postmenopausal osteoporosis.
References: Dawson-Hughes B et al, J Bone Miner Res, 2007; Isaia G et al, Osteoporosis Int, 2003.

Disclosure of Interest: None Declared

P220 - HIP FRACTURE INCIDENCE: A 6-YEAR RETROSPECTIVE EVALUATION IN VENICE-ITALY

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Aims: To evaluate the 6-yr (2003-2008) hip fracture incidence in >65 yr males and females in a catchment population of about 300.000 people, living in the city of Venice (Italy). About one third of Venice population live in the historical centre, a wide pedestrian zone where cars are not allowed, while the other two thirds live in a new town (Mestre) with private cars. In the historical centre people "must" walk to deal with ordinary daily life needs.
Methods: Data source: ICD9CM codes for femur fracture in Mestre and Venice Hospitals; yearly updated City Hall Census for general population data, used to calculate incidence.
Results: Hip fractures from 2003 to 2008 were 511±29 x yr. (Tab.1, cases/1000 inh.)

	Venice fem.	Mestre fem.	Venice mal.	Mestre mal.
2003	9,1	9	3,7	3,5
2004	10,1	9,8	4,6	3,7
2005	10,4	9,6	4,9	3,8
2006	11,3	9,3	4,2	2,5
2007	11,3	8,7	4,1	3,8
2008	10,8	9,8	4,5	3,6

Conclusions: The overall hip fracture incidence in a 300.000 >65 people living at sea level in a North-Eastern Italian city, did not show a definite evidence of a decreasing trend, in a 6-year evaluation period, neither for females nor for males. Lower overall incidence (average -1.1%) was detected in Mestre, for both genders. Venice population has an higher average age and may be more exposed to fracture risk, because of differences in lifestyle. Otherwise, it could merely be due to a bias: the "escape" of patients to private clinics, which are not available in Venice, where every fractured patient is admitted in the local public hospital.
References: -SH Gehlbach et al, Osteoporos Int 2007;18:585; -E. Mann et al, Geriatr 2008;8:35.

Disclosure of Interest: None Declared

P221 - HOW TO IMPROVE OSTEOPOROSIS MANAGEMENT FOLLOWING DISTAL FOREARM FRACTURE?

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Aims: In postmenopausal women, secondary prevention of osteoporosis, after distal forearm fracture, is underutilized, despite cost-effective therapies.

To improve osteoporosis management following distal forearm fracture, we propose an epidemiologic interventional study, with the help of Limousin National Health Insurance (NHI), Rheumatologists and Radiologists

Methods: From 2005 to 2006, postmenopausal women, between 50 and 75 years-old, with a distal forearm fracture, were identified by Limousin NHI. They were invited to realize spine and femoral neck bone mineral density (BMD) by dual energy x-ray absorptiometry (DXA). Auto-questionnaire regarding risk factors (RF) of fractures and osteoporosis treatment was fulfilled during BMD. Auto-questionnaire and BMD results were sent to each general practitioner (GP), with recommendation for treatment. One and three years later, a new auto-questionnaire was sent to each patient by NHI, to assess osteoporosis management and new fractures. We published study results one and three years later after BMD achievement.
Results: 324 women were included in this study. Mean age was 65 years. 28% of them had at least another risk fracture. 174 patients (55%) had osteopenia (T-score between -1 and 2.5 DS). 78 patients (24%) had osteoporosis (T-score below -2.5 DS).One year and three years after BMD achievement, auto-questionnaire were sent to each patient. 88% of them responded at one year, and 78% at three years.25 patients had a new peripheral fracture. Patients rate with osteoporosis treatment before BMD, and one and three years after BMD was as followed in table 1.

	Osteoporosis treatment before BMD	Osteoporosis treatment one year after BMD		Osteoporosis treatment three years after BMD
BMD group	N (±)	N (±)	p	N (%) p
Osteopenia	26/174 (15)	55/158(35)	**<0.0001**	45/117 (38,5) 0,53
Osteopenia and at least 1 FR	7/48 (15)	15/46 (33)	**0.04**	17/34 (50) 0,12
Osteoporosis	15/78 (20)	30/54 (55)	**<0.0001**	43/52 (82) **0,002**

Conclusions: there is a statistical significant improvement of patient number with osteoporosis treatment one year after BMD, mainly for patients with BMD osteoporosis. Three years after, the results are maintained, even increased significantly for patients with osteoporosis .In this study, bone densitometry after forearm fracture leads to improve osteoporosis management, increasing treatment rate.

Disclosure of Interest: None Declared

P222 - PREVALENCE OF OSTEOPOROSIS AND FRACTURE RISK IN A COHORT OF BULGARIAN WOMEN AGED 50-59 YEARS

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Aims: To estimate the prevalence of osteoporosis at the lumbar spine and the distribution of risk factors and fracture risk in young peri-menopausal women aged 50-59 in an epidemiologic survey

Methods: 436 women participated. Their mean age was 54.7±2.8 years (range 50-59), their mean BMI - 27.0±5.4 kg/m^2. Lumbar spine BMD was measured by dual-energy X-ray absorptiometry on Hologic QDR and Lunar DPX devices. All women completed a questionnaire adapted in Bulgarian from the FRAX® tool. The ten-year fracture risk for major and hip fractures was calculated without BMD. Statistical analysis was performed on a SPSS 13.0 package (Chicago, IL).
Results: 20.6± of all women had osteoporosis at the lumbar spine, 42.2± had low BMD and 37.2± had normal BMD. 15± of all women reported previous fractures, 37.3± were smokers, 4.2± reported use of glucocorticoids, 8.3± - alcohol overuse, 19.6± had other endocrine diseases. 52.5± had no physical activity and 13.7± had lost height > 3 cm. Mean ten-year risk for major fractures was 7.8± (range 1.6 – 76.0±) and for hip fractures – 0.6± (range 0.1 – 3.9±). Fracture risks in normal BMD, low BMD, osteoporosis were 0.61, 0.78 and 0.96± for hip fractures and 7.67, 7.45 and 8.59± for major fractures.
Conclusions: The studied women showed a higher prevalence of lumbar spine osteoporosis compared to data for the femoral neck. Inclusion of lumbar spine BMD would increase the number of women with osteoporosis. In women aged 50-59 the FRAX® tool might underestimate fracture risk especially if calculated without BMD.
Acknowledgement: This work was sponsored by the Ministry of Health as part of the National Osteoporosis Program in Bulgaria 2005-2010.

Disclosure of Interest: None Declared

P223 - VITAMIN D DEFICIENCY IS HIGHLY PREVALENT IN IRISH PATIENTS BEING REFERRED TO AN OSTEOPOROSIS CLINIC

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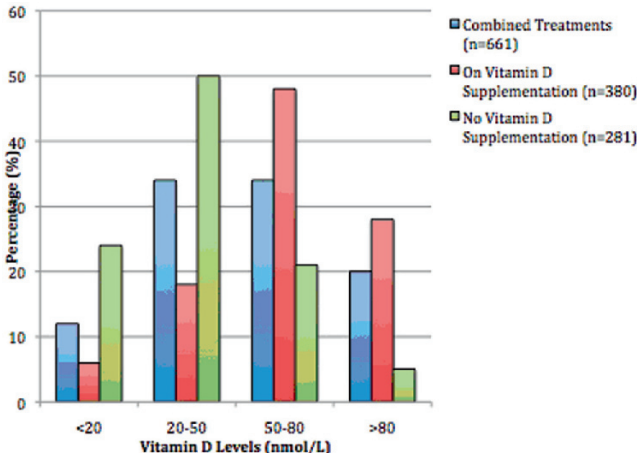
Aims: We aimed to assess the prevalence of vitamin D deficiency in patients being referred to an Osteoporosis Clinic in Ireland. To assess if adequate vitamin D levels were achieved with recommended guidelines on vitamin D cholecalciferol) supplementation. To assess the seasonal variation in vitamin D levels
Methods: This was a retrospective review of patients over 50 years of age referred to an Irish Osteoporosis Unit located in Dublin (53^{i}N) between January 2008 and December 2009. We reviewed baseline vitamin D levels at assessment along with history of fracture, type of Vitamin D supplementation, age and reason for referral.
Results: 661 patients were reviewed with a mean age of 70.98 (±10.6) years and a baseline 25(OH)D of 55.1 nmol/L (± 28.6). 57.6% of patients were on vitamin D supplementation at referral. Overall, 46% of patients had a 25(OH)D level <50nmol/L with 80% of patients <80nmol/L. Vitamin D supplemented patients had a mean 25(OH)D of 67.5 (± 26.9) nmol/L. 28% of supple-

mented patients achieved optimal 25(OH)D levels >80nmol/L. Seasonal variation of 25(OH)D levels was observed in both non-supplemented and supplemented patients, with highest levels of 25(OH)D being observed in late Summer and Autumn months compared to Spring months (p<0.005 and p<0.0005 respectively).



Conclusions: Vitamin D deficiency is highly prevalent in Irish patients being assessed for osteoporosis with suboptimal levels (<80nmol/L) being recorded despite being on recommended vitamin D supplementation. There is marked seasonal variation in vitamin D levels, which should also be considered when prescribing in Vitamin D_3 in osteoporotic patients.
References: 1. Holick MF, Mayo Clin Pro 206;81:353; 2. Bischoff-Ferrari HA et al, Am J Clin Nutr 2006;84:18.

Disclosure of Interest: None Declared

P224 - FALLS IN SUBJECTS WITH AND WITHOUT OSTEOPOROTIC FRACTURES FROM A SAMPLE OF PRIMARY CARE (PC) PATIENTS LIVING IN ROSARIO CITY, ARGENTINA

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Aims: To study falls occurring in subjects with and without fractures. To evaluate associations between falls and clinical kyphosis, body mass index (BMI), and fracture history.
Methods: Review of medical records of 898 outpatients attending a PC center (236/662, M/F, age 50-101 years). Variables: age, sex, medical history, falls in the previous year, age of occurrence and anatomical site of previous fractures, clinical kyphosis, BMI, use of walking aid. Statistical analysis: Student's *t*, lineal tendency, chi square tests, logistic regression analysis.
Results: The frequency of falls was 33% (women 37; men 22; p<0.0001); 5% of falls happened in geriatric institutions. Falls occurred outdoors in 61% of men and 40% of women (p=0.006). Age distribution of falls among women was 30% (50-59 years), 34% (60-69 y), 34% (70-79 y), and 45% (≥80 y); p=0.01. Among men, it was 0, 6, 26, and 32%, respectively; p<0.001. Men started having repeated falls at age 80; women since age 60. Most frequent causes were stumbling, slipping or loss of balance ["extrinsic" factors] (46, 17, and 26% respectively). These causes were more frequent among women (p=0.01). "Intrinsic" causes (fainting, low blood pressure, dizzy spells) were identified in 8% of women and 18% of men. The direction was forward in 53%, to one side in 24%, and backwards in 23% (p=ns between sexes). Past history of falls was positively associated with clinical kyphosis (OR=3.0; 95%CI 2.2-4.2) and past history of fracture (OR=2.4; CI 1.7-3.4), and negatively with BMI (OR=0.97; CI 0.95-0.99).
Conclusions: Women suffer more falls than men; frequency increases with age. Women fall mainly at home, and more repeatedly than men. The difference in intrinsic and extrinsic causes observed between sexes suggest the influence of factors related to muscle strength, neurological response, and postural control. Major predictors of falls where kyphosis and past fractures. These findings can be used to recommend preventive measures for PC patients.

Disclosure of Interest: None Declared

P225 - DIAGNOSIS AND TREATMENT OF OSTEOPOROSIS IN LONG-TERM CARE INSTITUTIONS

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Aims: To examine the frequency of osteoporosis diagnosis and treatment in long-term care institutions and to determine factors associated with 1) diagnosis and 2) treatment for osteoporosis.
Methods: Chart reviews were performed on 421 residents of 4 long-term care institutions. Age, sex, osteoporosis diagnosis and therapy, medication including bisphosphonates, comorbidities including dementia, history of falling, and fracture status were determined. Osteoporosis was defined as a documented diagnosis and/or a history of osteoporotic fracture. Risk-adjusted analyses were undertaken to determine factors associated with diagnosis or treatment.
Results: 290 (70%) subjects were female and the mean age was 83.6±8.2 years. 227 (54%) were considered osteoporotic. Before admission, 36 (17%) patients with a diagnosis of osteoporosis were on a bisphosphonate; after admission a further 30 (14.2%) patients started bisphosphonates. Overall, 150 (35%) subjects were on neither calcium nor vitamin D of which 45 (20%) were diagnosed as osteoporotic. Only 2 (3%) of those on bisphosphonates were not taking either vitamin D or calcium. Females, older patients with more comorbidities and those with a history of fracture were more likely to be diagnosed with osteoporosis (p<0.008). Of those diagnosed with osteoporosis, females were more likely to receive bisphosphonate treatment (Odds Ratio [OR]=3.2 [95% Confidence Interval (CI) 1.25, 8.22]). Factors associated with starting treatment on admission to long-term care were a previous fracture (OR=2.68 [95% CI 1.15, 6.29]) and documented osteoporosis (OR=10.57 [95% CI 6.45, 32.41]). History of injurious falls was not associated with either diagnosis (p=0.29) or treatment (p=0.35) of osteoporosis.
Conclusions: Overall, osteoporosis treatment rates were low, but approximately doubled on admission to long-term care. Although

a simple fall is the most common cause of hip fracture, a history of falling did not lead to diagnosis or treatment of osteoporosis. Further, males were less likely to be treated, even when diagnosed with osteoporosis.

Disclosure of Interest: D. Morrish Grant / Research Support from: sanofi-aventis, Consultant / Speaker's bureau / Advisory activities with: Novartis, Amgen, L. Beaupre: None Declared, S. Dieleman: None Declared, S. Majumdar: None Declared

P226 - HYPOVITAMINOSIS D IN MULTIETHNIC POPULATION OF UNITED ARAB EMIRATES (UAE)

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Aims: Despite being a sunny country, UAE has a high prevalence of Hypovitaminosis D. Nonarab expatriates contribute to 70± of the UAE population but there is dearth of data on their Vitamin D status. This retrospective study was carried out at Ras Al Khaimah Emirate of UAE to determine the Vitamin D status of multiethnic population and to compare the Vitamin D status in Arab & Nonarab population.
Methods: 263 subjects who underwent 25OH Vitamin D3 estimation were selected from an outpatient clinic record of a private hospital. There phenotypic characteristics, ethnicity, & available biochemical parameters were recorded. The presence of other co morbid conditions (diabetes, hypertension, dyslipidemia) was also recorded .Vitamin D deficiency & insufficiency were defined as 25OH Vitamin D levels<50 & 50-75nmol/L respectively.
Results: Out of 263 (174 Males, 89 Females) subjects, 202 were of South Asian & Asian origin (Nonarab) while 61 were of Middle Eastern origin (Arab). The mean age of study population was 46.32± 9.02yrs. The mean BMI was 28.36±4.88kg/m2. The mean 25OH Vitamin D3 levels were 34.67±19.65nmol/L (37±19.42 nmol/L in Nonarab & 27±18.55nmol/L in Arab group – Not significant). 89 (33.8%), 115(43.7%), & 53(20.15%) subjects had 25OH Vitamin D3 levels <25, 25-50 & 50-75 nmol/L respectively. 5(2%) subjects had levels > 75nmol/L. The commonest symptom of Hypovitaminosis D were generalized muscle pains & muscle weakness (53%). 98(37.26%) subjects were asymptomatic. Serum Parathyroid Hormone levels were not available. Diabetes mellitus, hypertension & dyslipidemia were present in 146 (55.5%), 196 (74.5%) & 174 (66.1±) subjects respectively. The Vitamin D levels were comparable in subjects with or without co morbidities.
Conclusions: Despite being a sunny country (15-36 degree North),the majority of multiethnic population of UAE is found to have Hypovitaminosis D. The mean Vitamin D levels were insignificantly lower in Arab population than that in Nonarab population. The insufficient sun light exposure & dietary habits could contribute to the higher prevalence of Hypovitaminosis D in this country. Earlier studies have not addressed the Hypovitaminosis D in expatriate population & Hypovitaminosis D through its deleterious effect on bone mineral homeostasis & bone mineral density may expose this population to higher risk of future osteoporosis and fragility fracture.

Acknowledgement: Dr JCF Demello, Dr G M Rao, Dr SA Hussain,& Ms Veena KV

Disclosure of Interest: None Declared

P227 - PAGET´S DISEASE OF BONE: REPORT OF 32 CASES (MEXICAN EXPERIENCE)

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Aims: Paget's disease of bone is a chronic disorder that presents one or more areas of aggressive osteoclast-mediated bone resorption preceding imperfect osteoblast-mediated bone repair.
Methods: This is a descriptive study of the largest series in Mexico, collected in a 20 years period, from January 1990 to December 2000.
Results: The series were composed by 32 patients, ranging from 45 to 82 years old, with a median of 64 years, of which 22 of the patients were females (69%), and the other 10 belong to the male gender (31%). It is remarkable that 8 of the individuals (25%), were Indo-American natives, while the rest of them were of European ascendant. Only 6 patients (18%) were symptomatic, and presented pain in the lumbar spine and pelvis. The image studies reported that in most cases, the bones most commonly affected were the pelvis (56%), followed by the lumbar spine and skull (28%). Only 6 cases presented the involvement of large bones (mainly femur and tibia). All the cases presented an increase in the serum alkaline phosphatase levels, and 80% in osteocalcin N-mid levels. The markers of bone resorption (deoxypyrodoline and B-Ctx) were elevated in only 33%. All the patients received medical therapy, the first cases were treated with Salmon Calcitonin, and the more recent cases received Bisphosphonates (either Etidronate, Alendronate or Risedronate). The latest 5 patients were treated with Zoledronate at a conventional doses for osteoporosis, with a good response showing normalization of the biochemistry markers in 100% of the cases.
Conclusions: Paget's disease of bone is distinguished by an increase bone turnover. The disease is commonly present in European population, and less prevalent in Central and South America. Being a less prevalent disease, specially in native populations, could certainly lead to a miss diagnosis. This could be reflected in the interference of a timely and appropriated treatment, not granting the patient's quality of life, and avoid further complications. Paget's disease of bone is still in a sub-registration in this part of the world.

Disclosure of Interest: None Declared

P228 - LOSS OF INDEPENDENCE IN THE ELDERLY, DUE TO HIP FRACTURES: A 9 MONTHS FOLLOW-UP STUDY

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Aims: The aim of the study was to analyse fatality and physical dependence following a hip fracture.
Methods: All patients admitted into the orthopaedics service of the São João Hospital (a central hospital in Porto city) during the period of 1st of May 2008 to 31st of April 2009, with a low-energy hip fracture, were invited to participate in the study. During the admission a questionnaire was applied by a trained interviewer, with questions about demographic factors, mobility before the fracture and clinical history. A follow-up study was conducted at 3, 6 and 9 months after discharge, with interviews made by phone calls, questioning about mobility and autonomy in performing basic daily life activities, mainly dressing and bath taking.
Results: From all patients admitted during the study period, 3 refused to participate, 3 died before the interview and 5 did not have enough mental autonomy to answer the questions. Therefore, there were 262 patients participating in the study, being 78% women, with a mean age of 80.2±9.0 years statistically different from the mean age of men that was 76.3 ±11.3 years ($p<0.05$). Three months after discharge, only 33% of the patients that used to live alone remained living alone. The others were institutionalized (14%), living in the house of a family member (29%), living in their home with a care taker (12%) or remained hospitalized (12%). The fatality for women was 8%, 14% and 20% and for men was 25%, 29% and 33%, respectively after 3, 6 and 9 months of the fracture. The patients who died were older (83±8.3 years old) than those who remained alive after 9 months (79±9.4 years old), with no significant differences between gender. Among patients who died, the trochanteric fracture was more frequent (61%) than femoral neck fracture (32%). During the follow-up period, 4% of patients had a fracture in the contralateral hip. After 9 months 17% of patients were able to walk without any help, 37% were walking with the help of devices, 25% were walking with the help of another person, 6% were in a wheelchair and 15% were bedridden. After 9 months, more than half of the patients (51%) reported the need for help in basic daily life activities.
Conclusions: Significantly higher fatality was observed in male patients. The hip fractures remain an important cause of loss of physical dependence in the elderly. Besides osteoporosis prevention, actions to prevent falls in the elderly should be taken.

Disclosure of Interest: None Declared

P229 - RISK OF FALL FROM STANDING HEIGHT IS DOUBLE IN PATIENTS WHO TAKE ANTIHYPERTENSIVE MEDICAMENTS: STUDY IN A COHORT OF HIP FRACTURE PATIENTS IN A CENTRAL HOSPITAL IN PORTUGAL

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Aims: The purpose of the study was to analyze the association between medicaments and causes of fall in the elderly.
Methods: All patients admitted into the orthopaedics service of the São João Hospital (a central hospital in Porto city) during the period of 1st of May 2008 to 31st of April 2009, with a low-energy hip fracture, were invited to participate in the study. During the admission a questionnaire was applied by a trained interviewer, with questions about demographic factors, mobility before the fracture, clinical history and event that caused the hip fracture. From the medical records, we got information about the type of fracture, day of surgery and type of surgical treatment.
Results: From all patients admitted during the study period, 3 refused to participate, 3 died before the interview and 5 did not have enough mental autonomy to answer the questions. Therefore, there were 262 patients participating in the study, being 78% women, with a mean age of 80.2±9.0 years statistically different from the mean age of men that was 76.3 ±11.3 years ($p<0.05$). The place of fall was inside home for 81% of the women and 65% of the men and in the street for the remaining. The 3 main causes of fall were from standing height (26%), after tripping over an obstacle (13%) and from the bed or chair (13%). The history of previous osteoporotic fracture (n= 51 patients) was different ($p<0.05$) among patients who had a trochanteric fracture (53%) than in those with femoral neck fracture (37%). Ten per cent of patients were not using any medication. Among those medicated, 54% were taking 1 to 3 drugs and the remaining 46% were taking 4 and more drugs. Despite, only 14% of patients were on treatment for osteoporosis at the time of the fracture. The three medications most referred were antihypertensive (53%), anxiolytics -hypnotics and sedatives (39%) and antithrombotic agents (30%). Those who were taking antihypertensive had 2.16 more risk to have a fall from standing height that those who were taking other medicaments (RR 2.16 CI95% 1.07 – 4.36)
Conclusions: Men were, on average, younger at the time of fracture and fall more in the street in relation to the women, being these results statistically significant ($p<0.05$). The risk of fall increases among patients who take medicaments and more actions of health education to prevent falls in the elderly should be taken.

Disclosure of Interest: None Declared

P230 - NO ASSOCIATION BETWEEN THE USE OF ORAL BISPHOSPHONATES AND INCIDENCE OF ATRIAL FIBRILLATION

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Aims: To study whether there is an association between use of oral bisphosphonates and atrial fibrillation (AF).
Methods: We conducted a cohort study of oral bisphosphonate users and their age-matched nonusers using data of women aged 50-89 from 3 large independent databases (447,855 from MarketScan® and 156,103 from Ingenix® of the United States; 69,805 from THIN of the United Kingdom). All women were followed during 2002-2006 for incident AF for up to 3 years from index date, which was defined for the users as the date of the first bisphosphonate prescription, and correspondingly assigned to their matched nonusers. To reduce exposure misclassification with respect to subsequent risk of incident AF, we required all women to have at least 2 years of continuous enrolment before the index date, during which time they must have no bisphosphonate prescriptions and at least 1 medical encounter. We also excluded women who had any of the following conditions during the 2 years before their index date: supra-ventricular or ventricular arrhythmia (including pacemaker), hyperthyroidism, hypothyroidism, alcoholism, prescriptions for anti-arrhythmics, thyroxin, strontium, or oral glucocorticoids. We estimated relative risks using Cox models that adjusted for disease and drug history.
Results: 8,001, 1,984, and 817 AF cases were identified during 744,340, 243,898, and 148,779 person-years of follow-up in the MarketScan, Ingenix, and THIN databases, respectively. Compared to nonusers, overall adjusted relative risk (95% confidence interval) for AF in oral bisphosphonate users were 0.92 (0.85-0.99) (MarketScan), 1.00 (0.87-1.16) (Ingenix), and 0.97 (0.79-1.20) (THIN); overall adjusted relative risk (95% confidence interval) for any cardiac dysrrhythmia were 1.01 (0.98-1.05) (MarketScan), 1.06 (0.99-1.13) (Ingenix), and 0.97 (0.79-1.20) (THIN).
Conclusions: Results obtained from data in all 3 databases of the 2 countries did not support an increased risk of AF or cardiac dysrrythmia among oral bisphosphonate users.

Disclosure of Interest: M. Pazianas Grant / Research Support from: Procter & Gamble and Sanofi-Aventis through University of Oxford by The Alliance for Better Bone Health, C. Cooper Consultant / Speaker's bureau / Advisory activities with: the Alliance for Better Bone Health, Eli Lilly Ltd., Novartis, GSK, Roche, Servier, MSD, and Amgen Pharmaceutical companies, Y. Wang Employee of: Warner Chilcott Inc, J. Lange Employee of: P&G, R. G. Russell Consultant / Speaker's bureau / Advisory activities with: Amgen, Glaxo-Smith-Kline, Eli Lilly, Novartis, Procter & Gamble, sanofi-aventis, and Servier

P231 - PREVALENCE OF VITAMIN D INSUFFICIENCY IN ELDERLY MALAYSIAN PATIENTS PRESENTING WITH LOW TRAUMA HIP FRACTURES

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Aims: As a tropical country with the availability of abundant year-long sunshine, the problem of vitamin D insufficiency is thought not to exist. With increased life expectancy in the average Malaysian of 76 years (women), 73 years (men), osteoporosis will become a significant problem. The aim was to assess the level of vitamin D and prevalence of vitamin D insufficiency in patients admitted to the Orthopaedic Surgical ward at University of Malaya Medical Centre, with low trauma hip fracture.
Methods: Patients above the age of 60 years, admitted with recent low trauma hip fractures (of <2 weeks' duration) from January 2008 – January 2009 were recruited. After obtaining informed consent, blood was taken for serum calcium, phosphate, albumin and 25 hydroxy-vitamin D (25OHD). Exclusion criteria were: known metabolic bone disease, chronic kidney disease, pathological fractures and neglected fractures of >2weeks' duration. 25OHD was assessed using the electrochemiluminescence (Roche Vitamin D3 (25-OH) method.
Results: 55 patients with hip fracture were recruited, mean age of 78.8 years (95% CI 76.4-81.2 yrs). At the same time, 20 control subjects (without fracture) were recruited, mean age 66.4 years (95% CI 61.8-70.7 yrs). The mean 25OHD for the fracture subjects was 22.3 ± 7.3 *vs.* 31.5 ± 7.7 ng/ml for controls, highly significant difference; $p<0.001$, $t=-4.7$, dF73. When using the cut-off level of <20ng/ml to categorise vitamin D insufficiency, 56.4% (31 of 55) of the fracture patients while only 5% (1 of 20) of controls were vitamin D insufficient, Pearson's Chi-square $p<0.0001$. There was no significant difference in serum calcium levels between the fracture and control subjects. The fracture group were found to have significantly lower direct sunlight exposure and less physical activity in comparison to the control group, suggesting that these were likely to contribute to the osteoporotic fracture.
Conclusions: Vitamin D insufficiency is likely to be a major risk factor contributing to elderly Malaysians who suffer osteoporotic hip fractures. Our data is important as vitamin D insufficiency remains a grossly underestimated problem by both Clinicians and patients alike.

Disclosure of Interest: None Declared

P232 - CURRENT STATUS OF OSTEOPOROSIS IN DEVELOPING-NATIONS: NEED FOR CENTRALIZED-DATA-COLLECTION & TREATMENT-GUIDANCE CENTERS TO STUDY EPIDEMIOLOGY

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Aims: Osteoporosis common in Developing-nations like India. Not-a-single Center exist in India designated for diagnosis/treatment. No proper epidemiological, mortality/morbidity data available in rural India. Osteoporosis in Indian-population diagnosed

at advanced stage hence poor-prognosis. Worsened by High incidence of malnourishment. Increased awareness/improved diagnosis needed to identify cases.
Methods: Current therapy problems: High incidence of crude-tobacco-smoking in India increases osteoporosis-rate. Therapy restricted to supportive care, as diet-modification. Treatment drugs needs to be provided at subsidized cost to rural/tribal areas to decrease Osteoporosis related fractures mortality. Lack of diagnosis, Rx-expertise in rural India makes poor Rx-Outcome. We need national-Osteoporosis-registry, educate doctors about diagnosis/treatment to improve QOL. Treatment-cost unaffordable to majority sufferers.
Results: Alternative Therapies as antioxidants gaining reputation. Health NGO's working in rural/tribal areas of developing-nations can collaborate with Osteoporosis-care-centers from USA-Europe for training/upgrading staff.
Conclusions: IOF WCO-ECCEO10 congress participants need to collaborate in research-projects with resource-poor-nations. We NGO-representatives need exposure to research methodologies used by European-experts. Our Indian-NGO working since 1998 on health-education & Osteoporosis prevention intends to raise these issues at Florence.

Disclosure of Interest: None Declared

P233 - PREVALENCE OF LOW BONE MASS AND ITS ASSOCIATION WITH VERTEBRAL FRACTURES IN A RANDOM SAMPLE OF MEXICANS SUBJECTS OVER 50 YEARS OLD

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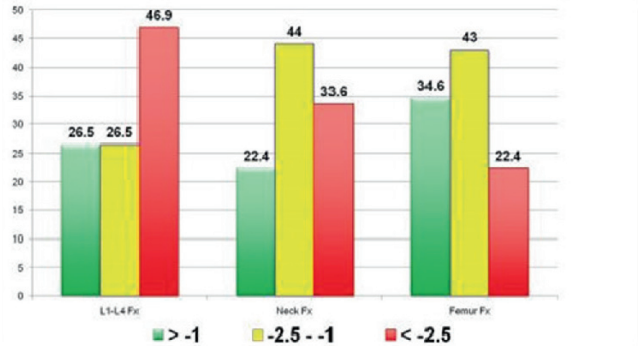
Aims: To determine the prevalence of low bone mass (LBM) and osteoporosis (OP) and its association with vertebral fractures in Mexican adults
Methods: Cross Sectional study of a total of 820 (414 males and 406 females) were included. Participants were randomly chosen according to a master sample and stratified by decades from 50 years old and from urban zones of Puebla, Mexico. A face-to-face interview was done by trained personal to each participant. Questionnaire included socio-demographic characteristics, gynecologic history and risk factors for OP. A bone densitometry on lumbar spine and hip were performed, and X rays of the hip, and spine (thoracic and lumbar region) were done and digitalized to determine morphometric fractures according to Eastell modified criteria. The categories of normal, LBM and OP were determined according to the OMS criteria.
Results: OP prevalence reached 8.8% in men and 17.3% in women (lumbar spine) and 5.9% and 15.9% respectively on hip. We also found a difference in the prevalence of OP, LBM and normal bone between sexes. These differences reached statistical significance in every life decade (p 0.001). As for its association with fractures, more than 50% of the vertebral fractures occurred in individuals with a normal to low bone mineral density. Vertebral fractures were found in 19.2% of women and 9.8± of men.



Conclusions: There is a significant difference in bone mineral density between sexes and fractures. Most of the vertebral fractures were reported in subjects with either normal to low BMD. This suggests that densitometry should not be the only criteria for diagnoses and treatment of Osteoporosis

Disclosure of Interest: None Declared

P234 - PERSISTENCE AT 1 YEAR OF SEVERAL ORAL ANTIOSTEOPOROTIC DRUGS AS A FUNCTION OF DOSING FREQUENCY: A PROSPECTIVE STUDY

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Aims: Treatments against osteoporosis have demonstrated fracture risk reduction in randomized clinical trials but persistence to therapy remains a major issue in clinical practice. Intermittent regimens have been developed to improve persistence. The aim of this prospective study was to compare the persistence at 1 year of various dosing regimens.
Methods: We have conducted the study in a universal health care system (Assurance Maladie of Rhône-Alpes, France), among osteoporotic postmenopausal women, 45 years or older refunded for the first time for a prescription of an oral antiresorptive treatment during February 2007. Patients previously treated by teriparatide or strontium ranelate were excluded. Persistence was defined by the proportion of patients refilling the prescription in the pharmacist delivery register (ERASME). Using statistical analysis by Kaplan-Meier survival curves and Log Rank tests, we compared treatment persistence of several drugs: raloxifene, daily-, weekly- and monthly brand and generic bisphosphonates.
Results: 1893 patients were included during one month and followed-up for 12 months. 289 (15%) patients have been treated with monthly bisphosphonates, 1298 (69%) with weekly bisphosphonates and 306 (16%) with daily treatments (296 raloxifene [16%], and 10 bisphosphonates [0.5%]). At one year, adherence to all treatments was low. Only 57% of patients on monthly bisphos-

phonates were still taking their drug at one year, while 44% of patients on weekly bisphosphonates and 37% on raloxifene were still persistent. Patients treated with raloxifene were significantly younger (mean±SEM) (60.2±0.4 years) and had less comorbidity than patients treated with the other drugs (68.8±0.3 years) p<0.001.
Conclusions: Persistence at 1 year ranged from 37% to 57% across the different dosing regimens. Persistence tended to improve with intermittent regimens.

Disclosure of Interest: C. Confavreux: None Declared, F. Canoui-Poitrine: None Declared, V. Tainturier: None Declared, A. Schott: None Declared, R. Chapurlat Grant / Research Support from: Servier, Amgen, Lilly, Procter and Gamble, Novartis, Consultant / Speaker's bureau / Advisory activities with: Lilly, Servier, Procter and Gamble, Maxence Pharma, Roche, Novartis

P235 - PRELIMINARY EVIDENCE FOR MENOPAUSAL BUT NOT ETHNIC OR SEASONAL DIFFERENCES IN BONE RESORPTION AS MEASURED BY SERUM C-TELOPEPTIDE: EARLY RESULTS OF THE D-FINES STUDY

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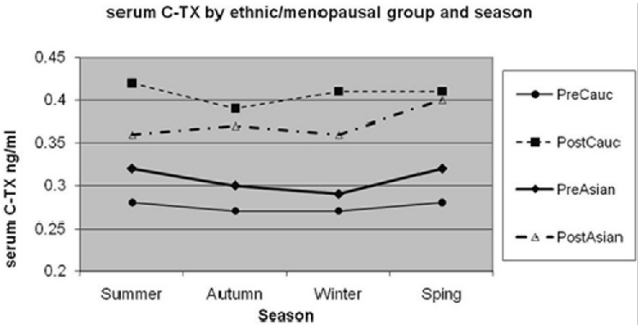
Aims: Bone turnover is a well studied phenomenon, however it is still unclear as to whether bone shows a season driven rhythm over the course of the year, particularly in ethnic groups. This study aimed to establish if bone turnover shows significant seasonal variation as this has practical implications for usage of bone markers in diagnostics.
Methods: The D-FINES study (Vitamin D, Food Intake, Nutrition and Exposure to Sunlight in Southern England) investigated 373 Surrey Caucasian (C) and Asian (A) women every season over a 12 month period (2006-2007). A random sub-sample of premenopausal C (n 18) and postmenopausal C (n 17); premenopausal A (n 13) and postmenopausal A (n 17) with blood samples for all seasons were selected. Serum CTX was determined by electrochemiluminescent immunoassay (Roche cobas e411 automated analyser).
Results: As shown in the Figure, a mixed between-within subjects ANOVA showed there was no significant main effect of season F(3,59.0)=1.467, p=0.233. However, there was a significant between subjects effect of group F(3,61)=3.099, p=0.033, with post hoc tests showing significant differences between the two C groups (p=0.007) and between the postmenopausal A and premenopausal C groups (p=0.042) but no significant differences between the other groups. Last, there was no significant interaction between season and group F(9,143.741)=0.540, p=0.843. The lower sCTX in the younger premenopausal groups is as would be expected. However, unexpectedly, there was a non-significant trend in the postmenopausal groups for the A women to have a lower mean sCTX than the C women. In contrast, in the premenopausal women, the sCTX was lower in the C group. Therefore it appears that it is menopausal status, not ethnicity which is likely the main reason for the group differences. Indeed, there was no significant difference between ethnic groups of the same menopausal status.



Conclusions: Overall, no evidence for a seasonal variation in bone resorption was found here but there was evidence for a menopausal difference in bone resorption. However, numbers of participants in this preliminary analysis was small, and the trend for an ethnic difference in the postmenopausal women might be statistically significant with higher subject numbers. Further analysis with a larger sample is planned.
Acknowledgement: This study was funded by the UK Food Standards Agency (Project N05064). All views are those of the authors alone

Disclosure of Interest: None Declared

P236 - EVIDENCE OF AN ASSOCIATION BETWEEN SEASONAL CYCLING OF 25(OH)D AND MARKERS OF BONE HEALTH IN UK SOUTH ASIAN BUT NOT CAUCASIAN WOMEN LIVING AT 51ON

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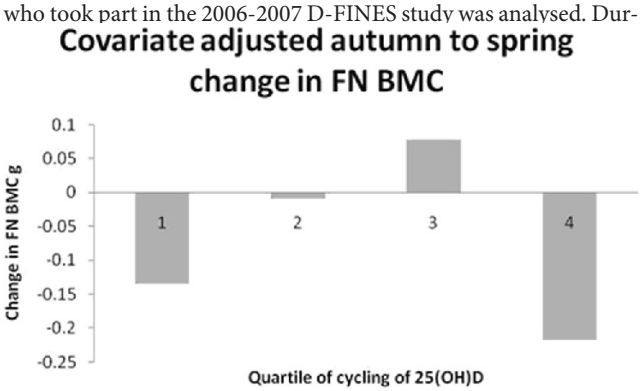
Aims: This study aimed to assess whether seasonal cycling of 25(OH)D (25-dihydroxy vitamin D) is associated with bone health.
Methods: A subgroup of 65 South Asian and Caucasian women who took part in the 2006-2007 D-FINES study was analysed. Dur-



Results: ANCOVA, controlling for summer and winter 25(OH)D status, age, BMI, socioeconomic status, physical activity, and dietary calcium showed no statistically significant association (p>0.05) between quartile of cycling of 25(OH)D and any bone measurement in either ethnic group except in the Asians for absolute autumn CTX (F=5.925, p=0.01) and change in femoral Neck BMC (F=3.111, p=0.05, see figure). Also, in Asians only, absolute autumn lumbar spine BMD approached significance (F =2.780, p=0.07).
Conclusions: It has been suggested that some findings of increased risk of some cancers in countries with high 25(OH)D could be due to slow adaption of CYP27B1 and CYP24 to fluctuating 25(OH)D (1). This begs the question as to whether seasonal cycling of 25(OH)D could be detrimental to bone. The findings here do not support this view. However, in Asians only, the loss of femoral neck BMC during the year in the top and bottom quartiles but gain in the 3rd quartile, and the increased autumn sCTX in the third quartile warrants further investigation.
References: 1 Vieth R, Int J Cancer 2004;111:468.
Acknowledgement: This study was funded by the UK Food Standards Agency (Project N05064). All views are those of the authors alone

Disclosure of Interest: None Declared

P237 - RELATIONSHIPS BETWEEN BONE SIZE, DENSITY AND FRACTURE: THE HERTFORDSHIRE COHORT STUDY

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Aims: It is often reported that bone size and bone density contribute independently to fracture risk, but the relation contributions are hard to disentangle due to the two dimensional nature of the most common assessment of areal bone density, dual energy x-ray absorptiometry. We used peripheral quantitative tomography (pQCT) to assess bone area and true volumetric bone density in a population characterised for fracture (the Hertfordshire Cohort Study).
Methods: We studied 305 men and 316 women. A lifestyle questionnaire that detailed fracture history since the age of 45 years was administered, bone densitometry assessment of the femur and lumbar spine performed (Hologic QDR 4500), and peripheral QCT examination of the radius and tibia undertaken at sites representing predominantly trabecular bone (4% radius and tibia) or cortical bone (66% radius, 38% tibia) using a Stratec XCT-2000.
Results: Thirteen women and 7 men reported a fracture of the distal radius after the age of 45 years; 7 men and 9 women reported a tibial fracture after 45 years of age. Bone area and volumetric bone density were significantly correlated at all sites (p<0.001), except at the tibia 38% site among men. Among women, at the radius, volumetric bone density at the 4% site and not area were associated with fracture (p<0.001); at the 66% site cortical area (and not density) were predictors of fracture, even after adjusting for bone density and confounding factors (age, body mass index, cigarette and alcohol consumption, physical activity, calcium intake, years since menopause and hormone replacement therapy use)(p=0.004). At the tibia, again volumetric bone density at the 4% site but not area was associated with fracture (p<0.001, after adjustment), while at the 38% site both area and volumetric density were significantly associated with fracture, even after adjustment for confounding factors, and corresponding area/density (area: p=0.009; density: p=0.03). Results in men were generally non-significant, possibly reflecting limited power due to small fracture numbers in this sample.
Conclusions: These data suggest that bone size and density assume greater importance at different fracture sites; small fracture numbers precluded full analysis in men.

Disclosure of Interest: None Declared

P238 - FREQUENT OSTEOPOROSIS RISK FACTORS IN POSTMENOPAUSAL WOMEN IN REPUBLIC OF MOLDOVA

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Aims: To determine the most frequent osteoporosis risk factors in postmenopausal women of the Republic of Moldova.
Methods: We evaluated 1168 postmenopausal women from different regions of Moldova. Anamnesis for osteoporosis risk factors, calculation of osteoporotic fracture risk by FRAX® tool was performed for all the participants. All the data were analyzed statistically.
Results: Mean age of the patients included into the study was 56,75±9,4 [40-84], mean of body mass index was 29,34±6,8 [17,6-53,5]. Menarche mean age was 12,8±2,6 y.o. [10-19], menopause mean age was 48,4±3,7 y.o.[40-56]. Documented family anamnesis for osteoporosis was positive only in 15% of the patients: hip fracture in 5,6%, vertebral fractures in 10,8%, both types of fractures in 1,4%. 12,4% of patients reported glucocorticosteroid exposure more than 3 months and 1,1% had rheumatoid arthritis. Height lowering was determined in 51,2% of patients, mean value was of 2,1±0,6 cm. Osteoporotic fracture risk probability by FRAX® showed total risk to vary from 1 to 33%, mean of 5,1±0,47%; hip fracture risk varied from 0,1 to 21%, mean 0,91±0,86%. It is to remark a significant importance of the factors related with abnormal estrogen secretion: irregular menses (23,6±), early menopause (under 45 y.o.) (22,1±) and late onset of menses (16,1±) having high values in the studied group. Long term breastfeeding (> 8 months) was found in 42,4% of women. Multiple deliveries (> 4) were reported in 5,4% of women. There was found direct correlation between higher FRAX® score levels and irregular menses(R=0,33), multiple deliveries(R=0,33). Endocrine disorders were registered in 22,8% of investigated. Diarrhea and gastrointestinal disorders were present in 4,6% and 24,8% of patients respectively. Among …alimentary" factors, calcium deficiency showed high prevalence – 67,3±, followed by

excess of alimentary fibers – 38±, the last being a specific feature for the population of the Republic of Moldova.
Conclusions: Among the most frequent osteoporosis risk factors in postmenopausal women in the Republic of Moldova we report family anamnesis of osteoporotic fractures, factors related with estrogenic exposure, multiple deliveries, gastrointestinal and endocrine disorders, and alimentary calcium deficiency. By FRAX® tool mean total risk of osteoporotic fracture in the following 10 years was 5,1±0,47%, mean hip fracture risk was of 0,91±0,86%.

Disclosure of Interest: None Declared

P239 - FRAX® SCORE AND VERTEBRAL FRACTURES IN POSTMENOPAUSAL WOMEN

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Aims: To determine relationship between FRAX® score based osteoporotic fracture risk probability and the presence of osteoporotic fractures evaluated by vertebral column X-ray morphometry.
Methods: We evaluated 1168 postmenopausal women with the duration of menopause more than 6 months. For all the participants calculation of osteoporotic fracture risk by FRAX® tool was performed and simultaneously vertebral column X-ray thoracic and lumbar region with vertebral morphometry was performed. Received data were analyzed statistically.
Results: Mean age of the patients included into the study was 56,75±9, 4 y.o. Calculated osteoporotic fracture risk probability by FRAX® constituted total risk to vary from 1 to 33%, mean of 5,1±0,47; hip fracture risk varied from 0,1 to 21%, mean 0,91±0,86. Morphometric analysis of vertebral column X-ray showed vertebras with vertebral body index less than 0,8 in 24,3% of patients, with the mean index for affected vertebras 0,71±0,2. The frequency of affectation of thoracic and lumbar region was in proportion of 1,3:1. A tendency to more frequent lumbar vertebral affectation in age group 50-59 y.o. was registered. We found a direct strong correlation between total osteoporotic fracture risk prognosis by FRAX® tool more than 8,2±0,1% and the presence of X-ray confirmed vertebral changes (R=0,73, p<0,001). Thus we may conclude that in investigated group osteoporotic fracture risk prognosis by FRAX® more than 8, 2±0,1% would be an indication for antiresorptive treatment administration. We also found that the presence of radius fracture in anamnesis, after the age of 40, had a strong relationship with the presence of vertebral fractures (R=0,5, p<0,005) and the presence of vertebral morphometric height lowering (R=0,33, p<0, 05). Tibia fractures in anamnesis did not reveal such correlations. Among the other relevant risk factors for higher FRAX® score and vertebral fracture incidence we found parental history of osteoporotic fractures and low body mass index. Low body mass index was more often related with thoracic vertebral fractures (R=0,33, p<0, 05).
Conclusions: In the studied group osteoporotic fracture risk prognosis by FRAX® tool more than 8,2±0,1% had strong correlations with X-ray confirmed vertebral changes determined by vertebral morphometry and can serve as a point for antiresorptive treatment consideration. Radius fracture after 40 y.o., parental history of osteoporotic fractures and low body mass index may also serve as an indicator possible vertebral fractures.

Disclosure of Interest: None Declared

P240 - INCIDENCE OF HIP FRACTURE IN INDIVIDUALS OVER 60 YEARS IN CHAPECÓ, SC, BRAZIL

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Aims: The high incidence of bone fractures is a major health problem worldwide resulting in high mortality, length of hospital stay, a great need for medical care and high costs that are encumbering on society and the state. The Brazilian Unified Healthcare System (SUS), the current healthcare model since 1988 in Brazil is responsible for this treatment. The objectives are: 1)To estimate the prevalence of hip fractures in elderly patients treated by the SUS in Chapecó. 2) Estimating the costs of hip fractures in the elderly for SUS. 3) Linking the occurrence of hip fractures with the variables "sex" and "age".
Methods: This is a retrospective cross-sectional study on the prevalence of hip fractures in elderly occurring between 2003 and 2007 in the city of Chapecó, state of Santa Catarina. The sample was drawn from the internal database of the Municipal Health Department of Chapecó including the following criteria: age above 60, have had one of three surgical procedures for hip fracture treatment in the period of 2003 to 2007.
Results: Of the 298 fractures in the general population, 245 were in people above 60 years of age. Of these 245 fractures, 218 (88.97±) were intertrochanteric, 25 (10.20±) were femoral neck fractures and 2 (0.81±) were subtrochanteric. The most affected were women (79%) and individuals above 80 years of age (39.18%). The incidence of hip fracture ranged from 3.04 per 100,000 and 9.25 per 100,000 for persons less than 60 and between 29.09 per 100,000 and 33.89 per 100,000 for persons above 60. The direct costs for the SUS in the aforementioned period were R$ 531.008,34, giving a annual average of R$ 106.201,66.
Table 1: Incidence hip fracture (per 1000.000 persons)

Year	Incidence >60years	Incidence <60years
2003	29,10	7,76
2004	29,09	8,26
2005	29,42	5,64
2006	33,89	9,25
2007	30,33	3,04

Conclusions: The prevalence of hip fracture in Chapecó is high, even considering only patients treated by the SUS. This reinforces the importance of the institution for preventive measures, since

this type of fracture is also associated with an increased risk of mortality. Despite the relatively low economic cost compared to European countries, we must emphasize that it is still considerable considering that the values reported by the SUS are below market value. Indirect costs were also not taken into account such as days off work for exams or additional costs for medication not covered by the SUS.

Disclosure of Interest: None Declared

P241 - ASSOCIATION OF PHYSICAL ACTIVITY AND CALCIUM IN BONE PARAMETERS

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Aims: To investigate the association between physical activity and calcium intake on bone parameters
Methods: To measure T-score and stiffness index in 1890 pre- and postmenopausal women we used an Achilles Express QUS device (GE Lunar Corp.) in the ankle. We assessed physical activity and dietary calcium intake with a questionnaire designed for the study (modified MEDOS questionnaire). Participants were divided according to: 1) weekly physical activity in women who have reduced activity (have not or occasionally exercised), moderate and regular activity and 2) daily consumption of calcium in women with intake of less or more than 800 mg.
Results: The comparison of the stiffness index was statistically significant among premenopausal women and with reduced ($p=0.016$) and regular physical activity ($p=0.039$). In premenopausal women who exercised regularly and received calcium above 800 mg QUS T -score values were significantly higher ($p<0.05$) compared to the other regardless of consumption of calcium.
Conclusions: Regular physical activity and adequate calcium intake is appropriate for women to get the greatest benefits for bone health.

Disclosure of Interest: None Declared

P242 - THE RELATIONSHIP BETWEEN NUTRITIONAL STATE, BODY COMPOSITION AND QUALITY OF LIFE IN OSTEOPOROTIC AND OSTEOPENIC POSTMENOPAUSAL WOMEN

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Aims: To analyse differences in osteoporotic, and osteopenic women as for nutritional state, body composition and quality of life (QoLs).
Methods: 18 osteopenic (Group 1), and 32 osteoporotic women (Group 2) aged 46 to 79 years who were postmenopausal for one year were enrolled into the study. Bone mineral density of the femur and lumbar spine were measured using dual-energy X Ray absorptiometry. Muscle strength (grip) was assessed using a dynamometer. Nutritional state of the patients was evaluated with Mini-Nutritional-Assessment (MNA) scale, and their body compositions were assessed by estimating their lean, and fat masses using dual-energy X Ray absorptiometry. For the evaluation of their QoLs, physical activities, and psychological states, ECOS-16, Nottingham Extended Activities of Daily Living Scale (NEADL), and Beck Depression Index were used, respectively.
Results: A statistically significant difference was not detected between both groups as for patients' ages, duration of menopause, body mass indices (BMIs), grip strengths, fat and lean masses ($p>0,05$). While any significant difference between 2 groups as for mean scores of ECOS-16, NEADL ve BDI was not found ($p>0,05$), in Group 1 total means of MNA were found to be statistically significant relative to Group 2 ($p<0,05$). A statistically significant positive correlation was observed between fat mass and total MNA values, and also between lean mass estimates, and BMIs, and grip strengths of the patients ($p<0,05$). However a statistically significant correlation between fat and lean mass estimates, and wv however ECOS 16, NEADL, and BDI item scores was not observed ($p>0,05$).
Conclusions: Nutritional state in the postmenopausal period is important for the prevention of osteoporosis. As expected, increase in fat mass is a primary risk factor for disability. Decrease in lean mass with aging leads to the development of sarcopenia which is a reversible cause of morbidity and mortality in older persons. In our study due to relatively lower mean age of our patients ($62,54\pm9,52$), we supposedly did not observe any significant difference between body compositions, QoLs, and functionalities of our patients.

Disclosure of Interest: None Declared

P243 - CALCULATION OF HELIOS FITNESS INDEX (HEL. F.I) AS AN INDICATOR OF LOCOMOTOR PARAMETERS IN WOMEN

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Aims: Parameters of the locomotor system in Greek women were analyzed and the new index Helios Fitness Index for evaluation of the kinetic and kinematic parameters was calculated.
Methods: Healthy women (n=176) aged 20-79 years (yrs) were included in the study separated according to age decade in 6 groups: group1 (n=12):20-29 yrs, group 2 (n=14): 30-39 yrs, group 3 (n=33):40-49yrs, group 4(n=59):50-59 yrs, group 5 (n=31):60-69 yrs, and group 6 (n=27)70-79yrs. None of them was taken any antiosteoporotic drug or calcium/vitD supplements. For the measurement of objective parameters of movement we used the mechanography system in Leonardo platform (Novotec, Pforzheim, Germany). This system measures forces (N) applied to the plate over time, calculates through acceleration the vertical velocity (m/sec) of centre of gravity and using force and velocity it calculates power (Watt) of vertical movements. Jumping was performed as counter-movement jump (i.e., brief squat before the jump) with freely moving arms. After explaining in all participants the process, they jumped on the platform (two leg jump). We calculated the new value Helios Fitness Index (HEL.F.I.) based on the previous work of M. Runge in the German population. An (HEL.F.I.) value of 100% corresponds to the average value of the Greek healthy women of our material of the same age according to power/body weight parameter.

Age decade / Data	20-29 (n 12)	30-39 (n 14)	40-49 (n 33)	50-59 (n 59)	60-69 (n 31)	70-79 (n 27)	p-value
Weight Kg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Height cm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BMI Kg/m²	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Height jump cm	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Speed m/sec	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Maximum Force N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Power Watt	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Power / Weight X X Kg/m²	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Hel Fit Ind	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Results: The anthropometric values and the kinetic parameters of the study population
Conclusions: Jumping mechanography gives to the clinician additional information about locomotor system.
References: 1. Dionyssiotis Y et al, Int J Women's Health 2009;1:113; 2. Runge M et al, Clin Physiol Funct Imaging 2004;24:335.

Disclosure of Interest: None Declared

P244 - ESTIMATION OF RISK OF MAJOR OSTEOPOROTIC FRACTURES AND PROBABILITY OF HIP FRACTURE ASSESSED BY FRAX® IN ADULT WOMEN IN ARGENTINA

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Aims: To estimate risk of major osteoporotic fractures and probability of hip fractures assessed by FRAX® calibrated to the Argentinean population.
Methods: Cross-sectional study; consecutive sample of 147 women aged 40 to 75 yrs, attending the Foundation for Research on Endocrine Metabolic Disease and Applied Clinical Research (Buenos Aires, Argentina 2008-2009) as part of UBACyT M441 project. Dependent variables: Risk of major osteoporotic fractures (<10% (low risk) ≥10% (Medium - High Risk). Probability of hip fracture (≤ 3% and > 3±). Independent variables: Age: <60 yrs and 60 to 75 yrs. Sum of Risk Factors (RF): 0 to 1 RF - ≥ 2 RF. Statistical analysis with SPSS 11.5, determining OR with 95% confidence interval (CI) and difference of proportions with value <0.05.
Results: Age= 60±6.7 yrs. BMI= 27.6±5.0 kg/m^2. Healthy weight (BMI <27.3 kg/m^2)= 52.4%. None showed low BMI. Risk of major osteoporotic fractures and hip fracture probability for most of the sample was <10% (87.7%, CI= 82.1-93.4) and ≤ 3% (88.4%, CI= 82.9-93.9) respectively. Women ≥60 yrs showed statistically significant association compared to younger patients: ≥10% risk of major osteoporotic fractures (OR 18.37 CI= 2.37-142.15-p: 0.0001) and > 3% risk of hip fracture (OR 17.01 CI= 2.19-132.09 p: 0.0002). The 83.7% (CI= 77.4-89.9) of the sample were between 0 and 1 RF. The most prevalent were smoking habit=24.5% (CI= 17.2-31.8), use of glucocorticoids= 16.3% (CI= 10.0-22.6) and personal history of previous fracture= 14.3% (CI= 8.3-20.3). Risk of major osteoporotic fractures showed statistically significant association with previous personal history of fracture (p= 0.0000) and use of glucocorticoids (p=0.0019), while the risk of hip fracture was significantly associated with previous personal fracture (p= 0.0002) and alcohol intake (p= 0.0047).
Conclusions: Statistical association was found between the increased risk of osteoporotic fractures and hip fractures, and age. FRAX® is a powerful epidemiological tool, easy and inexpensive to determine fracture risk and ensure early intervention by directing clinical prevention strategies to those who can benefit most in our population.

Disclosure of Interest: None Declared

P245 - OSTEOPOROSIS AND CLINICAL FEATURES OF ORAL PERI-IMPLANTITIS

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Aims: Peri-implantitis is an inflammatory disease, which causes progressive bone loss and eventual loss of the dental implant. Risk factors for peri-implantitis involve smoking, diabetes, and poor oral hygiene. Systemic bone loss in postmenopausal osteoporosis is associated with alveolar bone loss; however, there is no general agreement if osteoporosis can be considered a risk factor for peri-implantitis. The aim of this study was to find out, whether peri-implant destruction is influenced by systemic bone loss.
Methods: We performed a cross-sectional study among 118 women who received 544 dental implants with a mean age of 65±9 years at the Department of Oral Surgery (Medical University Vienna). The patients were assigned to one of three groups according to their declarations: those with osteoporosis (24.5%), those with osteopenia (8.5%), and the healthy controls (67.0%). The primary outcome was the occurrence of peri-implantitis; the secondary outcome were the occurrence of radiographic bone loss, probing depth >6mm, and peri-mucositis. Potential confounders such as age, recipient site, implant surface, smoking, plaque, calculus, periodontal disease and thyroid disease were also recorded.
Results: Peri-implantitis was observed in 5.9% of women with osteoporosis, in 0.9% with osteopenia, and in 13.6% of the healthy controls. Similar findings were observed with secondary outcome parameters e.g. radiographic bone loss (5.1%; 1.7%; 13.6%), probing depth >6mm (6.0%; 0.9%; 20.7%), and peri-mucositis (12.0%; 3.4%; 27.4%), respectively. The statistic evaluation based on a logistic regression showed no association between systemic bone loss and peri-implantitis. Age, recipient site, and implant surface were associated with the occurrence of peri-implantitis. Yet, even after statistical control for potential confounding factors in a multivariate analysis, no significant association between systemic bone loss and peri-implantitis was found.
Conclusions: Given the limitations of a retrospective study, our findings suggest that postmenopausal osteoporosis is not a risk factor for oral peri-implantitis.

Disclosure of Interest: None Declared

P246 - IS THERE ASSOCIATION BETWEEN METABOLIC SYNDROME (MS) AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Aims: The association between the presence of Metabolic Syndrome (MS) and bone mineral density nowadays is extensively researched. The aim of our study was to investigate influence of Metabolic Syndrome – sufficient criteria for MS (ATPIII-classification) at densitometrial findings in postmenopausal women.
Methods: This study was conducted on 103 postmenopausal woman at the age of 51-82 years. They were divided into 2 groups: Group 1-53 patients with MS, and Group 2-50 patients without MS. Bone mineral density was measured in lumbar spine and femoral neck using dual-energy x-ray absorptiometry.
Results: Student's T-test of two independent samples found statistically significant association between presence of MS and lower BMD (0,88085 vs. 0,79052, p<0,05) and lower T-score (-1,525 vs. -2,324, p<0,05) on lumbar spine. Otherwise, the statistically significant association between presence of MS and lower BMD (0,68558 vs.0,65154,p>0,05) and lower T-score (-1,483 vs.-1,826,p>0,05) on left hip was not established.
Conclusions: Poorly regulated glycaemia may accelerate the reduction of bone mineral density, on the other hand dyslipidaemia, obesity and other medical conditions which includes MS may protect the bone against fracture and increase BMD. The factors which influence the bone in metabolic disorders a still unknown and require further investigations.

Disclosure of Interest: None Declared

P247 - RELATIONSHIP BETWEEN CALCIUM METABOLISM AND BLOOD PRESSURE:

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Aims: Since there is increasing evidence indicating that the abnormalities in calcium metabolism are associated to high blood pressure, we aimed to see whether there is a relationship between serum 25-hydroxy vitamin D (25-OHvitD), PTH, IGF-1 levels and blood pressures of healthy people that have no drug use.
Methods: We evaluated 51 subjects (14 men, 37 women) between 19-60 years of age in June-September 2009 summer season. None of them were smoker and they were not under any medical treatment or vitamin-calcium supplementation and did not have any known disease. All were normocalcemic and normoalbuminemic. Their blood pressures were measured at sitting position three times from each arm by the doctor during the visit and the mean systolic and diastolic pressures were taken for each patient and pulse pressure was calculated as the difference between systolic and diastolic blood pressures.
Results: There was a significant relationship between systolic (p=0.001) and diastolic (p=0.002) blood pressures and serum intact parathormone levels. Pulse pressure and systolic blood pressure was significantly related with growth hormone levels (p=0.017 and p=0.023 respectively). There was no statistically significant relationship between serum ionized calcium, phosphorus, IGF-1 or 25-OHvitD levels and blood pressures. Also there was no relationship between IGF-1 and 25-OHvitD levels.

Conclusions: Parathormone (PTH) levels are known to be important among cardiovascular risk predictors in patients with chronic renal disease, and role of vitamin D and its relationship with IGF-1 is being discussed in metabolic syndrome and prehypertensive state [1-3], but their effects in normal subjects is still obscure. Our data suggest that serum parathormone levels may affect both systolic and diastolic blood pressures in healthy patients independent from serum calcium, phosphorus and vitamin D levels.

References: 1- Ford ES et al, Diab Care 28;2005; 2-Gomez JM. D, Curr Pharm Biotech 7;2006; 3- Michos ED, Melamed EL. Curr Opin Clin Nutr Metab Care 11;2008.

Disclosure of Interest: None Declared

P248 - DIETARY AND SUPPLEMENTAL VITAMIN D AND CALCIUM INTAKE AMONG ELDERLY WOMEN WITH OSTEOPOROSIS TREATED WITH ANTI-RESORPTIVE MEDICATONS IN FRANCE AND SPAIN: CALCIUM AND VITAMIN INTAKE STUDY (CAVIT)

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Aims: The purpose of this study was to describe and compare anti-resorptive medication use and daily vitamin D intake among elderly women with osteoporosis in two European countries.

Methods: A random sample of physicians participated in the CaVit study and referred 414 women aged 50 years and older diagnosed with osteoporosis to participate in the CaVit study. Food frequency questionnaires were administered on the telephone to collect information on daily diet, prescription medication use, and dietary supplement intake.

Results: Among women in the study, 56.9% of French patients and 59.9% of Spanish patients (p=0.6978 compared to France) reported using bisphosphonates. Vitamin D intake from daily diet was significantly below recommended levels for almost all patients (p<0.001).

Daily Vitamin D Intake and Supplement use				
	BS-users (n=188)	Other Medications (n=136)	No medication (n=90)	P value*
Mean daily dietary intake - Vit D, IU (SD)	165.3 (89.3)	148.3 (87.0)	148.6 (76.7)	0.354
Calcium intake, mg (SD)	1169.5 (421.1)	1090.6 (421.0)	980.7 (278.9)	<0.001
Vit D suppl.±	44.7	44.1	6.7	<0.001
Multivitamin use,±	11.7	12.5	11.1	0.810
Calcium suppl.,±	50.5	44.1	6.7	<0.001
*Overall medication-users vs. non-users				

Conclusions: A majority of the women surveyed being treated for their osteoporosis did not get adequate amounts of vitamin D from their diet or supplemental vitamin D. Calcium intake was above recommended levels for most individuals.

Disclosure of Interest: J. McFetridge: None Declared, G. Nocea Employee of: Merck, Sharp & Dohme Espana, S. Bolge: None Declared, S. Sen Employee of: Merck & Co., Inc, T. Fan Employee of: Merck & Co., Inc

P249 - INJURIOUS FALLS IN THE PAST 12 MONTHS AND OSTEOPOROTIC FRACTURES AMONG POSTMENOPAUSAL WOMEN: A LONGITUDINAL STUDY IN A REAL-LIFE SETTING

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Aims: This is a retrospective longitudinal study to assess the association between the impacts of injurious falls in the past 12 months on osteoporotic fractures among postmenopausal women.

Methods: An inception cohort of patients who were initiated on osteoporosis medications during August 1, 2005 to December 31, 2006 with at least 12 months of follow up were identified from the Ingenix claims database. Patients who had any antiresorptive medication during 12 months prior to the index date were excluded. Patients were required to be enrolled for 1 year before and 1 year after the index date. All patients were followed up to 1 year or till a fracture event occurred. Descriptive analyses and survival analyses were used to compare the characteristics of patients with and without recent injurious falls, and model the time to develop fractures.

Results: A total of 38253 patients were included in the analysis, with mean age of 60.5 (SD=8.9). The average length of follow up was 168.4 days (SD=138.5). About 9.9% of patients had falls related medical claims in the 12 months preceding the index date. The annual incidence of fractures was 2.79%. The unadjusted relative risk of a post-index fracture in patients with a pre-index fall is 6.06 (95% CI=5.35, 6.87). After adjusting for age, Charlson index score on comorbidity, history of fractures and post-index falls, having falls related medical claims in the 12 months before the index date was associated with greater risks of all fractures by 98% (RR=1.98; 95% CI=1.72, 2.29), hip fractures by 3 folds (RR=4.10; 95% CI=2.711, 6.22) and non-vertebral fractures by 1.56 folds (RR=2.56; 95% CI=2.09, 3.14). There was no significant association found between pre-index injurious fall and risk of post-index vertebral fracture (RR=1.2; 95% CI=0.94, 1.52).

Conclusions: Injurious falls in the past 12 months increased the risk of fractures among women with diagnosed osteoporosis and should be an endpoint for prevention.

Disclosure of Interest: T. Fan Employee of: Merck & Co., Inc, S. Rajagopalan: None Declared, S. Everett Consultant / Speaker's bureau / Advisory activities with: Merck & Co., Inc, S. Sen Employee of: Merck & Co., Inc

P250 - SECULAR TRENDS IN SWEDISH NATIONWIDE HIP FRACTURES 1987-2002: RESULTS OF BIRTH COHORT AND PERIOD EFFECTS

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Aims: The aim was to examine (i) secular trends and (ii) period and cohort effects in nationwide Swedish hip fracture data 1987-2002.
Methods: By use of Swedish national data for all in-patients aged ≥50 years 1987-2002 we examined annual number and incidence of hip fractures and explored age, period and cohort effects. Age adjustment was done by direct standardization, time-trend analysis by linear regression, changes in linear trends by join point regression and Age-Period-Cohort (APC) effects by log likelihood estimates in Poisson regression models.
Results: Before 1996 the age-standardized hip fracture incidence was stable (0.1% per year (95% confidence interval -0.2, 0.5)) and the annual number of hip fractures increased (2.1% per year (1.8, 2.4)). After 1996 both the age-standardized hip fracture incidence (-2.2% per year (-2.8, -1.6)) and the number of hip fractures (-0.9% per year (-1.5, -0.4)) decreased. APC-modelling revealed marked period+cohort effects limited to women, with a major reduction in hip fracture incidence by subsequent birth cohorts (estimated incidence rate ratio 2.2 comparing women born 1889-96 with 1945-52).
Conclusions: The age-standardized hip fracture incidence decreased after year 1996 and more than counteracted the effects of the increasing population at risk resulting in a decline in the annual number of hip fractures. The magnitude of combined period and cohort effects seems to be of biological importance. If our findings are universal new projections on hip fractures world wide must be calculated.

Disclosure of Interest: None Declared

P251 - PREVALENCE OF VITAMIN D DEFICIENCY IN PATIENTS REFERRED TO A PAIN CLINIC

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Aims: Vitamin D deficiency is highly prevalent in aged Spanish population and in patients with osteoporosis. This deficiency worsens the bone problem and in advances cases induces subclinical osteomalacia. Furthermore aggravates the muscular function impairment increasing the propensity for falling and the risk of fracture. Moreover, limited efficacy of antiosteoporosis drugs has been suggested if there is a vitamin D insufficiency. Finally vitamin D deficiency has been implicated in pain pathophysiology. We analyze the Vitamin D status in a series of patients referred to a Pain Clinic Unit for severe non-malignant chronic pain.
Methods: A consecutive, unselected series of 58 patients with chronic severe non-malignant pain, 28 with a previous diagnosis of osteoporosis, referred to the Pain Clinic of the Hospital del Mar of Barcelona. Eight men and 50 women aged 68.2 (SD 13.2) were included. Plasma levels of 25 hydroxyvitamin D (25 OH D) were measured by radioimmunoassay (INCSTAR) and the results expressed in ng/ml. The standard threshold for levels of insufficiency (<30 ng/ml), deficiency (<20 ng/ml) and severe depletion (<10 ng/ml) were accepted. PASW statistical package was used for analysis.
Results: The referral was made for back pain except two cases of CRPS (because Colles' fracture) and three with a generalized pain syndrome. Plasma levels (mean±SD) of 25 OH D were 20.18±13.24 ng/ml. No differences were observed between cases with osteoporosis (19,01±13,09) and without (21,27 ±13,52) (p=0.52). Levels of iPTHT were raised (57.4 ± 26.7 pg/ml) and inversely correlated with 25 OH D levels (r=-0.538, p=0.003). Twelve cases had severe depletion (<10ng/ml), 22 deficiency (11-20 ng/ml) 17 insufficiency (21-30 ng/ml) and only 7 showed normal levels (> 30 ng/ml). Overall 58% showed deficiency or severe depletion. Only 12± were within normal range.
Conclusions: Vitamin D deficiency is extremely prevalent in patients with non-malignant severe chronic pain. Approximately 60% of them were within range of insufficiency or severe depletion. Given the high prevalence of the problem, routine supplementation with vitamin D is warranted.

Disclosure of Interest: None Declared

P252 - HIP FRACTURE AND HIP PROTECTOR IN GERIATRIC IN-HOSPITAL PATIENTS

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Aims: Hip fractures are an important cause of morbidity and mortality in elderly subjects. Hip protectors are supposed to reduce the rate of hip factures. However, studies considering the efficacy of hip protectors showed conflicting results. Elderly in-hospital patients have a high risk of falling. The impact of hip protectors in those subjects has not been investigated so far.
Methods: We randomly assigned six hundred fifty frail or demented patients (152 men, age 83±7 years and 598 women, age 84±7 years) with a history of falls in the last three month before admission in a 1: 1 ratio, either to a group that wore a hip protector (safe hip soft) or to a control group. Adherence of the protector was checked daily by nurses. The rate of in-hospital fall and the number of hip fractures were recorded according to the patient group.
Results: The mean hospital stay was 22±14 days and did not differ between groups. During the hospital stay 81 falls occurred in the hip protector group and 96 falls occurred in the control group. The rate of falls was 10.7 per 1000 patient days in the protector group and 14.6 per 1000 patient days in the control group (n. s.). The hip protector was used in 78±31% of the days of prescrip-

tion. The rate of hip fractures was 0.13 per 1000 patient days in the protector group and 1.5 per 1000 patient days in the control group (p< 0.004).
Conclusions: Nurse guided surveillance leads to a high adherence of hip protectors in geriatric in-hospital patients. The risk of hip fracture can be reduced in frail or demented elderly subjects by the use of a hip protector.

Disclosure of Interest: None Declared

P253 - COMPARISON OF BMD SCORES OF HIGH-DOSE MILK-CONSUMERS VERSUS NON-REGULAR MILK CONSUMERS

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Aims: to observe the putative difference between BMD scores of regular- versus non milk consumers.
Methods: BMD has been measured by quantitative calcaneal ultrasound, T- and Z-scores have been calculated at two groups consisting each of 72 healthy, middle-aged, perimenopausal women, high-dose regular (>750g/day) and non-regular (<250 g/day) milk consumers. Dietary and lifestyle habits have been assessed by a questionnaire elaborated by our staff, to exclude ladies with any other OP risk factor. The BMD-scores obtained at the two groups have been compared statistically by the Mann-Whitney U test.
Results: T- and Z-scores of the high-dose milk consumers were significantly lower than the scores of the other group (p=0.005 for T-score and p=0.045 for Z-score, respectively).
Conclusions: excessive consumption of milk might be a risk factor for the development of osteoporosis in women in the perimenopausal period.

There are many controversial theories regarding the beneficial, respective the negative effects of milk consumption, further investigations are needed.

Disclosure of Interest: None Declared

P254 - PREVALENCE AND RISK FACTORS FOR DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS IN SOUTHERN BULGARIA

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Aims: To get some information on the epidemiology and risk factors of DISH in patients in Southern Bulgaria.
Methods: We are studied 92 patients from 4 regions in Southern Bulgaria, who are treated in Clinic of Rheumatology, Medical Institute, Plovdiv, 2007-2009, and control group. Data regarding body build, use of medications, concomitant diseases, blood pressure, and smoking habits were collected. Blood tests included fasting glucose, insulin levels, and lipid profile. Radiographs were taken according to a standardized protocol and DISH was classified using the Resnick criteria. Laboratory parameters and an interviewer-administered questionnaire were used to obtain data about exposure
Results: The prevalence of DISH in Southern Bulgaria in men over the age of 60 years is 18.1% and in women is 13.1%. In men DISH begins earlier in the lifetime. All patients with DISH were more likely to suffer from elevated body mass index, arterial hypertension, diabetes mellitus, and previous cerebral vascular disease. Significantly more patients with DISH had an electrocardiographic evidence of left ventricular hypertrophy (p<0.01). Compared with controls, patients with DISH had a greater body mass index (32.1 *vs.* 26.0 kg/m^2, P<0.05) and a higher serum level of uric acid (359 *vs.* 188 μmol/l, P<0.05) and were more likely to have had diabetes mellitus (22.8 *vs.* 9.1%, ^{P}<0.05).
Conclusions: Patients with DISH have a significantly higher likelihood to be affected by metabolic syndrome than non-DISH patients. They also have a significantly higher coronary heart disease risk and should be encouraged to take measures to reduce cardiovascular and cerebrovascular disease risks
References: 1. Resnick, SR Shaul, JM Robins, Radiology 115:513; 2. Al-Herz A et al. Clin Rheumatol. Sep 21 2007; 3.Miyazawa N, Akiyama I, Spine 2006;31; 4. Vezyroglou G, Mitropoulos A, Antoniadis C. J Rheumatol 1996;23:672.

Disclosure of Interest: None Declared

P255 - CERVICAL SPINAL CORD INJURY BY PATIENTS WITH DIFFUSE IDIOPATHIC SKELETAL HYPEROSTOSIS

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Aims: The aim of the study is the determined the cervical spinal cord injury by patients with diffuse idiopathic skeletal hyperostosis.
Methods: We are studied 95 patients from 4 regions in Southern Bulgaria, who are treated in Clinic of Rheumatology and Clinic of Neurology, Medical Institute, Plovdiv, 2007-2009, and control group. Data regarding body build, use of medications, concomitant diseases, blood pressure and neurological deficits. Radiographs were taken according to a standardized protocol and DISH was classified using the Resnick criteria. In view of a history of neurological loss, a magnetic resonance imaging (MRI) scan of the cervical spine was performed.
Results: All patients with DISH were more likely to suffer from elevated body mass index, arterial hypertension, diabetes mellitus, and previous cerebral vascular disease. 4 from the patients have acute cervical spinal cord injury 2 women and 2 males – 2 were with tetraplegic at presentation. Neurological manifestations secondary to DISH are commonly due to involvement of the cervical spine, which is affected in 68% of the patients with DISH. These stem from: reduced flexibility of the spine (43%), myelopathy (37%), atlantoaxial subluxation (3,5%), hyperextension injury of the neck (2%).

Conclusions: The potential catastrophic neurological sequelae of DISH from relatively minor trauma must be understood. Patients with DISH are at risk of certain complications, such as: disability, difficulty swallowing (bone spurs associated with DISH in the neck (cervical spine) can put pressure on your esophagus, making it difficult to swallow) and paralysis.
References: 1. Resnick, SR Shaul, JM Robins, Radiology 115:513; 2. A. Westerveld et al, Rheumatology, 2009;48:1133; 3.LA Westerveld, JJ Verlaan, FC Oner, European Spine J 2009;18:145; 4. Gun Seok Oh et al, J Korean Neurosurgical Society 42:487.

Disclosure of Interest: None Declared

P256 - EFFICACY, SIDE-EFFECTS AND ROUTE OF ADMINISTRATION ARE MORE IMPORTANT THAN FREQUENCY OF DOSING OF ANTI-OSTEOPOROSIS TREATMENTS IN DETERMINING OPTIMAL ADHERENCE: REVIEW OF PUBLICATIONS FROM 1979-2009

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Aims: Review available published literature on magnitude of non-adherence with current osteoporosis regimens and determine any association between frequency and modality of medication administration, patient preference and compliance.
Methods: A search through peer-reviewed journals from the medical literature databases MEDLINE, EMBASE, Biosis and Derwent Drug File was completed for published articles from Jan 1979 to Jan 2009. Search strategy included combinations of MeSH terms looking at "patient preference", "adherence" and "compliance" based on "dosing frequency" and "modality".
Results: In observational studies discontinuation rates were 18-22% for daily bisphosphonates and 7% for weekly bisphosphonates over 6-12 months. Poor compliance rates were demonstrated by Medication Possession Ratios (MPR) of 68-71% for oral bisphosphonates at 12 months, with only 43% of patients having a MPR ≥80% at two years for daily and weekly bisphosphonates combined. Persistence at one year was 39-43% with daily and weekly bisphosphonates but decreased to 18-23% at two years. Preference and observational studies suggest patient preference and improved adherence with weekly bisphosphonates over daily bisphosphonates (≥84% preference for weekly, MPR 60-76% vs. 46-64%; Persistence 43.6-69.7% vs. 31.7-55.7% at 12 months respectively). Data concerning monthly bisphosphonates is conflicting and confounded by differences in cost, availability of patient support programs and how persistence is defined. Early studies suggest patient preference for annual Zoledronic acid infusions over other weekly bisphosphonates (66.4-78.8 vs. 9.0-19.7% respectively). However, information on drug effectiveness, side-effects and route of administration were important factors in determining preference over frequency.
Conclusions: Studies suggest that less frequent dosing is preferred by patients and may improve adherence especially when other factors are ignored. However perceived efficacy, side-effects, medication cost, availability of patient support programs and route of delivery influenced patient preference over frequency of dosing or convenience.

Disclosure of Interest: None Declared

P257 - BONE MINERAL DENSITY IN PATIENTS WITH RHEUMATIC CONDITIONS – ASSOCIATION WITH MUSCLE STRENGTH

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Aims: There is a concomitant decline in muscle strength of the upper and lower limbs and also in bone density between fifth and sixth decades. The objective of the study was to analyze whether that decline is more pronounced in patients with rheumatic diseases.
Methods: Subjects of the study were patients who were referred to the rheumatologist due to the rheumatic complaints. They were classified according to their first rheumatologic diagnosis: cervicobrachial (CB) syndrome, lumbosacral (LS) syndrome, osteoarthritis of the hands, shoulder, knee and hip and inflammatory arthritis (undifferentiated polyarthritis, rheumatoid arthritis, spondylitis ankylosans). Assessment of lifestyle characteristics (smoking, physical activity, calcium intake), anthropometric measurements (height, weight, body mass index) and back-leg dynamometry (in pounds) were performed in all patients. Bone mineral density (BMD; g/cm^2) at the lumbar spine, proximal femur and distal third of radius was measured using dual-energy X-ray absorptiometry. The differences between groups were tested by t-test and ANCOVA, while the association between BMD and analyzed predictors was tested by multiple regression.
Results: There were 251 female and 97 male patients. The mean age was 59.8 years in women and 62.7 years in men. Men had significantly higher dynamometry values than women ($p<0.0001$). Comparing to men, women had significantly lower bone density in spine ($p<0.001$), femur neck ($p=0.012$) and radius ($p<0.0001$). Patients with inflammatory arthritis had the lowest BMD at the spine and femur. However, the difference in BMD between patients with different rheumatic diagnosis was not significant. Dynamometry was the lowest in patients with hand and shoulder arthritis, following by the patients with inflammatory arthritis (Table 1). There was no significant between-groups difference in dynamometry, according to the rheumatic diagnosis ($F=1.46$, $p=0.21$).
Conclusions: When excluded patients with hand and shoulder rheumatic conditions, patients with inflammatory arthritis had the lowest muscle strength. These results suggest a potential role of the decline of muscle strength in bone loss of those patients.

Disclosure of Interest: None Declared

P258 - WHAT DO PATIENTS TREATED FOR OSTEOPOROSIS KNOW ABOUT VITAMIN D AND CALCIUM? RESULTS FROM THE LARGE CROSS-SECTIONAL MULTICENTER STUDY "HOW MUCH DO I KNOW ON OSTEOPOROSIS" (HOST STUDY) IN CROATIA

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Aims: Compliance with osteoporosis therapy is one of the weakest links in the current osteoporosis treatment paradigm. Improved knowledge regarding the potential benefits of vitamin D and calcium may result in more regular use of these supplements and overall better treatment outcomes for patients with osteoporosis. The objective of this study was to investigate the knowledge of these two supplements in a large population sample of subjects treated for osteoporosis in Croatia.
Methods: Patients with established diagnosis of osteoporosis from physiatric, rheumatologic and nuclear medicine outpatient clinics throughout Croatia were included in the study. There were 3,123 subjects (3,021 women, 102 men), whose mean age was 66.64±8.92 years and the median duration of recorded osteoporosis of 2.0 years (interquartile range 4.0). All patients were read a physician-guided questionnaire with 13 multiple choice questions. We present herein the results of the questionnaire regarding the role and importance of vitamin D and calcium supplementation.
Results: A total of 283 (15%) subjects among those who responded to this question (N=1,857) declared they had limited knowledge about calcium. The majority of patients were aware that calcium had a role in bone formation and that some types of food contained calcium. As for their knowledge of vitamin D, 496 (27%) subjects among those who responded to this question (N=1,843) reported having limited knowledge regarding Vitamin D. Approximately 50% of the respondents were aware that Vitamin D was dependent on sun exposure. Only 8% of respondents were aware of reports that 2 out of 3 women had insufficient Vitamin D levels and only 13% were aware that women suffering from prior osteoporotic fractures had an increased likelihood of Vitamin D deficiency.
Conclusions: In this large survey of subjects treated for osteoporosis, almost 30% of patients declared that they had limited knowledge about vitamin D. Awareness and/or knowledge of the importance of vitamin D on bone health was limited as was knowledge regarding the importance of Vitamin D to muscle strength, coordination and incidence of falls. Activities aimed at increasing the awareness of importance of vitamin D in the bone health should be undertaken, since this may have a positive influence on compliance of vitamin D use and further contribute to the efficacy of osteoporosis treatment.
Acknowledgement: The study was funded by Merck Sharp & Dohme d.o.o., Zagreb, Croatia

Disclosure of Interest: S. Grazio Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme; Servier; Roche; Lilly, J. Morovic-Vergles Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme; Roche, D. Babic-Naglic Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme; Sanofi Aventis; Servier; Roche, B. Curkovic Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme; Roche; Sanofi Aventis; Servier, A. Punda Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme, A. Pranic Kragic Consultant / Speaker's bureau / Advisory activities with: Merck Sharp & Dohme

P259 - DAIRY PRODUCTS AND HIP FRACTURE RISK AMONG ELDERLY WOMEN IN NORWAY – THE HUNT STUDY

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Aims: The role of dietary calcium in the prevention of osteoporotic fractures is uncertain. Dairy products constitute the main calcium source in the Norwegian diet, and the consumption of milk is high in Norway. Paradoxically, Norway has one of the highest hip fracture incidences in the world. The aim of the study was to investigate the association between dairy products (milk and cheese) and the risk of hip fractures among elderly women in Norway.
Methods: Information at baseline was collected as part of a population-based health study in the county of Nord-Trøndelag, Mid-Norway (HUNT). Distal and ultradistal radial bone mineral density (BMD) was measured by single X-ray absorptiometry. A comprehensive questionnaire included questions about general health and lifestyle factors, medication use, diet, menstrual history and pregnancy. The diet questions included questions on current milk and cheese consume. A total of 4851 women aged 65 or more (mean age 73.0) who had attended forearm bone mineral density (BMD) assessment as part of HUNT, and had no previous hip fracture were included in the study. All hip fractures occurring after inclusion in the health study were registered (mean follow-up: 9.3 years) by hospital records.
Results: Totally, 391 women (8.1%) sustained a first hip fracture during follow-up. There was no variation by age in consumption of dairy products. 82.2± of the women reported drinking ≥1 glass of milk every day, and 83.7± reported eating ≥1 slice of cheese every day. We found a positive relationship between milk and cheese consumption and BMD. In a multivariate regression analysis, corrected for age, weight, height, self reported health status, inactivity, smoking, maternal osteoporosis, menopausal age and hormone replacement therapy, we found no association between either milk nor cheese consumption and hip fracture risk.
Conclusions: Intake of milk and cheese was positively associated with BMD, but not with the 9-year risk of hip fractures among these elderly Norwegian women.

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P260 - THE BONE MINERAL DENSITY FINDING REPORT AND THE MOST COMMON OSTEOPOROSIS RISK FACTORS REPORT IN WESTERN SERBIA POPULATION SAMPLE

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Aims: To analyze the bone mineral density findings in Western Serbia random population sample with the first DXA device for densitometry in this region, and the most common risk factors for arising osteoporosis.
Methods: The retrospective study comprised densitometry findings, made by DTX 4000 DXACare device in the first 1000 patients, and their survey questionnaires, filled in prior to the measurement, were analyzed. Five most common osteoporosis risk factors were observed as well as their correlation with bone mass findings. The statistical processing was done by the following tests: Kruskal Wallis, X2, Fischer s Exact, Mann-Whitney, Grouping Variable.
Results: 47.2% had normal finding, 33.6% had osteopenia, and 18.8% had osteoporosis according to WHO recommendations for diagnosis of osteoporosis from 1994. We got statistically high significance ($p<0.01$) with densitometry finding for women, early menopause, more age and low body mass index. There is a significant correlation ($p<0.05$) of bone density with use of risk medicines group (corticosteroids, phenobarbitone, MTX).
Conclusions: The individuals with increased risk for osteoporosis were differentiated by analyzing BMD findings and survey questionnaires in order to create education program on significance of bone mass measuring in timely manner and on negative effects of risk factors on bone hardness.

Disclosure of Interest: None Declared

P261 - ECONOMIC AND CLINICAL BURDEN OF HIP FRACTURES IN POSTMENOPAUSAL WOMEN IN THE UNITED KINGDOM (UK)

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Aims: To determine the incremental cost of health care and clinical outcomes in the 12 months following incident hip fractures among postmenopausal women in the UK.
Methods: Cohort study of women aged 50 years or older with a hospitalization for an incident hip fracture, age- and comorbidity-matched to women without any fracture. Individual one-to-one matching was performed. Cohorts were identified in The Health Improvement Network database between 2001 and 2005. Women in the hip fracture cohort were required to have a hospitalization compatible with hip fracture within 1 week of the recorded fracture date. Women were followed for 1 year to ascertain health care resource utilization (HCRU) and incremental costs of hip fractures. Costs included hospitalizations, general practitioner (GP) visits, accident and emergency visits, specialists referrals and prescription of medications.
Results: A total of 2,427 women hospitalized due to a hip fracture were analyzed. The mean age was 81 years (±9.3). The median baseline Charlson comorbidity score was 1. The mean days of follow-up were 298 days for the hip fracture cohort and 340 days for the non-fracture cohort. About 18% of women without fractures were hospitalized during follow-up. Approximately 18% of women with hip fracture and 4% of women without fractures had at least one emergency admission (RR 4.7; 95% CI 3.8-5.8). There were no major differences in the proportion of women visiting the GP, having a referral, or taking prescription medications. Mortality was higher in the hip fracture cohort (18%) than in the non-fracture cohort (7%) (RR 2.5; 95% CI 2.1-3.0). The overall average cost of HCRU per woman was £5,335 for the hip fracture cohort and £1,113 for the non-fracture cohort. The overall 1-year mean incremental cost of hip fractures was £4,222. Most of the incremental cost (97%) was for hospitalizations, with an increment of £4,095 (95% CI: £3,992-£4,198). Approximately 98% of the overall incremental cost occurred in the first 6 months following the hip fracture.
Conclusions: The estimated incremental cost of hip fractures in postmenopausal women in the UK is £4,222. The increment is mostly related to the cost of hospitalization and treatment of the hip fracture. The incremental costs are likely to be underestimated and would be even larger if long-term care costs such as rehabilitation and nursing home care were captured. A higher mortality rate was recorded in the hip fracture cohort compared to the non-hip fracture cohort.

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P262 - ECONOMIC AND CLINICAL BURDEN OF NON-VERTEBRAL NON-HIP (NVNH), VERTEBRAL AND MULTIPLE FRACTURES IN POSTMENOPAUSAL WOMEN IN THE UNITED KINGDOM

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Aims: To determine the incremental cost of health care and clinical outcomes in the 12 months following incident selected fractures [NVNHF, vertebral (VF) and multiple(MF)] in postmenopausal women in the UK.
Methods: Cohort study of women aged ≥50 years with incident selected fractures, individually matched on age and comorbidity to women without fractures. Cohorts were identified from The Health Improvement Network database from 2001 to 2005. Follow-up started from the fracture date for the cases and same calendar date for the matched controls, to the earliest of 12 months after start date, death, or end of enrolment. We examined health care resource utilization (HCRU) and estimated 1-year incremental costs associated with each fracture type. Costs included hospitalizations, general practitioner (GP) and accident and emergency visits, referrals and prescription of medications. Descriptive analysis were performed on occurrence of subsequent fractures and death.
Results: 14,030 women had a NVNHF (including 7,070 wrist/forearm and 2,545 humerus fractures), 1,471 had a VF, and 193 had MF. During the 1-year follow-up, greater proportion of women in the fracture cohorts was hospitalized, prescribed medications, visited a GP or emergency facilities, or had referral to a specialist than women in non-fracture cohorts. The rate of subsequent fractures was 12% in the NVNHF cohort and 6% in women with VF or MF. The risk of death was greater among women with fractures than women in non-fracture cohorts. Relative risks (RR) for mortality: VF, 1.7 (95% CI: 1.3-2.2); NVNHF, 1.6 (95% CI: 1.4-1.7); and MF 2.7 (95% CI: 1.3-5.4). The overall mean cost of HCRU per woman were: VF, £2,180, NVNHF, £1,604 and MF, £3,648. The overall mean incremental cost were: VF, £1,152 (95% CI: £1,030-£1,274), NVNHF, £690 (95% CI; £653-£726) and MF, £2,581 (95% CI: £2,148-,015). Hospitalizations represented 54% (VF), 77% (NVNHF), and 90% (MF) of the total incremental cost in each respective cohort. Cost of medications made up to 29% (VF), 10% (NVNHF) and 7% (MF) of the total incremental cost respectively. Most of the total annual costs concentrated in the 6 months after the date of fracture in all cohorts.
Conclusions: The costs of HCRU is higher among women with fractures than among women in the non-fracture cohorts. Hospitalizations are the main driver of the cost associated with the care of fractures in postmenopausal women. Mortality in women with selected fractures is also higher than in women in the non-fracture cohorts.

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P263 - POOR BONE HEALTH AND INCREASED CARDIOVASCULAR DISEASE RISK: EVIDENCE OF A LINK IN THE D-FINES STUDY POPULATION

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Aims: The aim of the present subsidiary study was to examine: 1) the association between serum lipids and bone quality in Autumn and Spring 2007; 2) the association between vitamin D status and BUA according to ethnicity groups.
Methods: The D-FINES study (Vitamin **D**, **F**ood **I**ntake, **N**utrition and **E**xposure to **S**unlight in Southern England) is currently investigating the interaction between diet and sunlight exposure on vitamin D status in Caucasian and Asian women aged 19–70 years living in Southern England. Fasted blood samples were collected from a total of 279 Caucasian and 94 Asian women in each season. Bone quality was assessed using broadband ultrasound attenuation BUA during Autumn and Spring seasons of 2007.
Results: As is shown in the Table below, there was a significant negative correlation between lipid profiles and BUA in Caucasian women but not Asian women, with effect greatest in the Spring. These finding remained significant for cholesterol, TAG and LDL after adjustment for BMI and vitamin D status.

Table. Pearson correlation (*r* values) between serum lipid and BUA in Caucasian and Asian women

	Autumn 07			Spring 07		
	All groups n=86	Caucasian n=58	Asian n=28	All groups n=47	Caucasian n=34	Asian n=13
TAG (mmol/l)	-0.05	-0.11	0.15	-0.19	-0.32* (-0.36*)	0.19
Cholesterol (mmol/l)	-0.19	-0.24* (-0.17)	0.02	-0.33* (-0.33*)	-0.41** (-0.39**)	-0.02
LDL (mmol/l)	-0.16	-0.22	0.02	-0.33* (-0.36*)	-0.41** (-0.41**)	0.00
HDL (mmol/l)	-0.15	-0.17	-0.05	-0.13	-0.13	-0.11
Insulin (mU/l)	0.14	0.19	-0.02	0.21	0.30* (0.28)	0.004

*$P<0.05$ **p<0.01 (partial correlation) Adjusted for BMI; vitamin D status

There were no statistical differences in mean BUA between ethnic groups but a trend for lower level in Caucasian women (Caucasian 71.43[15.85] versus Asian 73.17[14.67] in Autumn; Caucasian 68.31[18.10] versus Asian 72.89[19.24] in Spring). No cor-

relations were found between vitamin D status and BUA in either of the ethnic groups.
Conclusions: These data indicate a link between poor bone health and increased CVD risk in Caucasian populations and certainly warrant further investigations.

Disclosure of Interest: None Declared

P264 - IMPACT OF OSTEOPOROSIS ON HEALTH RELATED QUALITY OF LIFE (SHORT-FORM 36) IN CHILEAN ELDERS: THE ALEXANDROS STUDY

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Aims: To evaluate the impact of osteoporosis on the Quality of Life (QoL) in Chilean elderly using Short-Form-36 Health Survey (SF-36).
Methods: Cross-sectional study in 947 community-living subjects aged 60-98y (31% men) conducted in Santiago de Chile, in 2008-2009. A structured home interview including socio-demographic characteristics, SF-36, self reported chronic diseases, disability and functional limitations, observed physical performance and anthropometry was applied to the whole sample. Osteoporosis was defined as ever been told by a doctor having it or self reported wrist, femoral neck or lumbar spine fractures. Score of 8 subscales, Physical-Function (PF), Role-Physical (RP), Bodily-Pain (BP), General-Health (GH), Vitality (VT), Social-Functioning (SF), Role-Emotional (RE) and Mental-Health (MH), were calculated using the Standard method (US-based). Summary measures for mental health component (MCS) and physical component (PCS) were calculated using Chilean-Specific scoring algorithm.
Results: Subjects reporting osteoporosis had lower scores in all specific domains (subscales) and summary measures MCS (47.3±8.8 vs. 50.1±8.0; $p<0.0001$) and PCS (44.9±8.4 vs. 49.1±7.7; $p<0.0001$) in both men and women. Women had lower age adjusted scores than men. Logistic regression analysis showed that osteoporosis was associated with poorer scores in QoL and being women (OR 6.5; 95%CI 3.9-6.5) but not with educational level.
Conclusions: These results support the evidence that osteoporosis have a significant impact on QoL of Chilean elder population.
Acknowledgement: Research relating to this abstract was supported by Fondecyt Grant 1080589

Disclosure of Interest: None Declared

P265 - THE STUDY ABOUT THE ASSOCIATION BETWEEN THE QUALITY OF LIFE AND THE SEVERITY OF THE OSTEOARTHRITIS DIAGNOSED BY THE RADIOGRAPHY IN THE POPULATIONS AGED OVER 40 YEARS OLD IN MOO 15, NAYAO VILLAGE THA-KRADARN SUBDISTRICT, SANAMCHAIKHET DISTRICT, CHACHOENGSA

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Aims: In order to study the association of the quality of life and the severity of the osteoarthritis diagnosed by the radiography in the population aged over 40 years old in Nayao village, Chacheonsao and find the prevalence, risk factors and the association of the quality of life that was measured by Modified Thai version of the Western Ontario and McMaster (WOMAC) osteoarthritis index
Methods: Collect the data in the populations aged over 40 years old in Nayao Village, Chacheonsao by interviewing the demographic data and radiograph in the standing antero-posterior and lateral position of both knees so as to diagnose the osteoarthritic condition and interpret the result by the criterion of American College of Rheumatology. The diagnosis of osteoarthritic condition and the radiography are used to evaluate the severity of the osteoarthritis by the criterion of Kellgren-Lawrence grading scale.
Results: There were 350 participants, aged average 55 years old. The prevalence of the osteoarthritis in Nayao Village was 161 people (46%). The people who are over 55 years of age have a high risk of developing osteoarthritis (p-value <0.001). Females have a high risk of developing osteoarthritis(Adjusted OR 2.268, 95% CI 1.382-3.728). The people who have a body mass index (BMI) over 25 have a high tendency to develop osteoarthritis (p-value 0.016). Using the Fisher's exact test to see the association between the quality of life measured by Thai modified WOMAC for Thai rural areas and the severity of the osteoarthritis of both knees diagnosed by the radiography indicates that there is statistical significance (p-value=0.004 and 0.012 CI 95%). The reliability of Thai modified WOMAC and Thai modified WOMAC for Thai rural areas have Croncbach's α which is equal to 0.930 and 0.932 relatively and the intraclass correlation coefficient of Thai modified WOMAC and Thai modified WOMAC for Thai rural area is 0.989.
Conclusions: The level of quality of life and the severity of osteoarthritis diagnosed by the radiography of both knees have a statistically significant association and Thai modified WOMAC for Thai rural areas that the researchers created, is appropriate to use and evaluate the level of quality of life for the people in the country. Moreover, the Modified Thai version of AAOS knee questionnaire is practical in the clinical ways for convenience and rapidity.

Disclosure of Interest: None Declared

P266 - EFFECT OF COMMUNITY-BASED NUTRITION EDUCATION INTERVENTION ON CALCIUM INTAKE AND BONE MASS IN POSTMENOPAUSAL VIETNAMESE WOMEN

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Aims: To examine the effect of community-based nutrition education intervention on calcium intake and bone mass in Vietnamese postmenopausal women.
Methods: Design: A controlled trial was conducted in two groups as intervention and control. The intervention group was given nutrition education during 18 months to improve calcium intake, while the control subjects had the usual diet. Calcium intake and bone mass were evaluated every 6 months. Bone mass was assessed by Speed of Sound (SOS) at calcaneus, referred to as quantitative ultrasound measurement. Anthropometric indices and serum parathyroid hormone (PTH) were determined at baseline and at the end of intervention. Setting: Two rural communes of Hai Duong province located in the Red River Delta in Vietnam. Subjects: A total of 140 women aged 55–65 years, who were more than 5 years postmenopausal and with low calcium intake (<400 mg/d), were recruited. After 18 months of intervention, 108 women completed the study.
Results: Results: Calcium intake in the intervention group had increased significantly (P< 0.01) while it had no significant changes in controls. SOS values were not changed significantly in the intervention subjects while it decreased significantly by 0.5% in the controls (P<0.01). The intervention led to a decrease in serum PTH by 12% (P<0.01). In the controls, there was an increase in serum PTH by 32% (P<0.001).
Conclusions: Conclusion: Nutrition education intervention was effective in improving calcium intake and retarding bone loss in the studied subjects.

Disclosure of Interest: None Declared

P267 - MILK INTAKE ACCOMPANIED WITH HIGHER INTAKE OF VITAMIN D MIGHT EFFICIENTLY DECREASE BODY FAT MASS AND INCREASE LEAN MASS DURING MODERATE WEIGHT LOSS IN NORMAL WEIGHT YOUNG JAPANESE WOMEN

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Aims: Our study investigated whether increased intake of dairy calcium and vitamin D affect changes in body fat, lean mass, and bone mineral density (BMD) during moderate weight reduction in normal weight young Asian women who have generally low calcium intake. Unnecessary dieting is quite common among young women, even if they are slender. They may reduce BMD and increase the risk of osteoporosis in later life.
Methods: One hundred female college students (ages; 23± 5 years, BMI; 21.5±2.3 kg/m^2, calcium intake; 474±196mg/day) who had expressed a desire to lose weight as many young women do today, were randomly assigned to drink a glass of milk (n=52) before dinner or they were given no instructions on milk intake (control, n=48), and were advised to consume a moderately energy-restricted diet and to increase physical activity for 4 months. All of them had to keep a diary of body weight, dairy intake, and physical activity for 4 months. Their actual milk intakes were 184±84 ml/day (total Ca intakes were 557± 248 mg/day) and 67±67 ml/day (total Ca intakes were 382± 143 mg/day), respectively. Body composition (body fat and lean mass) and BMD (L2-L4, femur neck) by dual-energy X-ray absorptiometry (DXA), blood pressure, serum glucose, and lipid profiles were measured at baseline and after 4 months.
Results: Moderate energy restriction for 4 months resulted in significant decreases in weight (-0.9±1.8 kg), L2-L4 BMD(-0.008±0.025g/cm^2), waist and hip circumferences, and blood pressure to the same extent in both of the control and milk groups. Serum LDL and HDL-cholesterol and total glyceride did not change in either group. However, a significant decrease in body fat (-1.2±2.6 kg) and increase in lean mass (0.3±2.0 kg) were observed only in the milk group. The gain in lean mass was strongly correlated with the decrease in fat mass (r=-0.78), and an even stronger correlation (r=-0.85) was observed in the subjects with higher intake of vitamin D (>=188IU/day; median). Intake of vitamin D and serum 25(OH) D were associated positively with intake of protein and negatively with body fat mass. Changes in body lean mass were correlated with changes in L2-L4 BMD (p=0.05) and the highest quartile of lean mass gain in milk subjects had no decrease in L2-L4 BMD.
Conclusions: Intake of more dairy and vitamin D or protein should be recommended even for young people dieting, to allow efficient loss in body fat and gain in lean mass without losing BMD.

Disclosure of Interest: None Declared

P268 - FOLLOW-UP OF THE BONE FRACTURE RISK WITH FRAX® TOOL IN PATIENTS NOT TREATED WITH ANTIFRACTURE MEDICINES: POMOST STUDY

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Aims: It is suggested not to use FRAX® tool in assessment of the efficacy of the treatment with medicines of approved antifracture efficacy but there is no information on the follow-up of the fracture risk in those treated with vitamin D and calcium or not treated at all.

The aim of the study was to assess the changes of 10-year fracture risk (10-FR) of the main bones with the use of FRAX® in patients not treated with antifracture medicines and to assess the use of FRAX® in making therapeutic decisions in osteoporosis in these patients.
Methods: The study was performed in 98 patients (22 males and 76 females) aged 66.6±7.1 years not treated with antifracture medicines, without any new fracture risk factors during observa-

tion and with the baseline 10-FR of the main bones £20% (low and medium 10-FR) calculated with the use of British calculator. Their age and DXA results of femoral neck (T-score) were changed only during observation. All out of 3 were supplemented with vitamin D (400-800 IU daily) and calcium (500-1000 mg daily).

Results: Baseline 10-FR was 9.0±3.7% (3.1-19%). The controlled 10-FR was assessed in 57 patients after 1 year, in 54 after 2 years and in 22 after 3 years. After 1-year increase of 10-FR was found in 29 (0.1-3.2 percentage points – PP; median 1 PP), decrease in 18 (0.2-2.3 PP) and was not changed in 10 patients. After 2 years increase 10-FR was found in 38 (0.1-6.0 PP; median 1 PP), decrease in 10 (0.1-2.2 PP) and was not changed in 6 patients, and after 3 years increase in 20 (0.3-3.4 PP; median 1.3 PP), decrease in 1 (-0.5 PP), and not changed in 1 patient. The change from low to medium risk group was found after 1 year in 5, after 2 years in 4, and after 3 years in 3 patients. The change from medium to high risk group was found after 1 year in 1 patient, after 2 years in 1 patient, and after 3 years in anyone. Nobody was shifted from the low to high risk group at any time of observation.

Conclusions: FRAX® method can be useful in making decision on the time of control DXA exam before decision on the treatment with antifracture medicines. The changes of 10-FR during 1-3 years of observation in majority of patients with low and medium baseline fracture risk are small. This suggests no indication for the repeated DXA exam up to 3 years at least, when the new clinical risk factors of bone fracture are not recognized. Controlled DXA examination is justified earlier when baseline 10-FR is close to upper border value (at least 18% in our study).

Disclosure of Interest: None Declared

P269 - CHANGES IN THE VITAMIN D ENDOCRINE SYSTEM AND BONE TURNOVER (SERUM TRACP) AFTER FOUR WEEKS OF DAILY ORAL VITAMIN D3 SUPPLEMENTATION IN HEALTHY ADULTS: ARE THERE ETHNIC DIFFERENCES?

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Aims: To study the effect of vitamin D3 supplementation on serum vitamin D metabolites, PTH and bone turnover in two ethnic groups, and predictors of change in these metabolites.

Methods: In a trial designed to compare the effect of different vitamin D supplements, healthy men and women aged 19-48 y recruited in the community received a daily dose of 10 µg (400 IU) vitamin D3 during 4 weeks in late winter. Serum samples were drawn at baseline and after 28 days for analysis of 25-hydroxyvitamin D (s-25(OH)D), 1,25-dihydroxyvitamin D (s-1,25$(OH)_2$D), intact parathyroid hormone (s-iPTH), and osteoclast-specific tartrate-resistant acid phosphatase 5b (s-TRACP). Height and weight were measured, and background information was collected through a questionnaire. The data include 48 subjects with ethnic Norwegian or Sri Lankan Tamil background. We performed multiple linear regression with age, gender, BMI, ethnic background, and baseline levels as covariates in all analyses of change.

Results: Mean (SD) s-25(OH)D increased from 46.3 (23.9) to 80.7 (25.4) nmol/l ($p<0.001$). Baseline s-25(OH)D was predicted only by ethnic background, Sri Lankan Tamils having mean 24 (95% CI -47, -1) nmol/l lower s-25(OH)D than ethnic Norwegians. Mean (SD) increase in s-25(OH)D was 36.2 (10.0) in Sri Lankan Tamils and 33.8 (14.1) in ethnic Norwegians, $p=0.60$. BMI and baseline s-25(OH)D were inversely related to increase in s-25(OH)D. Mean (SD) s-iPTH decreased from 6.0 (2.6) to 4.8 (2.1) pmol/l ($p=0.002$). Sri Lankan Tamils had slightly higher baseline s-iPTH than ethnic Norwegians (mean 6.4 vs. 5.9 nmol/l), but levels at follow-up were similar. Change in s-iPTH was predicted by baseline s-iPTH; those with higher baseline levels had a larger decrease (-0.7 pmol/l per pmol/l (95% CI -0.9, -0.5)). Baseline s-1,25$(OH)_2$D was positively predicted by s-25(OH)D (mean higher level of 1.1 (95% CI 0.5, 1.8) pmol/l per nmol/l).There was no overall change in s-1,25$(OH)_2$D at follow-up ($p=0.23$). Mean (SD) s-TRACP increased from 2.6 (0.7) to 3.0 (0.7) U/l ($p<0.001$). There was a tendency to a larger increase in Sri Lankan Tamils, who had lower baseline levels. There were no significant predictors of change in s-TRACP in the multiple regression model.

Conclusions: We observed a significant suppression of PTH but an increase in serum bone TRACP during four weeks of vitamin D supplementation. The effect was similar in the two ethnic groups studied.

Disclosure of Interest: None Declared

P270 - RISK FACTOR CHARACTERISTICS OF WOMEN WITH INCIDENT FRACTURES: THE GLOBAL LONGITUDINAL STUDY OF OSTEOPOROSIS IN WOMEN

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Aims: Numerous studies have documented factors that place women at increased risk of fragility fracture but most have been constrained by cohorts limited by age group or geography. We sought to assess the association between established risk factors for fracture using data from a large multinational study.

Methods: GLOW is an observational, longitudinal study of non-institutionalized women 55+ recruited by 723 primary physician practices in 10 countries. Practices typical of each region were

identified. All women visiting the practice within the prior 2 years were eligible. Self-administered questionnaires were mailed (baseline, 12 months). Data collected included information on demographics; medical history; risk factors for osteoporosis-related fracture; fracture occurrence; self-report of prevention, diagnosis and treatment of osteoporosis.

Table. 1-year fracture incidence by baseline risk factor (N=32,457).
There are no significant statistical interactions between risk factors and region at a 0.01 significance level.

	Percent with 1-year fracture			
	n	Without characteristic	With characteristic	p-value
Previous fracture since age 45	7310	3.2	8.4	<0.001
BMI <20 kg/m^2	1737	4.3	5.0	0.22
Parental hip fracture	4953	4.0	5.5	<0.001
Current smoker	2844	4.3	4.5	0.73
>20 alcoholic drinks/week	151	4.3	4.6	0.85
Early menopause	4406	4.3	4.9	0.066
Fallen at least twice	4456	3.8	7.8	<0.001
Arms to rise from chair	10,090	3.8	5.4	<0.001
Health fair or poor	6736	3.9	5.9	<0.001
Osteoarthritis / degenerative joint disease	12,950	3.8	5.1	<0.001
Hormone replacement	2550	4.4	3.4	0.024
Cortisone or prednisone	938	4.3	6.1	0.011
Fall-related risk factors				
0	11,653	–	3.2	<0.001 (Mantel-Haenszel test)
1	9621	–	3.7	
≥2	9540	–	6.1	

Results: 1-year data were available for 32,457 women (54% of baseline). At 1 year there were 1409 single-occurrence fractures (79 spine, 72 hip, 265 wrist). Incidence of fractures was 4.3% and increased with age (55-64 years, 3.7%; 65-74, 4.1%; 75-84, 5.5%; 85+, 8.4%). Fracture incidence was higher for women with a history of fracture since age 45, parental hip fracture and use of cortisone or prednisone (Table). Current smoking, BMI <20 kg/m2, early menopause, and consumption of >20 alcoholic drinks/week were not associated with a higher incidence of fracture. Women with characteristics associated with risk of falls (falling ≥twice in baseline year, needing to use one's arms to rise from a chair, fair or poor health, and osteoarthritis or degenerative joint disease) had a higher incidence of fracture.
Conclusions: A significantly higher incidence of fracture in the GLOW cohort was found for women with established risk factors such as prior fracture and parental hip fracture, but not for low BMI, current smoking, early menopause or high alcohol use. Several indicators of fall risk also showed increased risk of fracture.

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P271 - SUBCLINICAL DECLINE IN RENAL FUNCTION WAS ASSOCIATED WITH INCREASED BONE DENSITY IN A JAPANESE ELDERLY MALE POPULATION: FORMEN STUDY

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Aims: Chronic kidney disease (CKD) aggravates bone metabolism in its end stage. We examined whether subclinical decline in renal function affected bone metabolism in elderly men.
Methods: The Fujiwara-kyo Osteoporosis Risk in Men (FORMEN) Study examined all male participants of a larger cohort study referred to as the Fujiwara-kyo Study, who were living in Nara, Japan, aged 65 years and older, and able to walk independently. The baseline survey included BMD measurements at the spine and hip by DXA (QDR4500A, Hologic), biochemical serum tests including creatinine, osteocalcin (OC), and tartrate-resistant ACP isoenzyme 5b (TRACP5b), anthropometric measurements and interviews on medical history and lifestyle factors. Glomerular filtration rate (eGFR) was estimated by the Modification of Diet in Renal Disease equation modified for Japanese by the Japanese Society of Nephrology. Participants who had medical conditions which may affect bone turnover were excluded.
Results: Among eligible 2012 men, 1663 remained from the exclusion. Their mean age, serum creatinine level and eGFR were 73.1±5.2 (range: 65-93) years, 0.89±0.20 (0.49-3.99) mg/dl and 66.9±13.0 (12-124) ml/min/1.73m^2, respectively. According to the Kidney Disease Outcomes Quality Initiative CKD staging,

proportions of stage 1 (90<=eGFR), 2 (60<=eGFR<90), and 3 or severer (eGFR<60) were 4.5%, 66.3%, and 29.3%, respectively. We compared BMD among 5 groups classified by quintile of eGFR, and found a significant dose-dependent decreasing trend in BMD both at the spine and hip with increase in eGFR. This tendency remained significant after adjusted for age, BMI and lifestyle factors (1.047 g/cm^2 in the lowest quintile group, 0.998 in the highest at the spine). Similarly-adjusted odds ratios (OR) for low BMD (T-score<-1) at the hip in the quintile groups based on the lowest group showed 11% increase in risk per 1 quintile increase (OR: 1.11 (95% confidence interval: 1.02-1.21). Serum OC level was significantly higher in the lowest eGFR group than in the highest, but TRACP5b levels did not differ significantly.

Conclusions: We observed a significant association of subclinical renal dysfunction with increased BMD in elderly Japanese men. This unexpected finding should be confirmed in cohort studies including on-going FORMEN Cohort Study.

Acknowledgement: The FORMEN study was performed as ancillary study of The Fujiwara-kyo Study, and supported by the Japanese Society for Promotion of Science (#20659103, #21390210) and the Japan Dairy Association (2008).

Disclosure of Interest: None Declared

P272 - EVIDENCE-BASED ASSESSMENT OF THE EFFECTIVENESS OF A CLINICAL PRACTICE GUIDELINE FOR PREVENTION OF OSTEOPOROSIS AND OSTEOPOROTIC FRACTURE

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Aims: We examined the relationship between the use of a new guideline, "Evidence-based guideline for the prevention of fracture and osteoporosis to promote community health", by local governments and the introduction of evidence-based health measures.

Methods: Of 1,978 local and national health centers, we selected 262 facilities that had planned to improve their measures for the prevention of osteoporosis, and asked them to participate in a randomized clinical trial (RCT). We then conducted a pre-intervention interview with 100 randomly-selected centers using an assessment sheet. The centers were randomly divided into two groups based on a minimization method by defining the area, population, and type of municipality as stratification factors. Following the intervention, we conducted a blind survey using the above-mentioned assessment sheet.

Results: During the intervention period, the guideline was used by 50% of the centers in the intervention group. We compared the level of health advice prior to (baseline) and following the intervention. Regarding advice on calcium intake/supplements and vitamin D intake, a greater improvement was noted in the intervention group. A marked improvement was also observed in advice given to the intervention group on physical training including fast walking, vigorous exercise, stretching and moderate exercise, and training to strengthen the muscles of the lower body.

Conclusions: Prior to the implementation of the intervention, some preventive measures provided by local governments were not based on scientific evidence. The introduction of the guideline facilitated the improvement of important measures regarding advice on calcium intake and exercise. However, little improvement was made in several items, indicating the inefficacy of the guideline booklet as a communication tool. It is necessary to develop supplemental tools to help local governments implement effective and efficient health promotion measures for community residents.

Acknowledgement: The study was supported by Health and Labour Sciences Research Grants (2006-2007) from The Japanese Ministry of Health, Labour and Welfare.

Disclosure of Interest: None Declared

P273 - THE PATTERN OF MORTALITY ASSOCIATED WITH BONE MINERAL DENSITY IN ELDERLY MEN – MROS SWEDEN

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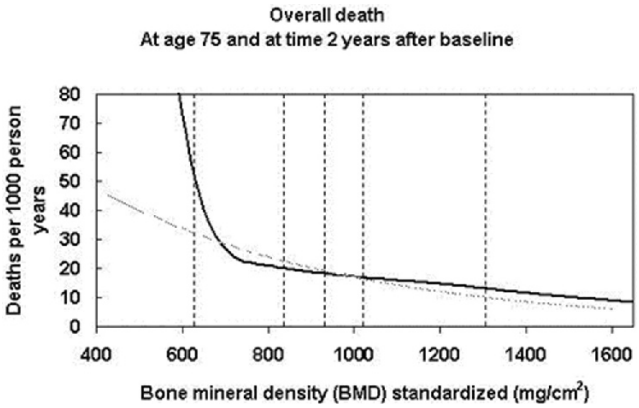
Aims: We examined the relationship between bone mineral density (BMD) and risk of death among elderly community dwelling men recruited to the MrOS Sweden study to determine the pattern of mortality associated with BMD and the impact of comorbidities.

Methods: A random, population-based sample of 3014 men aged 70-81 years was recruited at medical centres in Gothenburg, Malmo, and Uppsala. Data collected at baseline included general health and life style questionnaires and BMD measured at the total body, spine and hip using DXA. At the time of analysis, men had been followed for up to 6.5 years, with an average follow-up of 4.5 years. Poisson regression models investigated the relationship between BMD and the hazard function of death, adjusting for age and time since baseline. A similar approach was used to examine other predictors of mortality and a final multivariate model was constructed to determine independent predictors.

Results: During follow-up, 382 men had died (all cause mortality). Low BMD at all measured skeletal sites were associated with increased mortality. Other significant predictors, in univariate analyses, included current smoking, self-estimated health, multiple medications and comorbidities (cancer, stroke, myocardial infarction and angina). In multivariate analysis, low BMD remained significantly associated with increased mortality risk (GR 1.27, 95%CI 1.14, 1.42) and was independent of adjustments for a histo-

ry of cancer, angina, diabetes, systolic blood pressure and self-estimated health. Contrary to expectation, the relationship between BMD and death was not well described by a linear model. The Figure shows the relationship between BMD and mortality derived from the multivariate model showing significant non-linearity (p=0.020) with marked effects at lower BMD values. A man with a total hip BMD measurement lying at the 1st percentile would have a 3.7 years lower life expectancy than a man with median BMD, whereas at the other extreme (99th percentile) there is a gain in life expectancy of 1.7 years compared to that at median BMD.



Conclusions: This study shows that low BMD imposes a substantial excess risk of death compared to an average BMD, whilst a higher than average BMD has little impact on mortality.

Disclosure of Interest: None Declared

P274 - OSTEOPOROSIS AND RISK FACTORS WITH MALES YOUNGER THAN 50 ON TERRITORY OF MUNICIPALITY INDJIJA

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Aims: To examine the frequency of decreasing mineral bone density as well as risk factors with males on Indjija Municipality territory, treated in rheumatic ambulance.
Methods: The study of intersection that included 143 males. The age of examined patients ranged from 35 to 50 years, BMI from 17.22kg/m2 to 34.00 kg/m2. The values of T-score on spine and hip was measured by DXA method on Hologic machine. Serum level of vitamin D measured on Roche Hitachi machine, by ECLIA method. Nonparametric statistical methods was used in analysis.
Results: The values of T-score on spine from -3.9SD to 1.2SD, on hip from -3.2SD to 1.1. The distribution by affection that needed help was: low back pain 76.11%(102pts), knee osteoarthritis 58.02%(83pts), shoulder periarthritis 39.16%(56pts), Dipytren contracture 9.09%(13pts), hip osteoarthritis 11.88%(17pts), sciatica 6.99%(10pts). The present other disorders were: insulin-nondependent diabetes 15.38%(22pts), insulin-dependent diabetes 8.39%(12pts), hypertension 45.45%(65pts), hyperparathyroidism 2.09% (3pts), hyperthyroidism 2.09% (3pts), stroke16.08% (23pts), hepatitis B 2.79% (4pts), renal failure 4.19% (6pts). The present risk factors: smoking 62.93% (90pts), regular alcohol consumption 22.37% (32pts), sitting at workplace for hours 56.64% (81pts), low body mass 30.06%(43 the deficiency of D vitamin in serum 61.53% (88pts).Low bone density was present with 56.64% (81pts) patients - osteopenia with 46.15± (66pts) and osteoporosis 10.49%(15pts) examined patients. Statistically significant correlation was between low bone density and 1)vitamin D insufficiency (p=0.04), 2)low body mass (p=0.05), 3)hyperparathyroidism with presence of sedentary (p=0.007), 4)hyperthyroidism with presence of sedentary (p=0.04), and 5)renal failure (p=0.03). Above the level of statistical significance for stroke (p=0.06).
Conclusions: Low mineral bone density is not rare within examined younger male population (to 50 years) on Indjija Municipality territory. Although all patients were checked in ambulance for other reasons, with the considerate history were discovered risk factors for lower bone density, which was proven by osteodensitometry. The question is how the examined sample represent the state in male population till the 50th year of life in this region.

Disclosure of Interest: None Declared

P275 - EXERCISE, CALCIUM INTAKE, AND REGULAR INTAKE OF BREAKFAST DURING HIGH SCHOOL ARE ASSOCIATED WITH HIGH BONE MINERAL DENSITY IN MALE ADOLESCENTS

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Aims: To clarify the factors associated with bone mineral density (BMD) in male adolescents at the age of peak bone mass.
Methods: From 1993 to 2002, all male freshers at the Wakayama Medical University were recruited in the study; all participants provided informed consent. BMDs of the lumbar spine (L2–4) and femoral neck (FN) were measured using dual energy X-ray absorptiometry (Lunar DPX-1000). A detailed interview was conducted to obtain information on the participants' medical history, family medical history, smoking status, drinking habits, and physical activities. In addition, information on nutrition intake, including calcium intake and breakfast eating habits, during elementary school, junior high school, high school, and at the time of the study were recorded. Anthropometric measurements such as height, weight, arm span, dominant wrist circumference, and grip strength were also performed.
Results: Of the 387 freshers, 382 (age range, 18–29 years; mean age, 20.7 years) completed the study (participation rate, 98.7%). The mean BMDs of L2–4 and FN were 1.21 g/cm^2 and 1.12 g/cm^2, respectively. No participants were diagnosed with osteoporosis (OP) according to the diagnostic criteria defined by the World Health Organization. The mean BMD of L2–4 in the group that performed ≥10 hrs of exercise per week during high school was significantly higher than that in the group that performed <10 hrs of exercise per week (≥10 hrs, 1.23 g/cm^2; <10 hrs, 1.20 g/cm^2; $p<0.05$). This tendency was also observed for the BMD of FN

(≥10 hrs, 1.15 g/cm^2; <10 hrs, 1.10 g/cm^2; p<0.05). The BMD of FN in the group that drank milk everyday during high school was significantly higher than that in the group that drank less milk (every day, 1.13 g/cm^2; less, 1.10 g/cm^2; p<0.05). The BMD of L2–4 in the group with regular breakfast eating habits during high school was significantly higher than that in the group that did not eat breakfast (regular, 1.21 g/cm^2; omission, 1.16 g/cm^2; p<0.05). This tendency was also observed for the BMD of FN (regular, 1.12 g/cm^2; omission, 1.07 g/cm^2; p<0.05).

Conclusions: Exercise, daily milk intake, and regular intake of breakfast during high school are associated with high BMD in male adolescents.

Disclosure of Interest: None Declared

P276 - PREVALENCE OF VITAMIN D DEFICIENCY, SECONDARY HYPERPARATHYROIDISM DURING WINTER IN PREMENOPAUSAL IMMIGRANTS AND ETHNIC FINNISH WOMEN: ASSOCIATIONS WITH FOREARM BONE MINERAL DENSITY

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Aims: The aim of this study was to determine the prevalence of vitamin D deficiency, secondary hyperparathyroidism in Bangladeshi and Somali immigrant women living in Helsinki. As vitamin D status and serum parathyroid hormone (S-iPTH) levels affect bone mineral density (BMD) in adults, we also wanted to investigate ethnic differences in BMD status at the distal and diaphyseal radius and compare the findings with that of Finnish women.

Methods: The study was carried out in the Helsinki area (60°N) during January- February 2008. A total of 143 healthy subjects aged 20-48 years, were recruited from 2 groups of immigrant women (Bangladeshi, *n*=34; and Somali, *n*=48) and a group of ethnic Finnish women (*n*=61). Height, weight and background information was collected. Serum concentrations of 25-OHD and iPTH were measured. Peripheral quantitative computed tomography (pQCT) measurements were taken at 4% and 66% of the forearm length (measured with tape measure), proximal to the distal radial joint surface.

Results: In all three groups, the distribution of serum 25OHD concentration was shifted overall toward the lower limit of the normal range. A very high prevalence of vitamin D insufficiency (S-25OHD <50nmol/l) was observed (89.6%) in Somali subjects. Serum iPTH level was very high (>65 ng/l; secondary hyperparathyroidism) in 79% of these subjects. Total bone mass at all sites of forearm was significantly higher (p<0.001) in Bangladeshi and ethnic Finnish women compared with Somali women.

Conclusions: The high prevalence of hypovitaminosis D, secondary hyperparathyroidism and low bone status in Somali women are indicative of higher risk of osteoporosis. Thus, the result of this study indicate that more attention should be focused on vitamin D and BMD status in this group of population.

Disclosure of Interest: None Declared

P277 - HEALTHCARE RESOURCE UTILIZATION IN POSTMENOPAUSAL WOMEN ENROLLED IN POSSIBLE EU*

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Aims: POSSIBLE EU* is an ongoing, prospective observational study exploring the management and experience of postmenopausal women receiving bone loss medications in the EU. This exploratory analysis describes healthcare resource utilization (HCRU) in this patient population.

Methods: At baseline, 3402 women receiving bone loss medication were enrolled from Germany, France, Italy, Spain and the UK. Clinical data, patient-reported outcomes, and HCRU (including inpatient, outpatient, pharmacy, and other services) were collected by physicians and patients. In this interim analysis, we report the 12-month follow-up data (physician reported [N=3402] and patient reported [N=2921]).

Table: Physician and patient-reported HCRU (mean (SD)) for the 12-month follow-up period (costs not presented)

Physician-reported	All (N=3402)	France (N=846)	Germany (N=708)	Italy (N=526)	Spain (N=567)	UK (N=755)
MD Visits[1]	8.3 (9.9) n = 3377	6.2 (4.4) n = 842	15.1 (17.7) n = 704	8.5 (5.2) n = 524	8.6 (5.7) n = 556	3.9 (3.9) n = 751
Medications[2]	6.4 (5.2) n = 2979	6.1 (4.5) n = 760	6.1 (4.7) n = 646	3.6 (3.2) n = 374	4.8 (3.5) n = 464	9.2 (6.4) n = 735
Patient-reported	**All (N=2921)**	**France (N=711)**	**Germany (N=617)**	**Italy (N=427)**	**Spain (N=477)**	**UK (N=689)**
Inpatient LOS[3]	9.6 (13.2) n = 302	9.4 (12.1) n = 65	12.5 (15.1) n = 95	9.6 (16.2) n = 30	8.3 (9.4) n = 34	6.8 (10.9) n = 78
Days Without Normal Activity	10.6 (31.7) n = 2753	6.1 (25.8) n = 658	11.5 (34.2) n = 567	7.9 (25.3) n = 417	15.4 (37.9) n = 466	12.6 (33) n = 645
Days Missed Paid Work	6.6 (25.6) n = 861	5.8 (27.6) n = 264	6.2 (29.8) n = 142	2.9 (9.4) n = 74	13.8 (44.4) n = 155	4.2 (15.7) n = 226

LOS calculated for patients with non-zero and non-missing values; for other resources, number of patients includes zero values and excludes missing data
[1] MD: Routine primary healthcare physician visits
[2] Concomitant medication excluding bone loss medications
[3] LOS: Length of stay; number of nights during 1st admission to hospital

Results: For the full analysis set at baseline, patients had a median age (Q1, Q3) of 69 (61, 76) years, median BMI (Q1, Q3) of 25.3 (22.5, 28.5) kg/m^2 and a median (Q1, Q3) of 3 (2, 5) ongoing comorbid conditions. For the 12-month follow-up period, the table shows direct HCRU, time lost from work and other activities.

Conclusions: In postmenopausal women receiving bone loss medications, there appears to be a substantial variation in use of resources across Europe. These preliminary analyses will help to understand the clinical and economic burden and overall disease management in this patient population.

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Disclosure of Interest: B. Jonsson Consultant / Speaker's bureau / Advisory activities with: received funding for advisory boards from Amgen., C. Cooper Consultant / Speaker's bureau / Advisory activities with: received consultancy/advisory committee fees from Servier, Procter & Gamble/Alliance, Eli Lilly, Merck

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P278 - INCREASED BONE MINERAL DENSITY IN ELDERLY SWEDISH MEN WITH DIABETES TYPE 2: POSSIBLE MECHANISM

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Aims: Diabetes Mellitus type 1 is recognized as a risk factor for low bone mineral density (BMD) and osteoporotic fractures. In elderly men with diabetes type 2 (T2DM) the findings are conflicting. Increased BMD – and increased risk for incident fractures – were found in some studies. Experimental data indicates that the osteoblast-derived protein osteocalcin regulates plasma glucose partly via adiponectin. (Lee NK et al 2007, Cell). The bone marker osteocalcin was inversely related to plasma glucose and fat mass in elderly men (Kindblom JM et al 2009 JBMR). Osteocalcin is inversely related to BMD. The aim was to investigate if Swedish elderly men with T2DM have increased BMD – and increased fracture risk; elucidate possible mechanism of variation of BMD in diabetic men.
Methods: 3014 men, aged 69-80 years old from the Swedish Mr OS-study completed a standard questionnaire concerning diseases, medical treatment, calcium intake, physical activity and had BMD of the hip and spine measured using DXA scanners. 1412 men had an X-ray of the thoracic-/lumbar spine. Radiological registers were used to confirm new fractures after baseline visit. In Gothenburg (subpopulation n=970) vitamin D, adiponectin, osteocalcin and pro-collagen were analysed.
Results: At baseline 9.5± had diabetes. BMD in all sites were 5-6± higher among men with T2DM ($p<0.0001$). After adjustment for BMI this significance remained ($p<0.01$). T2DM-men had more diseases (stroke, myocardial infarction, hypertension); lower calcium intake, physical activity and a higher BMI. T2DM-men had no increased risk for prevalent vertebral fractures (OR 0.61; 95± CI: 0.35-1.09) or incident fractures (OR 0.90; 0.54-1.48) during the follow-up (3.3 years). In Gothenburg 15± had diabetes (according to questionnaire and/or p-glucos ≥ 7.0 mmol/L). Men with diabetes had 22± lower osteocalcin, 21± lower adiponectin and 9± lower vitamin D ($p<0.001$). Multivariate analyses showed independent association between diabetes and low osteocalcin, adiponectin, vitamin D and high BMI. Low osteocalcin and adiponectin, high vitamin D and BMI associated to BMD.
Conclusions: Independently of BMI elderly men with T2DM have increased BMD but not increased fracture risk. Low osteocalcin and low adiponectin – adjusted for BMI, age, vitamin D and pro-collagen – are strongly associated to diabetes mellitus and might be a possible mechanism of increased BMD in elderly men with T2DM.

Disclosure of Interest: None Declared

P279 - CHANGES IN BONE MINERAL DENSITY AND RISK FACTORS FOR BONE LOSS IN ADOLESCENTS: A 3-YEAR OBSERVATION IN JAPANESE MEDICAL STUDENTS

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Aims: To assess changes in bone mineral density (BMD) and determine the risk factors for bone loss in young individuals in Japan.
Methods: All freshers at Wakayama Medical University between 1993 and 2000 were invited to participate in the study; all participants provided informed consent before enrolling in the study. The BMDs of the lumbar spine (L2–4) and femoral neck (FN) were measured using dual energy X-ray absorptiometry (Lunar DPX-1000). A detailed interview was conducted to obtain information on the participants' medical history, family medical history, smoking status, drinking habits, physical activities, and nutrient intake, including calcium intake and breakfast eating habits. Anthropometric measurements such as height, weight, arm span, dominant wrist circumference, and grip strength were also obtained. After 3 years, i.e., when the students were in the fourth grade, their BMDs of the same sites were re-examined by the same investigator (NY).
Results: Of the 480 freshers (315 men, 165 women), 456 (298 men and 158 women; age range, 18–29 years; mean age, 20.2 years) completed both the baseline and follow-up surveys (fol-

low-up rate, 95.0%). The mean BMD of L2–4 in the first grade was 1.20 g/cm^2 and 1.18 g/cm^2 in men and women, respectively, and that in the fourth grade was 1.27 g/cm^2 and 1.20 g/cm^2, respectively. Thus, the BMD of male students markedly increased. This tendency was also observed in the case of the FN (men: first grade, 1.11 g/cm^2; fourth grade, 1.15 g/cm^2, women: first grade, 0.97 g/cm^2; fourth grade, 0.97 g/cm^2). Conversely, the BMD of L2–4 decreased over 3 years in 92 students (20.2%; 54 men, 38 women), and that of the FN decreased in 175 students (38.5%; 96 men, 79 women). Logistic regression analysis with occurrence of bone loss over 3 years (yes: 1, no: 0) as an objective factor was performed after adjustments for age, gender, and body mass index. It revealed that smoking (odds ratio (OR), 2.20; 95% confidence interval (CI), 1.11–4.36; p=0.024) and omission of breakfast (OR, 2.06; 95% CI, 1.26–3.36; p=0.004) were significantly associated with bone loss at L2–4, whereas no significant lifestyle factors were associated with bone loss at the FN.
Conclusions: This 3-year observation of BMD in first-year students showed that BMD in adolescents tended to increase, except in the case of the FN in women; moreover, smoking and omission of breakfast were risk factors for bone loss at L2–4 in adolescents.

Disclosure of Interest: None Declared

P280 - OSTEOPOROSIS IN A POLIO POPULATION

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Aims: Polio can produce flaccid asymmetric weakness and muscle atrophy, which causes reduced mobility and increases the risk for falls. The objectives of this study were to determine the frequency of osteoporosis and osteopenia at the hip and lumbar spine in a polio patient population; (2) to evaluate the association of lower-extremity strength with bone density at the hip; and (3) to evaluate the association of bone density and other potential contributing factors to osteoporosis such as age, time since acute polio, mobility status, muscle atrophy and length of extremity which was effected.
Methods: A bone densitometry was requested depending on the doctor's judgment after patient evaluation. All patients were evaluated by the same physician. Patients (n=72) of the disable evaluation clinic of PMR department were called between October 2008 and January 2010. Inclusion criteria for the study were (1) history and physical examination consistent with previous paralytic polio and (2) bone densitometry result available. Reasons for noninclusion were (1) presence of other medical disorders that can cause osteoporosis (e.g., untreated thyroid disease, Paget's disease, primary hyperparathyroidism, Cushing's syndrome, gastrectomy, malabsorption syndrome), (2) current or previous use of medications, which can cause osteoporosis (e.g., steroids, certain anticonvulsants), and (3) presence of other significant neurologic difficulties (other than paralytic polio and postpolio syndrome). Hip strength, ambulatory level, disability evaluation were recorded. SPSS was used in statistical analysis
Results: Fifty males and 21 females were examined, with a mean age of 33 years and range 25–48 years. The overall patient population included was weaker when comparing the strength sum score in both legs. Osteopenia (84±) and osteoporosis (16±) were found in patients. Osteoporosis at the hip tended to occur more frequently in patients who were ambulated with wheelchair. significant correlations were found between hip bone density and same hip flexor strength (r=0.4).
Conclusions: Our findings of a high frequency of low bone density in a postpolio clinic population and a significant correlation of ambulation level and lower-extremity muscular strength should alert clinicians and refer these patients for bone densitometry

Disclosure of Interest: None Declared

P281 - THE EFFECT OF HYPOVITAMINOSIS D AMONG PRIMARY KNEE ARTHROPLASTY PATIENTS

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Aims: To document the prevalence of hypovitaminosis D and its effect on postoperative outcomes in primary knee arthroplasty patients.
Methods: We prospectively studied 108 primary total and partial knee arthroplasty patients by obtaining serum 25-hydroxyvitamin D (25OHD) on the day of surgery. Western Ontario and McMaster Osteoarthritis Index (WOMAC) scores were recorded at baseline, 3 months, and 1 year postoperatively. Patients were divided into 3 groups: vitamin D sufficient (≥30 ng/ml), insufficient (<30 to >20 ng/ml), or deficient (≤20 ng/ml). Statistical Package for the Social Sciences (SPSS; Chicago, IL) was used for ANOVA and regression analyses.
Results: Hypovitaminosis D was found in 82.4% of patients (36.1% insufficient; 46.3% deficient). Groups did not differ in age, gender, body mass index, ethnicity, season of vitamin D testing, pre-existing osteoporosis, or preoperative WOMAC scores. Preoperative 25OHD in patients who supplemented (26.6±9.9) was not significantly higher than those who did not (21.6±8.3). Three months after surgery, preoperative vitamin D status nearly reached statistical significance (p=.08) as a predictor of postoperative stiffness when controlling for preoperative supplementation and stiffness. Deficient patients (63.0±24.2) had the least stiffness, followed by insufficient (57.2±24.8) and sufficient (55.9±24.8). One year after surgery, preoperative vitamin D status was a significant (p=.02) predictor of postoperative stiffness when controlling for preoperative supplementation and stiffness. Deficient patients (78.9±20.9) had the least stiffness, followed by insufficient (65.5±29.0) and sufficient (58.8±30.6). Vitamin D/calcium supplementation nearly reached significance (p=.08) as a predictor of stiffness at 1 year when controlling for preoperative vitamin D status and stiffness. Those with preoperative supplementation had less stiffness (81.3±18.9) than those without (67.6±27.9).
Conclusions: There is a high prevalence of hypovitaminosis D among knee arthroplasty patients and therefore an unexpectedly high co-incidence with osteoarthritis of the knee. Vitamin D deficient patients had the greatest benefit from primary knee arthroplasty at 1 year. This study was limited by biases inherent in

patient self-report questionnaires. Further studies are needed to elucidate the potential therapeutic role and effect of preoperative vitamin D/calcium supplementation on postoperative recovery.

Disclosure of Interest: None Declared

P282 - CORRELATION BMI AND OSTEOPOROSIS IN POSTMENOPAUSAL GREEK WOMEN

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Aims: Many factors have been associated with osteoporosis in postmenopausal (PO) women, such us family history, fractures, tobacco, diet, height and weight. The aim of this study is to determine the association among osteoporosis, height, weight and Body Mass Index (BMI).
Methods: 128 (PO) Greek women participated in this study with age range from 52 up to 70 (± 61) and were measured on lumbar L2-4 with DXA. After the measurement of height and weight we calculated the BMI and we correlated it with BMD (cm^2). Statistical analysis was made with ANOVA .
Results: The results were ranged from 14,5% up to 80,1% related with the weight of patient, from 8,5% up to 25,6% related with the height and from 15,6% up to 37,8% related with BMI. The statistical analysis showed the relation between BMI and osteoporosis (P<0,02), however, weight in association with osteoporosis and height in association with osteoporosis, in postmenopausal women, showed high statistical association (P>0,0001 and P<0,0001).
Conclusions: In conclusion, postmenopausal women with low weight independent from height and postmenopausal women with short height independent from weight are highly associated with osteoporosis in comparison with patients with low BMI. *Postmenopausal Greek women with low weight and short height rather patient with low BMI correlate in a better way with the diagnosis of osteoporosis.*

Disclosure of Interest: None Declared

P283 - FREQUENCY OF OSTEOPOROSIS IN PATIENTS WITH RHEUMATIC DISEASES ATTENDING THE RHEUMATOLOGY CABINET, PRISTINA, 2006-2009

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Aims: Osteoporosis is a metabolic disease characterized by progressive reduction of bone mass and micro-architectural deterioration with a subsequent increase in bone fragility and susceptibility to fractures, especially of the vertebral bodies, hip, femoral neck and hand-wrist. This is mainly a disease of the elderly, more in the females and in many countries it takes the form of epidemics, which has become one of the most important causes of morbidity, disability and even death. The aim of this work is to present the frequency of cases with osteoporosis and to highlight the importance of the disease as a social and medical problem.
Methods: Using the epidemiologic retrospective method, we analyzed 1664 cases of patients with osteoporosis diagnosed and treated within the period of four years, from 2006 to 2009 in the Rheumatology Cabinet of the Main Centre for Family Medicine, Pristina.
Results: The results show that from all rheumatic patients, 9.42% where patients with osteoporosis. The disease is more frequent in women (86.7%) than in men (13.3%) and it shows the tendency of occurring more frequently in both sexes with ageing. From overall cases with osteoporosis, 48 cases suffered lumbar vertebrae fractures or femoral fractures.
Conclusions: The conclusion of this study is that early diagnosis and better organization of work especially in consulting offices for women during menopause and post-menopause period will result in improving life quality to patients with osteoporosis in general.

Disclosure of Interest: None Declared

P284 - DETERMINATION OF SERUM CONCENTRATIONS OF 25 HIDROXIVITAMIN D IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY AND ITS ASSOCIATION WITH PARAMETERS OF BONE METABOLISM AND VERTEBRAL FRACTURES

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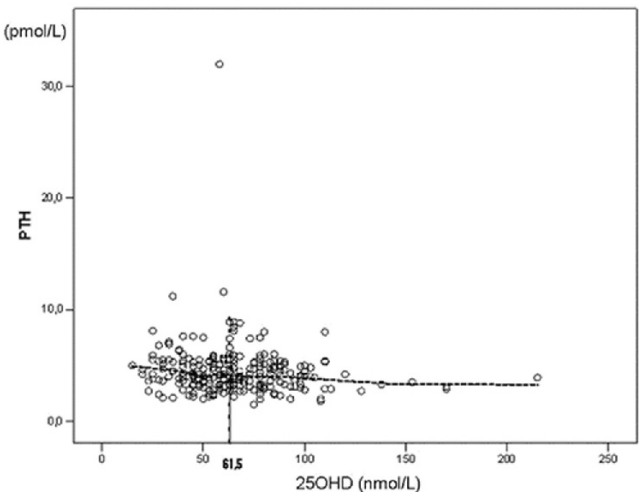
Aims: This study was design to determine the medium serum concentrations of 25-hydroxyvitamin D (25OHD) in postmenopausal women with low bone mineral density (BMD), to find the cutoff of parathormone (PTH) elevation, and to correlate 25OHD with BMD, biochemical parameters and vertebral fracture presence.



Methods: Transversal study, with collection of 25OHDand PTH, and determination of DMO and column radiograph.
Results: A high incidence of inadequate serum concentrations of 25OHD (68.3%) was found as well 8% of secondary hyperparathyroidism. No significantly differences were found between 25OHD serum concentrations and the evaluated parameters, except PTH, which had a negative association. The established cutoff was 61.5 nmol/L.
Conclusions: The elevated incidence of hypovitaminosis D in elderly women with low BMD suggests that a systematic evaluation of 25OHD serum concentrations must be done for this population. It is recommended the use of 61.5 nmol/L as a cutoff until the realization of an epidemiologic study that represents all Rio de Janeiro city (RJ, Brazil).
Acknowledgement: Wyeth International, to allow the use of baseline data from a multicenter study.

Disclosure of Interest: None Declared

P285 - EFFECTIVENESS OF INTERVENTIONS TO IMPROVE THE DETECTION AND TREATMENT OF OSTEOPOROSIS IN PRIMARY CARE SETTINGS: A SYSTEMATIC REVIEW

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Aims: To systematically review the literature to describe the effectiveness of interventions aiming at improving the detection and treatment of osteoporosis in primary care.
Methods: Eight different electronic databases were searched. Clinical trials registries, the TRIP database, ProQuest, the NIH reporting tool, and proceedings of the International Osteoporosis Foundation's World Conference on Osteoporosis were also searched. Randomized controlled trials, controlled clinical trials, quasi-randomized trials, controlled before-after studies, and interrupted time-series written in English or French from 1985 to 2009 investigating interventions aiming at improving the detection and/or treatment of osteoporosis in primary care were considered. Eligible studies also had to include patients at risk or at high risk for osteoporosis in whom osteoporosis screening or treatment is indicated according to Canadian and American guidelines. Outcomes included bone mineral density (BMD) testing, osteoporosis-treatment initiation and fractures. Each article was independently assessed by two evaluators to assess its relevance and extract data, and discrepancies were resolved by consensus.
Results: 14 reports regarding 11 different studies were included in the review. Eight of the 11 eligible studies provided data on outcomes of interest. Follow-up duration ranged between 4 and 16 months. Of those 8 studies, 7 showed a statistically significant improvement in the incidence of BMD testing in the intervention group as compared with the control group, with absolute increases ranging from 22% to 51% and from 4% to 18% in studies targeting high-risk and non- high-risk patients, respectively. Moreover, 5 studies showed a statistically significant improvement in the initiation of osteoporosis treatment following intervention, with absolute increases ranging from 6% to 30% in studies targeting high-risk patients and of 2% in the one study that involved non-high-risk patients. Two studies reported non-statistically significant differences regarding fracture incidence. Most effective interventions were multifaceted and targeted both primary care physicians and high-risk patients (with prior fragility fracture or long-term glucocorticoid use).
Conclusions: Multifaceted interventions targeting high-risk patients and their primary care physicians may be effective in improving the management of osteoporosis. However, the improvement is often modest, particularly in non- high-risk patients.

Disclosure of Interest: None Declared

P286 - PREVALENCE OF OBESITY, OVERWEIGHT, AND VITAMIN D DEFICIT IN OSTEOPOROTIC POSTMENOPAUSAL WOMEN OF BUENOS AIRES CITY, ARGENTINA

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Aims: Vitamin D (VD) is essential for bone and musculoskeletal health. Obesity is a risk factor for hypovitaminosis D since obese patients usually have less exposure to UV radiation either by making less physical activity or by the possible kidnapping of VD by the adipocytes. This fact would determine a lower synthesis of 25(OH) VD due to a negative feedback with 1.25(OH) 2D and PTH. A recent survey shows that just 10.6% of the people between 20 and 49 years with overweight and obesity have VD values ≥36ng/ml. The objective was to establish the prevalence of obesity, overweight and vitamin D deficit in osteoporotic postmenopausal women (PMW) of Buenos Aires who attended the site for the osteoporosis study
Methods: We evaluated 397 PMW, average age 65 (53-98) years with diagnosis of osteoporosis underwent a bone mineral densitometry performed with a Lunar Prodigy Advance DXA equipment of antero posterior lumbar spine and femoral neck in Buenos Aires, metropolitan area (latitude 35 ° South) who attended Centro TIEMPO for bone mass evaluation. Patients with thyroid disease, liver and kidney failure and those receiving corticosteroids, anticonvulsants and anticoagulants were excluded. Body Mass Index (BMI) was considered as follows: <19 as low weight (LW), normal weight between 19-25 (NW), 25-30 overweight (OW) and above 30 obese (O). 25 (OH) VD was measured between October and December by RIA with a Diasorin kit and was divided into <20 ng / ml, between 20-30 ng / ml, between 30-40 ng / ml and> 40 ng / ml. Pearson Chi-Square and Fisher exact-one tailed test were performed

Results: LW was detected in 2.01% (8) of the patients, mean age 67 years old (YO) (54-76), 38.04% in the NW (151) age 64 YO (53-85), OW in 45,34% (180) age 66 YO (54-98) and 14.61% in the O YO (58) age 68 (54-82).

Serum 25 (OH) VD levels according to BMI

25 (OH) VD	LW	NW	OW	O
<20	1 (12,5%)	34 (22.5%)	43(23,9%)	26(44.8%) *
20-30	6 (75.0%)	72 (47.7%)	96 (53,3%)	24 (41,4%)
30-40	1 (12,5%)	37 (24.5%)	40 (22,2%)	8 (13,8%)
40	0 (0%)	8 (5.3%)	1 (0,6%)	0
n=397	8 (2.01%)	151 (38.04%)	180 (45,34%)	58 (14,61%)

* Pearson Chi-square p=0.00048 Fisher exact, one tailed p=0.0006

The percentage of obese osteoporotic women with 25(OH) VD level below 20 mg/ml was statistically significant

Conclusions: 60% of the studied postmenopausal osteoporotic women shown overweight/obesity and 45% of obese patients has values below 20 ng / ml.

Disclosure of Interest: None Declared

P287 - RELIABILITY OF NEW AUTOMATED 25-OH-D-VITAMIN ASSAYS IN MEASUREMENT OF D-VITAMIN STATUS

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Aims: The aim of the study was

- to assessed the analytical performance of two automated chemiluminescent 25-OH-D-vitamin immunoassays i.e. direct methods from serum without any pre-treatment of samples
- to compare these methods to conventional manual radioimmunoassay (RIA) involving pre-treatment of samples with an organic solvent.
- to test the accuracy of these three routine methods against liquid-chromatography-tandem mass spectrometry (LC-MS/MS).

Methods: The direct automated methods tested were Elecsys 25-OH vitamin D_3 assay on Roche Modular E170 (Roche Diagnostics, Mannheim, Germany) and 25-OH Vitamin D TOTAL Assay on LIAISON (Diasorin, Saluggia, Italy). These immunoassays were compared to manual RIA (DiaSorin, Stillwater, MN, USA) and LC-MS/MS. In the method comparison studies fresh serum samples from same patients were used.

Results: The comparison of Elecsys 25-OH vitamin D_3 with RIA yielded the regression equation: Elecsys=0.912 x RIA + 6.745 (n= 90) and with LC-MS/MS: Elecsys=0.78 x LC-MS/MS + 9,22 (n= 64). The corresponding comparison of LIAISON 25-OH Vitamin D TOTAL Assay with RIA yielded the regression equation: LIAISON=1.00 x RIA – 3.44 (n= 90) and with LC-MS/MS: LIAISON®=0.81 x LC-MS/MS + 3.83 (n= 64). In comparison with LC-MS/MS, using the cut-off of 50 nmol/L (deficiency vs. normal), approximately 13% of samples were misclassified with RIA, and 15% with Elecsys and LIASON, respectively.

Conclusions: The automated direct Vitamin 25-OH-D methods provide the benefits of automated methods, being precise and potentially improving laboratory workflow and efficiency. Additionally, a reasonable overall agreement with LC-MS/MS and RIA was observed. However, large between method variation was found in some individual patient samples with both of these methods.

Disclosure of Interest: None Declared

P288 - QUALITY OF LIFE REDUCTION ONE YEAR AFTER AN OSTEOPOROTIC FRACTURE IN RUSSIA

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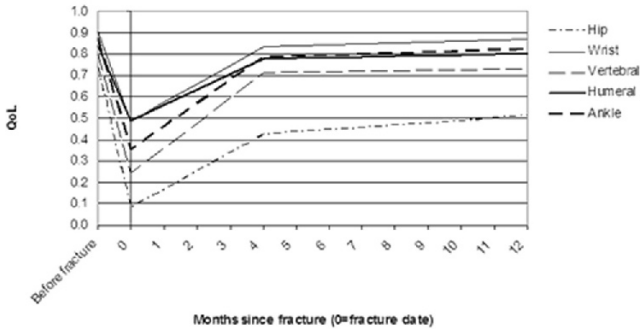
Aims: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is a large prospective multinational study with the aim of estimating costs and quality of life (QoL) related to osteoporotic fractures. The purpose of this study is to present an interim analysis of the QoL impact the first year after sustaining an osteoporotic fracture in Russia.

Methods: Patients were enrolled from 8 study centres in Russia. Patients were asked about their QoL before (recollected), directly after the fracture (within two weeks after fracture), at four and twelve months after the fracture. The QoL was estimated with the EQ-5D questionnaire, visual analogue scale (VAS), producing QoL estimates between 0 (death) and 1 (perfect health).

Results: A sample of 823 patients were registered at the time of data extraction (January 14th 2010). The patient sample consisted of 184 hip, 216 wrist, 174 vertebral, 95 humeral and 154 ankle fractures. The mean age at fracture was 65 and the sample consisted of 81% women. The pre-fracture quality of life values were between hip at 0.73 (CI_{95}:0.70-0.77) and wrist 0.90 (CI_{95}:0.88-0.92). The results depicted in Figure 1 indicate a substantial drop in QoL sustaining an osteoporotic fracture, most prominent for hip fractures. Hip fracture patients are still experiencing a significantly reduced QoL one year after fracture (average 0.51 CI_{95}: 0.46-0.56). For the other fracture types, QoL increased again within the first year of fracture although not reaching the pre-fracture QoL. The same pattern was detected when QoL was estimated with VAS, although not reaching as low levels of QoL as when estimated with EQ-5D.

Figure 1. Quality of life after sustaining an osteoporotic fracture in Russia



Conclusions: Osteoporotic fractures were associated with a significant loss in quality of life immediately after the fracture. Increases of the quality of life estimates were seen at the four month follow-up, but still at one year after fracture, patients were at a lower quality of life than before the fracture.

Disclosure of Interest: None Declared

P289 - QUALITY OF LIFE REDUCTION ONE YEAR AFTER AN OSTEOPOROTIC HIP FRACTURE IN ITALY

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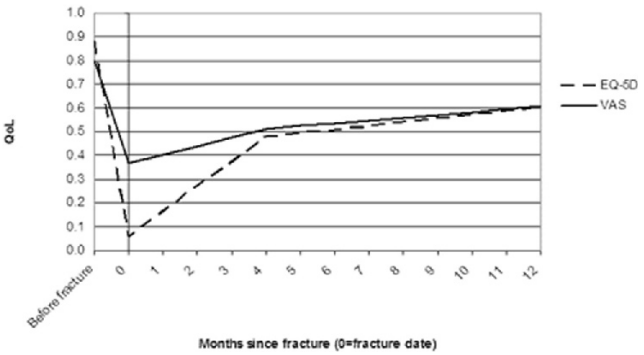
Aims: A large prospective international study (ICUROS) is currently ongoing, assessing costs and quality of life related to osteoporotic fractures. The purpose of this study is to present an interim analysis of the quality of life (QoL) impact during the first year after sustaining an osteoporotic hip fracture in Italy.
Methods: Patients were enrolled from one study centre in Italy. Patients were asked about their QoL before (recollected), directly after the fracture (within two weeks after fracture), at four and twelve months after the fracture. The quality of life was measured by the EQ-5D questionnaire and the EQ-5D visual analogue scale (VAS).
Results: A data extraction was conducted in January 2010. The dataset contained 59 hip fracture patients in Italy who had reached the one year follow-up. All patients were women with a mean age at fracture of 81. The pre-fracture QoL was estimated at 0.88 (CI_{95}: 0.84-0.92) and 0.80 (CI_{95}: 0.77-0.83) with EQ-5D and VAS, respectively. As depicted in Figure 1, hip fractures were associated with a significant reduction in the patients QoL, although most prominent when measured with the EQ-5D. At the four month follow up the QoL had increased, but there was a sustained significant reduction in QoL still after one year.

Figure 1. Quality of life after sustaining an osteoporotic hip fracture in Italy



Conclusions: The data indicate that osteoporotic hip fractures have a substantial effect on the patient's quality of life in Italy. There was still a marked reduction in quality of life at one year after sustaining the fracture, irrespective of estimation method.

Disclosure of Interest: None Declared

P290 - EDENTULISM AS A PREDICTOR OF OSTEOPOROSIS AMONG POSTMENOPAUSAL BAHRAINI WOMEN

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Aims: To appraise a simple and cost-effective tool that may be used as part of a health policy approach to the detection and mitigation of osteoporosis in postmenopausal Bahraini women.
Methods: A Cross sectional study was conducted in five randomly selected primary health care centers in Bahrain, to test the association between the co-existing conditions (edentulism and osteoporosis), between March 17- May 15, 2007. Within these centres, a convenience sample of 170 postmenopausal Bahraini women were recruited, interviewed and examined through a questionnaire, tooth count, and ultrasound bone density screening procedure. Edentulism was categorized with regard to magnitude of tooth loss; 1-5 missed teeth (group 1), 6-15 (group 2), 16-25(group 3), >25(group 4).
Results: Only 21.7% of the women, who participated in the study, were shown to have normal bone density; 51.2% had osteopenia and 27.1% had osteoporosis. 2.9% of participants had full dentition, whereas 97.1% had missing teeth. After adjusting for the effect of age, the odds of having osteoporosis for group 2, was 3.0 times greater than the odds of group 1. The odds ratios associated with group 3 and group 4 were 15.32 and 66.55, respectively. No significant association between edentulism and parity or gravidity was found. A mathematical model was developed that linked edentulism and probability of osteoporosis, across postmenopausal women.
Conclusions: Edentulism was found to be significantly associated with osteoporosis, and can be used to identify those women in whom further specific investigations for osteoporosis, is indicated. Therefore, and given the need to repeat this study using

the gold standard for assessing bone mineral density, edentulism can potentially serve as a simple and cost effective tool to predict latent osteoporosis. Contrary to local cultural beliefs that tooth loss is an inevitable part of pregnancy, no significant association between edentulism and parity or gravidity was found.

Disclosure of Interest: None Declared

P291 - FRAX® IMPLEMENTATION IN FRACTURE RISK ASSESSMENT. IS IT SUPERIOR TO T-SCORE ALONE IN IDENTIFYING SUBJECTS WITH PROBABLE VERTEBRAL FRACTURES?

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Aims: The primary goal of osteoporosis management is to assess fracture risk and target treatment accordingly. The FRAX® was developed as a tool for fracture risk assessment. It incorporates BMD and various risk factors and is expected to be superior to BMD measurement alone and to permit a better identification of subjects with osteoporosis. The aim of the current study was to explore and compare the association of FRAX®-calculated 10 year risk and the BMD to height reduction as an indicator of vertebral fractures.
Methods: Material and methods: A random sample of 1332 postmenopausal women 50-89 years of age, divided into 10-year age groups, was studied. All subjects filled a questionnaire concerning risk factors and femoral neck BMD was measured by DXA on Hologic QDR and Lunar DPX units. Further, the 10-year major fracture and hip fracture risks ere calculated using the FRAX® tool. The subjects were divided into two groups according to whether a height reduction of >3 cm was present. The calculated risks and T-score were compared between the two groups.
Results: Results: Osteoporosis was found in 214/1277 subjects (16.8%): 9.1% in the 50-59, 12% in the 60-69 and 32.1% in the ≥70 year olds.

Table 1. Mean T-scores and hip and major fracture risks.

Age Group	T-score (SD)	Major Fracture risk (%)	Hip fracture risk (%)
50-59 years	-.8799±1.15	8.847±6.45	.9998±1.54
60-69 years	-1.2424±1.06	13.115±7.33	1.7284±2.79
≥70 years	-1.8678±1.15	19.584±10.65	6.4830±8.93

A height reduction of more than 3 cm was found in 440/1331 (33.1%).The proportion of subjects with reduces height increased with age. The 10-year hip and major fracture risks were higher in the subjects with a height reduction (4.52±6.90% and 17.36±10.19% vs. 1.98±3.81% and 11.47±7.98% respectively, both p<0.001) and T-score was lower (-1.72±1.09 vs. -1.07±1.18, p<0.001). The ROC curve AUCs predicting height reduction were: for calculated major fracture risk - 0.722 (0.639-0.750), for calculated hip fracture risk – 0.708 (0.679-0.738) and for T-score – 0.345 (0.314-0.376).
Conclusions: Conclusion: As expected, both calculated fracture risks increases with the decrease in T-score. They however increase more steeply with age, than is the reduction of the T-score and seem to have a better predictive power for height reduction than T-score alone. Thus FRAX® calculation may help optimize treatment decisions. Further studies may add more conclusive results.
Acknowledgement: This work was sponsored by the Ministry of Health as part of the National Osteoporosis Program in Bulgaria 2005-2010.

Disclosure of Interest: None Declared

P292 - FATIGUE FRACTURES IN 2010

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Aims: Fatigue fractures (FF) were first described by Breithauf in 1855. Since then, these fractures have remained identical with regard to their diagnosis, localisation, evolution and treatment. To identify risk factors predisposing to a fatigue fracture in a population monitored in a rheumatologist's general practice.
Methods: Rheumatologists of Ile de France (France) proposed a questionnaire to their patients presenting with a FF during a consultation.
Results: 47 questionnaires were collected by rheumatologists from Hauts-de-Seine (92), Paris (75) and Val de Marne (94). 78.7% of patients were females, mean body mass index was normal for both sexes. Mean age at occurrence was 55 for a mean menopausal age of 48.2. Diagnosis was established by radiography in 25% of cases, by MRI in 25%, and by scintigraphy in 32%. Risk factors: 70% of patients had no sporting activity or less than 1 hour of walking weekly. (in contradiction with previous FF descriptions). Walking is the major triggering factor. Alcohol, smoking, anorexia, corticosteroids or other treatments were not significant. All fracture sites are conceivable but the foot is the most affected one. Lower limbs examination revealed 72% of foot fractures out of which 53% were metatarsal . Previous fractures were described in 1/3 of cases, involving the fibula, tibia, femur, pelvis, upper limb, trunk (ribs and vertebrae (spondylolisthesis)). The most commonly used treatment is relief of the load. Biochemical investigations have shown no marked abnormalities, vitamin D is normal at an average level of 30 ng / ml. PTH is normal despite insufficient calcium intake, lower than 1 g/d in 62% of cases. Bone densitometry showed: lumbar rachis osteopenia in 50% of cases, osteoporosis in 32%, osteopenia at the femoral neck in 53.6%, femoral neck osteoporosis in 18%. Results strongly raise the question of implementing treatment.
Conclusions: Description of FF has not changed since 150 years. The major advent of densitometric investigation, revealing osteopenia in 50% of cases, emphasizes the necessity to look for an indication for antiosteoporosis treatment. The other identified

factor is a deficit in calcium intake (62%) to be compensated by calcium-vitamin supplementation.

Disclosure of Interest: None Declared

P293 - EVALUATION OF PATIENT PAIN BY A RHEUMATOLOGIST IN GENERAL PRATICE

X. Grapton [1,*], D. Leclere [2], L. Poulain [3], P. Lemesle [4], P. Renard [5] on behalf of RHUMA CREER 92
[1]Private practice, Colombes, [2]Private practice, Suresnes, [3]Private practice, La Garenne Colombes, [4]Private practice, Asnieres sur Seine, [5]Private practice, Courbevoie, France

Aims: Pain is the main reason for a rheumatology consultation. The aim of this study is to analyse the reactions of the physician, his practice and actual experience with regard to pain experienced by his patients.
Methods: 15 Rheumatologists responded to a previously developed questionnaire and gave their impressions.
Results: Rheumatologists were between 40 and 60 years old, 52% were female, all were in private practice. In over 70% of cases they estimate that the patients are not clear when explaining site, type, severity or duration of their pain, or where they can obtain dialectic assistance (72%). The abundance of details irritates them (33%). Physician takes into account the grimaces and moan. By means of the presentation of the pain, the physician learns about the psychological profile of his patient (80%). He listens more and is sympathetic if the pathology described is severe taking more account of physical suffering than mental. 100% of the rheumatologists show comprehension, 80% empathy, but 73% discouragement. The factors influencing their reactions to pain are ranked as follows: self-professional experience, ethics, relationship with the patient, emotional feelings, education level. Patient puts off managing his pain and 92% of rheumatologists believe self-medication is legitimate, irritatingly delays consultation (75%). Internet consultation is normal (67)%, and recourse to other medicines is acceptable (60%). He thinks that the psychological profile of the patient affects the perception of pain, as well as the professional or familial context, but not age. Rheumatologists redefine the debate if necessary and always remain the decision maker relating to requests for treatments or investigations. Finally, more than 67% of patients expect from the rheumatologist: relief, diagnosis and attention, but not prevention or compassion.
Conclusions: If pain prompts a rheumatology consultation, this is poorly clarified by the patient. The handicap, as well as the psychological, social and professional repercussions are fully taken into account by the physician who is understanding and empathetic. His experience and ethics control his attitude and allow him to fully meet the expectations of his patient.

Disclosure of Interest: None Declared

P294 - FRACTURES ANALYSIS IN JUVENILE IDIOPATHIC ARTHRITIS CHILDREN

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Aims: Today there are no definition fracture predictors in children, unlike adults. To research fractures frequency among juvenile idiopathic arthritis (JIA) children and to detect fracture markers.
Methods: We included 184 JIA children, 77 boys and 112 girls. Bone mineralization parameters were detected by dual-energy X-ray absorptiometry of lumbar spine L_1-L_4. Bone biochemical markers were osteocalcin, C-terminal telopeptides, parathyroid hormone (PTH), Ca, Ca^{++}, P, total alkaline phosphatase (TAP) activity. We have detected *ApaI*-, *TagI*-, *BsmI*- restriction length polymorphism assay (RLPA) of vitamin D (*VDR*) receptor gene, *Hind III* marker of osteocalcin gene, *Sp I* marker of I type collagen Iα chain (*ColIαI*), *BclI* marker of glucocorticoid receptor gene (*GCR*).
Results: Fractures of different localizations were detected in 25 children (13,2%), in 17,0% of girls and 7,8% of boys. We have no revealed differences in bone mineralization parameters between children with and without fractures. Also we have no detected differences due to glucocorticoids administration in JIA children. Girls with fractures had significantly higher arthritis activity parameters, such as, swollen joints count (p=0,001), leucocytes count (p=0,025), thrombocytes count (p=0,045), and bone metabolic markers, such as, TAP activity (p=0,008) and PTH (p=0,03) than girls without fractures. Boys with fractures had significant lower arthritis activity parameters, such as, tender joints count (p=0,007) and swollen joints count (p=0,0002), Ritchie articular index (p=0,04), visual-analog score (p=0,03), CRP level (p=0,017). Boys with fractures had significantly frequent H allele of *HindIII* osteocalcin gene polymorphism.
Conclusions: We have revealed that fractures in girls were associated with high arthritis inflammatory activity and high levels of PTH and TAP activity and in boys with low arthritis inflammatory activity and H allele presence of *HindIII* polymorphic osteocalcin gene.

Disclosure of Interest: None Declared

P295 - A NOVEL MUTATION OF TGF-B1 IN CAMURATI-ENGELMANN DISEASE: GENOTYPE-PHENOTYPE CORRELATION AND MEDICAL MANAGEMENT

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Aims: Camurati-Engelmann disease (CED) is a rare autosomal dominant craniotubular dysplasia characterized by hyperostosis and sclerosis of the diaphyses of the long bones and the skull. It is caused by activating mutations in transforming growth factor β-1 (TGFB1), on 19q13.1-q13.3, that have been shown to stimulate bone formation, suppress bone resorption and inhibit muscle and fat development. The extreme variability in phenotypical expression makes it difficult to detect possible genotype-phenotype correlation.We report the clinical experience in an old male patient (now 34 years old) affected by CED with an ex-novo mutation of TGFB1 on exon 7 (Pro375Arg), in heterozygosis, not described in the literature.
Methods: To reduce severe pain in the extremities, easy fatigability and muscle weakness, he had been treated with a daily dose of deltacortene 25 mg from 4 to 13 years old, with clinical remission. Symptoms again occurred after nine years. The patient had high level of inflammatory index and bone turnover. Total body radiography and cranial TC showed the classical signs of CED: gross thickening of skull and of the cortex of the diaphyses of long bones of extremities with areas of sclerosis and osteolysis. Audiogram showed a bilateral hypacusia caused by stenosis of internal and medium ear cavity. He presented also hypothyroidism and hypogonadism. He is followed by dermatologists for the presence of multiple atypical naevi, with progressive increasing in number in the past five years, an occurrence never reported in patients described so far.
Results: After a first attempt with FANS therapy, for the persistence of symptomatology, he was treated with monthly cycles of metilprednisolone ev (1.5 mg) for eight years. He had a great relief from pain, but inflammatory index never normalised. At 28 years old the bone and muscular pain increased, so the frequency of corticosteroid infusion was increased, substituted, when he was 33, by deltacortene 25 mg/day p. os, reduced after five months to 20 mg/day. In the past three years the patient started vitamin D supplementation and one year ago i.v. ibandronate cyclical therapy. Relief of pain and normalization of inflammatory indices only occurred in the past eight months.
Conclusions: A novel activating mutation in exon 7 of TGFB1 gene has been found in this patient affected by a classical presentation of the disease, and a not yet reported occurrence of multiple atypical naevi. The difficulties in life-long needed treatment of CED are discussed.

Disclosure of Interest: None Declared

P296 - A MULTIGENIC COMBINATION OF POLYMORPHISMS WITHIN ESR1, ESR2, FSHR, CYP19A1, NRIP1 AND BMP15 GENES ARE ASSOCIATED WITH THE BONE MINERAL DENSITY AT HIP IN SPANISH POSTMENOPAUSAL WOMEN

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Aims: Looking for markers related to osteoporosis, we have analyzed single nucleotide polymorphisms (SNPs) located in genes related to the estrogen pathway.
Methods: A multicentric study with 1980 unrelated postmenopausal women was carried out. Complete clinical data, femoral densitometry and peripheral blood were obtained from participants in order to determinate candidate gene polymorphism. To perform the genotyping of the markers we employed LightCycler™ (Roche Diagnostics) and pyrosequencing™ technologies. We are evaluating if the simultaneous presence of 11 polymorphisms in 6 genes (*FSHR*, *ESR1*, *ESR2*, *NRIP1* and *CYP19A1*) determines a lower or higher risk of suffering the disease. We have studied 13 digenic and 10 trigenic possible epistatic interactions between the most osteopenic genotypes.
Results: The digenic interactions which resulted statistically significant were:

- *CYP19A1* rs10046 DD/*BMP15* rs3897937 GG combined genotype: T-score= -1.36±0.86, p= 0.04.
- *ESR2* rs4986938 GA/*BMP15* rs3810682 GG combined genotype: T-score= -1.45±0.77, p= 0.04.
- *NRIP1* rs2229741 AA/*BMP15* rs3897937 GG combined genotype: T-score= -1.74±0.93, p= 0.03.

The multilocus analysis which resulted statistically significant were:

- *ESR2* rs4986938 GA/*NRIP1* rs2229741 AA/*BMP15* rs3897937 or rs3810682 GG combined genotype: T-score= -2.32±0.91, p= 0.02.

Conclusions: This study indicates that multilocus interaction into estrogen related genes may play a major role in postmenopausal hip osteoporosis. According to our data, epistatic interaction of *ESR2*, *NRIP1* and *BMP15* alleles seems to be the most likely to predispose to a hip osteoporosis. However, we will need more studies about these complex genes in order to establish a clear cut relation with hip osteoporosis.

Disclosure of Interest: None Declared

P297 - THE RELATIONSHIP BETWEEN POLYMORPHISM OF PEROXISOME PROLIFERATOR ACTIVATED RECEPTOR GAMMA (PPARΓ) GENE AND OSTEOPOROSIS IN AGED MALE IN CHINESE POPULATION

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Aims: To study the relationship between the single nucleotide polymorphisms of exon 6 C161→T of peroxisome proliferators activated receptor γ (PPARγ) gene and osteoporosis in aged male.
Methods: Genomes DNA were extracted from peripheral white blood cells and PCR-RFLP was used to analyze the gene frequency distribution in non osteoporosis (NOP)group and osteoporosis (OP)group in old male. Bone mineral density of lumbar and the upper thighbone (triangle of big rotor, neck of thighbone and Ward's) were measured by dual energy X-ray absorptiometry. Serum osteocalcin were measured by ELISA.
Results: The exon6 of PPARγ have three genotype(CC,CT and TT).The distribution frequency of genotype accord with Hardy-Weinberg law. The gene frequency of T allele in osteoporosis were higher than that in non osteoporosis . Compare with the control group, OP have a lower level of serum bone gla protein and bone mineral density. The bone mineral density in the genotype of CT and TT were lower than that in the genotype of CC.
Conclusions: Our study shows the SNP of 6th exons of PPARγ may relate to osteoporosis in old males. T allele of PPARγ may be a impressionable factor of osteoporosis in old males. PPARγ may be a candidate gene of osteoporosis in old males.

Disclosure of Interest: None Declared

P298 - THE CUMAGAS-OSTEO DATABASE INFORMATION SYSTEM FOR CATALOGUING AND META-ANALYZING GENETIC ASSOCIATION STUDIES IN OSTEOPOROSIS: DEMONSTRATION USING GENES IN FOCAL ADHESION PATHWAY

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Aims: The number of genome-wide association studies (GWAS) and candidate-gene association studies (GAS) in osteoporosis is increasing rapidly. These studies have implicated many gene pathways such as the focal adhesion (FA) pathway genes. In order to catalogue the data from GWAS and GAS and to provide evidence of association in osteoporosis, we developed CUMAGAS-OSTEO (http://biomath.med.uth.gr), a web-based information system which allows the retrieval and cumulative synthesis of the data with the capability of update.
Methods: Currently, CUMAGAS-OSTEO includes data from genes involved in the FA pathway and considers binary phenotype. The data were originated from studies identified by systematically searching PubMed and HuGE Navigator. In synthesizing the data, the random effects pooled odds ratio (OR) for the allele contrast, the recessive and dominant models were calculated and the heterogeneity between studies was examined. The genotype distribution of controls was tested for Hardy-Weinberg equilibrium (HWE). The differential magnitude of effect in large versus small studies was checked using Harbord's test.
Results: Thirty five studies for six variants of COL1A1 gene were catalogued and were synthesized (G2046T, G-1997T and -1663indelT, more than three studies) in CUMAGAS-OSTEO. All studies were underpowered (<50%) and in all studies, the controls conformed to the HWE (P≥0.05). The allele contrast for variants G2046T and G-1997T produced significant association: OR=1.65 (1.31-2.08) with large heterogeneity I^2=74% and OR=1.38 (1.05-1.81) with lack of heterogeneity I^2=0%, respectively. The variant -1663indelT showed lack of heterogeneity and non significant association. The recessive and dominant models followed similar pattern of results as the allele contrast. For the most popular variant (G2046T, 23 studies), the Horbold test was significant and the cumulative meta-analysis showed a trend of association as evidence accumulates.
Conclusions: CUMAGAS-OSTEO would be a useful tool for current genomic epidemiology research in the field of osteoporosis. CUMAGAS–OSTEO is expanded to other gene pathways including GAS and GWAS and will be updated.

Disclosure of Interest: None Declared

P299 - VITAMIN D RECEPTOR GENOTYPE BB IS ASSOCIATED WITH YOUNG AGE IN INDIAN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM

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Aims: Polymorphisms in the Vitamin D receptor (VDR) gene affects the clinical and bone densitometric parameters in primary hyperparathyroidism (PHPT). We studied VDR polymorphism (Bsm1, Taq1, and Apa1) in Indian subjects with PHPT and its influence on clinical and biochemical parameters and BMD.
Methods: VDR alleles (Bsm1, Taq1, and Apa1) were examined in 30 Indian patients with sporadic primary hyperparathyroidism and compared with a normal age-matched population.
Results: We did not find any differences in the frequencies of the VDR genotypes between PHTP patients and the controls. The distribution of Bsm1 polymorphism in the PHPT group was: Bb 60.4%, BB 5.3% and bb 34.3%. The age of the patients was significantly lower (29±12 yrs) in bb genotype than in BB/Bb genotype (50±14, 39±11 yrs). In the PHPT group, no statistical association was found between different allelic distribution and total calcium, serum PTH, gland weight, and ALP. There was no influence of VDR on bone density at hip, lumbar spine and proximal forearm
Conclusions: In PHPT patients, amongst the VDR alleles, there was a trend towards a higher prevalence of the polymorphic site Bsm. The age is significantly lower in bb genotype

Disclosure of Interest: None Declared

P300 - VITAMIN D RECEPTOR GENE VARIABILITY AS A FACTOR INFLUENCING BONE MINERAL DENSITY IN PEDIATRIC PATIENTS

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Aims: To determine the relationship between the polymorphism of vitamin D receptor gene and the bone mineral density in children.
Methods: The study group consisted of 395 children aged 6 to 18 years. All patients underwent genotyping using the PCR-RFLP method within polymorphic loci BsmI (rs1544410), FokI (rs2228570), ApaI (rs7975232) and Taq I (rs731236) of the VDR gene. The BMD (g/cm^2, Z-score) and BMC (g, Z-score) by DXA method, as well as Z-scores of the BUA, SOS and Stiffness ultrasonic parameters were evaluated. Based on densitometry results, children were divided into 3 groups: I - Z-score±1.0; II - Z-score from -1.1 to -2.0; and III - Z-score $\leq$-2.1. A control group numbering 294 children was used for the purpose of allele frequency comparisons.
Results: The occurrence of studied polymorphism alleles in the control group did not significantly differ from the values expected according to the Hardy-Weinberg equilibrium (p values: 0.1224 for BsmI; 0.5958 for TaqI; 0.0817 for ApaI; and 0.8901 for FokI). ApaC (a) allele carrier status in group III children was associated with an increased BMD (x=0.8 vs. 0.69, p=0.0296) and BMC value (x=28.76 vs. 22.14, p=0.0565) in spine projection results, Stiffness (x=-1.12 vs. -1.91, p=0.0347) and SOS (x=-1.43 vs. -2.27, p=0.0319) ultrasonic parameters. In group II, significantly increased SOS values (-1.13 vs. -1.73, p=0.0378) were noted in FokT (f) carriers.
Conclusions: The presence of ApaC (aa) and FokT (ff) polymorphisms favours a higher bone mass and better bone structure (decreased bone mass loss) in the analysed group.
Acknowledgement: The study was partly financed by Ministry of Science and Higher Education grant N^0 40605031/1860 Wojciech Mlynarski and Wojciech Fendler received support from the TEAM program of activity 1.2 of the Innovative Economy Operational Programme coordinated by the Foundation for Polish Science.

Disclosure of Interest: None Declared

P301 - IS THE VDR POLYMORPHISM A FACTOR OF BONE FRACTURES RISK IN CHILDREN?

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Aims: Genetic factors, such as Vitamin D Receptor gene (VDR), contribute to 75-80% of likelihood of fractures in children. The study investigated the relationship between VDR gene variability and incidence of fractures in children.
Methods: The study group numbered 395 children aged 6-18 years. All patients underwent genotyping by PCR-RFLP method within polymorphic loci BsmI (rs1544410), FokI (rs2228570), ApaI (rs7975232) and TaqI (rs731236) of the VDR gene. A control group of 294 children was used for allele frequency comparisons. In 161 individuals a detailed medical history concerning fractures has been collected and the following examinations were performed: densitometric examination (DXA) and bone turnover markers measurements (osteocalcin and Ntx). Analysis of factors associated with risk of fractures was performed using backward, stepwise multivariate logistic regression. Variables tested were: clinical factors standardized for sex and age where appropriate, VDR polymorphism genotypes and concentrations of bone metabolism markers.
Results: Analysis showed that the variables associated with occurrence of bone fractures were: concentration of osteocalcin (OC) and Z-score of total bone mineral density (BMDt) with borderline significance. Odds Ratios (ORs) for specific parameters were 1,01 (95%Confidence Interval 1,00-1,02) for osteocalcin, (p=0,006) and 0,66 (95%CI 0,42-1,03; p=0,07) for Z-score BMDt. In subgroup analysis of patients with low bone mass, factors associated with fractures were: osteocalcin (p=0,04) and carriage of *Bsm*I G (b) (p=0,07) and *Apa*I C (a) alleles (p=0,08). Odds Ratios equalled 1,01 (5%CI 1,00-1,02) for OC, 0,29 (95%CI 0,07-1,14) for *Bsm*I G plus and 2,13 (95%CI 0,91-4,99) for *Apa*I C plus.
Conclusions: 1. Increase of BMDt for one standard deviation in group of examined children reduced the odds of fracture by 41%, but an increase of OC by 1 increased risk of bone fracture by 1%.

2. Allele BsmI G(b) was associated with lower risk of bone fractures, while ApaI C (b) allele promoted a higher risk of bone fracture in children with low bone mass.
Acknowledgement: Wojciech Mlynarski and Wojciech Fendler received support from the TEAM program of activity 1.2 of the Innovative Economy Operational Programme coordinated by the Foundation for Polish Science. The study was partly financed by Ministry of Science and Higher Education grant N^0 40605031/1860

Disclosure of Interest: None Declared

P302 - THE EFFECT OF VITAMIN D RECEPTOR GENE POLYMORPHISMS IN THE BONE MINERAL DENSITY OF POSTMENOPAUSAL WOMEN STRATIFIED BY CALCIUM INTAKE

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Aims: The investigation of the effect of common vitamin D receptor (VDR) gene polymorphisms in bone mineral density (BMD) of Greek postmenopausal women based on their calcium intake.
Methods: Healthy postmenopausal women (n=578) were recruited for the study. Exclusion criteria included any known disease and medication affecting bone metabolism. BMD of the lumbar spine and hip was measured using the Dual-Energy X-ray Absorptiometry method (Lunar DPX-MD). Weight and height were

measured and data concerning medical and medication history were collected. Assessment of dietary calcium intake was performed with multiple 24-hour recalls (including enriched foods but not calcium supplements). Genotyping was performed for the BsmI, TaqI and Cdx-2 polymorphisms of the VDR gene using the iPLEX Gold assay (Sequenom Inc.). Statistical analysis was performed in the total sample and in the two subgroups of calcium intake (based on the median value of the variable, 680mg/day).
Results: Polymorphisms were not associated with BMD, presence of osteoporosis or presence of osteoporotic fracture in the total sample. In the group of low calcium intake (<680mg/day), all polymorphisms were associated with unadjusted BMD of the lumbar spine (p<0.05), but not with hip BMD. Specifically, the minor alleles B, t and A of BsmI, TaqI and Cdx-2 polymorphisms respectively were associated with lower spine BMD. Following adjustment for potential covariates (age, weight, height), only the association of Cdx-2 polymorphism with spine BMD remained statistically significant (p=0.025). In this group, BsmI and TaqI polymorphisms were associated with the presence of osteoporosis (odds ratio=2.180, 95%CI=1.084-4.387, p-value=0.028 for B allele, odds ratio=2.321, 95%CI=1.131-4.765, p-value=0.021 for t allele). In the group of higher calcium intake (>680mg/day) no significant differences were observed within the genotypes for all polymorphisms.
Conclusions: The effect of VDR gene in BMD and osteoporosis risk is significant in women with low calcium intake, while its impact is masked in higher calcium intakes. This result emphasizes the significance of adequate calcium intake in postmenopausal women, given that it exerts a positive effect on bone mineral density even in the presence of negative genetic background.
Acknowledgement: Maria Stathopoulou is scholar of Greek State Scholarships Foundation.

Disclosure of Interest: None Declared

P303 - INTERRELATION BETWEEN BONE MINERAL DENSITIES AND LIPIDS PROFILE IN POSTMENOPAUSAL WOMEN

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Aims: Menopause is the special period in women's life when many physiological changes develop, for example, dislipidemia, atherosclerosis, decrease BMD. In menopause atherosclerosis and osteoporosis develop simultaneously. Typical for this period is the increase in frequency of ischemic heart diseases and myocardial infarction. The risk factors including atherogenic dyslipidemia, insulin resistance, smoking, low physical loading are common for development atherosclerosis and osteoporosis.
Methods: In Department of Clinical Physiology and Pathology of Locomotor Apparatus, Institute of Gerontology AMS Ukraine 52 women aged 41-82 (average age is 63,96±9,5) were subdivided into groups based on duration postmenopause period: I group (n=17)- till 10 years; II group (n=17) — 10-19 years; III group(n=18)- 20 and more years. Bone mineral density (BMD) was determined by means of Dual-energy X-ray absorptiometer "Prodigy" (GE Medical systems). Serum total cholesterol(Chol), triglyceride levels(Tr), low-density lipoprotein cholesterol (LDC), low serum high-density lipoprotein cholesterol (HDC), very low-density lipoprotein cholesterol(VLDC) were performed.
Results: The results showed on weakly positive correlation between whole dates of BMD and lipids profile dates in patients of I group; strong negative correlation between Chol and Z-score of Femur neck (r=-0,7; p=0,002), BMD Femur neck and Chol (r=-0,49, p=0,04); LDC and BMD Femur neck in II group (r=-0,5; p=0,03); LDC and Z-score of Femur neck (r=-0,7; p=0,003) and strong positive correlation between whole dates of BMD and atherogenic lipids profile dates in III group: BMD Femur neck and LDC (r= 0,73; p=0,001); BMD Total body and LDC (r=0,58, p=0,01); BMD Femur neck and Tr (r= 0,73; p=0,001); BMD radius UD and Tr (r= 0,85; p=0,0001).
Conclusions: The results point to necessity prescribe the hypolipidemic treatment in women II group.

Disclosure of Interest: None Declared

P304 - ALENDRONATE TREATMENT MARKEDLY IMPROVES IMPLANT OSSEOINTEGRATION

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Aims: Metallic implant osseointegration begins with a phase of bleeding and inflammation and then of bone resorption around the implant which is followed by a phase of bone formation. Bisphosphonates inhibit bone resorption. The aim of the present study was to investigate the efficacy of alendronate to modify osseointegration, in order to better understand the underlying mechanisms.
Methods: We measured the resistance to pull-out of 1 mm diameter titanium rods implanted into the proximal tibia of 6 month-old female rats. The titanium implants, sandblasted and acid-etched along the surface of non threaded part, were inserted into both tibias and the rats received alendronate orally (18 ug/kg/d, 2/7 days, n=15) or vehicles (n=15) for 8 weeks. The tibias were then removed for microCT and resistance to implant pull-out was tested by recording the maximal force necessary to completely loosen the implant (group A). In a second series of experiments (group B) bone microCT around the implant was investigated at time 0, 4 and 16 weeks after implantation. All results are expressed as means±SEM (n). Significance of differences were (* p<0.05 vs. control and # p<0.05 vs. basal).
Results: (A) Alendronate treatment significantly improved implant osseointegration as compared to the controls increasing pull-out force (+48.9%*), positively influenced microarchitecture: trabecular bone volume (BV/TV±) +36.2%* and bone implant contact (BIC) +19.2%*. (B) Micro-architecture around the implant was similar to control bone after 4 weeks. In contrast alendronate improved these parameters already by 4 weeks.

Week		0	4	16
BV/TV	Control	42.8±4.6 (9)	44.0±2.4 (10)	40.2±4.5 (10)
BV/TV	Alendronate		57.7±2.6 (13)*#	53. ±.9 (8) *#
BIC	Control	70±4 (9)	82±2 (10)*	73±5 (10)
BIC	Alendronate		94±1 (13) *#	91±1 (8) *#

Conclusions: In conclusion, alendronate treatment improved the early osseointegration of titanium implants improving the micro architecture in the vicinity of the implant. These current results support benefits of alendronate in orthopaedic and dental surgery to enhance osseointegration.

Disclosure of Interest: None Declared

P305 - PTH EFFECTS ON BONE ARE ATTENUATED IN PROTEIN MALNOURISHED RATS

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Aims: PTH is registered for the treatment of severe osteoporosis. Osteoporotic elderly frequently suffers from protein malnutrition, which is associated with low serum IGF-1 level. Since there is a relation between IGF-I and PTH action on bone, we investigated whether the administration of PTH has similar action on bone strength under low and normal protein intake.
Methods: Six months old female rats were fed an isocaloric diet containing 2.5% (low-protein, LP) or 15% casein (normal protein, NP) for 3 weeks. Then rats in each diet group were treated with 5 or 40µg/kg PTH daily, or with vehicle for 4 weeks. At the end of treatments rats were sacrificed; proximal tibia was used for µCT analysis and for axial compression testing. Blood was collected for dosage of IGF-I and markers of bone turnover. Values are expressed as mean±SEM, significance of differences was performed using an Anova (*p<0.05, **p<0.0001).
Results:

	15% casein			2.5% casein		
	vehicle	5µg/kg PTH	40 µg/kg PTH	vehicle	5µg/kg PTH	40 µg/kg PTH
Load (N)	166.9±15.6	259.2±23.9*	328.0±26.8**	191.4±16.9	199.3±17.1	275.2±24.9*
BV/TV(%)	0.16±0.02	0.24±0.01*	0.36±0.03**	0.12±0.01	0.2±0.02*	0.27±0.03**
SMI	2.15±0.16	1.34±0.10*	0.29±0.23**	2.36±0.14	1.57±0.12*	1.06±0.25**

PTH treatment increased BV/TV and reduced Structure Model Index in rat fed a NP or a LP diet. The improvement of bone microarchitecture in NP fed rats was significant at both 5 and 40µg/kg PTH whereas in LP fed rats only at 40µg/kg PTH. Bone strength followed a similar trend. Osteocalcin levels (bone formation) were increased by PTH treatment in rat fed a NP or a LP diet (+170%vs +191%) but deoxypiridinoline levels (bone resorption) were increased only in animal fed a LP diet (0% vs. +154%). Plasma IGF-I was significantly decreased in rat fed a LP diet and was not affected by PTH treatment.
Conclusions: Despite a low protein intake and low IGF-I plasma level, PTH is able to stimulate bone formation. These results indicate that PTH effects on bone are attenuated in protein malnourished rats.

Disclosure of Interest: None Declared

P306 - BONE MINERAL DENSITY IN BERARDINELLI-SEIP CONGENITAL LIPODYSTROPHY

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Aims: Aim: This communication reports four distinct cases of Berardinelli-Seip syndrome, followed during six years, and reviews the literature with special emphasis on the bone density findings. Berardinelli-Seip Congenital Lipodystrophy (BSCL) is a rare autosomal recessive disease that is characterized by almost complete absence of adipose tissue, muscular appearance, organomegaly, hypertriglyceridemia and severe insulin resistance since birth. Bone manifestations of this syndrome have been documented but are usually overshadowed by the severe metabolic alterations.
Methods: Methods: Anthropometric, body composition, and bone mineral density (BMD) measurements were made, and insulin, leptin, free testosterone, estradiol, IGF-I, LH, FSH, bone remodeling markers were measured. Pituitary, thyroid, suprarenal and gonadal hormonal functional studies were normal.
Results: Results: Patient 1, a 13-years-old girl, presenting diabetes for four years, hepatomegaly, fatty liver, splenomegaly, pulmonary valvular stenosis, paternal uncle presenting same phenotype, showed lumbar spine BMD 1,184g/cm^2(Z-score 1.0). Patient 2, a 8 year-old boy, diabetic onset at 7 years-old, fatty liver, hyperlipidemia, no cardiac findings, lumbar spine BMD 0.815 g/cm^2. Patient 3, a 26 year-old woman, diabetes onset at 11 years-old, presenting fatty liver, hepatomegaly, kidney enlargement, urolithiase, umbilical hernia, acanthosis nigricans, severe hyperlipidemia, lumbar spine BMD 1.347 g/cm^2 Patient 4: a 23 year old woman, acanthosis nigricans, hirsutism, phlebomegaly, hepatomegaly, BMD 1.268 g/cm2 .
Conclusions: Conclusion: These cases illustrate the heterogeneity of the phenotype that may occur in Berardinelli patients. Furthermore, in accordance with previous studies, our findings point to a slight involvement of the bone metabolism in this insulin resistant patients. The BMD protective factor is not clear. The interaction between the fat-related endocrine system and bone seems to be complex and may involve local putative effect of insulin and leptin on bone, enhanced IGF sensitivity, or increased local production of IGFs. Other studies are necessary to clarify these issues. FAPESQ/CNPq 010/04

Disclosure of Interest: None Declared

P307 - RELATIONSHIP BETWEEN BONE MINERAL DENSITY, LEAN BODY MASS, VITAMIN D STATUS AND PARATHYROID HORMONE IN POSTMENOPAUSAL WOMEN: A PROSPECTIVE STUDY

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Aims: To assess the relationship between bone mineral density (BMD) and lean body mass, vitamin D and parathyroid hormone (PTH) in Saudi postmenopausal women.

Methods: A total of 820 Saudi postmenopausal women living in the Jeddah area were studied. Bone mass and lean body mass were measured by a dual-energy X-ray absorptiometry. Plasma 25-OHD and intact-PTH were measured together with biochemical bone turnover markers including [formation: serum osteocalcin (OC),bone-alkaline phosphatase (BAP)and absorption: C-telopeptide fragment of type 1 collagen (sCTx),and cross-linked N-telopeptide type 1 collagen (sNTx)] and serum calcium, phosphate and magnesium. The relationship between bone mass and lean body mass and other variables were examined using univariate analysis by means of Chi-square test and multivariable analysis using multiple logistic regression. ANOVA was used to examine the differences among women according to quartiles of 25-OHD values.
Results: Serum 25-OHD correlated with all skeletal sites in women studied except for the spine (r=0.19-0.36; P<0.05) BMD at sites enriched in cortical bone were 0.28-0.86 SD lower in the women with the lowest vitamin D quartile as compared with that in the highest quartile. After adjusting for intact-PTH, the magnitude of correlation between BMD and 25-OHD remained significant. After controlling for lean body mass the magnitude of these correlations did not significantly change. After controlling for age and height, both lean body mass and intact-PTH contributed significantly to BMD variation at all skeletal sites examined. Adjusting for age, height, lean mass, PTH, 25-OHD did not show any significant residual contribution to BMD variation.
Conclusions: Vitamin D effects on BMD in postmenopausal women is largely mediated via variations of intact-PTH rather than that of lean body mass.

Disclosure of Interest: None Declared

P308 - PARATHYROID HORMONES RESPONSE TO VITAMIN D INSUFFICIENCY IN SAUDI POSTMENOPAUSAL WOMEN IN RELATION TO BODY COMPOSITION, BONE AND LIFESTYLE CHARACTERISTICS

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Aims: To assess the effect of vitamin D insufficiency in relation to parathyroid hormone (PTH) response, bone metabolism, body compositions and lifestyle characteristics among Saudi postmenopausal women.
Methods: A total of 724 Saudi postmenopausal women (> 50 years) living in the Jeddah area were studied. Bone mineral density (BMD) and body composition were measured by dual-energy x-ray absorptiometry. Serum 25(OH)D and intact-PTH were measured together with biochemical bone turnover markers including [formation: serum osteocalcin (s-OC), procollagen type 1 N-terminal propeptide (s-PINP); and resorption: C-telopeptide fragment of type-1 collagen (s-CTX); and urinary cross-linked N-telopeptide type 1 collagen (u-NTX)], serum insulin like-growth factor (IGF-1) and serum minerals. Women exhibiting vitamin D deficiency (serum 25(OH)D<50 nmol/L) were stratified by tertiles of serum intact-PTH: secondary hyperparathyroidism (SHPT) defined as those responded with intact-PTH values in the highest tertile; functional hypo-parathyroidism (FHPT) defined as those non-responding with intact-PTH values in the lowest tertiles, whereas women with serum intact-PTH levels in the mid-tertile were defined as having intermediate parathyroid status.
Results: Serum 25(OH)D levels were significantly higher (P<0.01) in SHPT as compared with that of FHPT. Bone turnover markers were significantly increased and BMD [neck femur and spine (L_1-L_4)] values were decreased in women with SHPT (P<0.05; each case). Women with SHPT were heavier (P<0.01) and had 21-26% higher fat mass (P<0.001) than corresponding women with FHPT. Women with FHPT had lower serum magnesium values and higher IGF-1 levels. Using regression analysis, significant predictors of fat mass were serum-intact-PTH (r=0.231, P<0.01), s-OC (r=-0.117, P<0.05), and s-PINP (r=-0.112, P<0.01) with no effect of serum 25(OH)D.
Conclusions: Vitamin D deficiency (25(OH)D<50 nmol/L) is associated with variable PTH responses. The greater body and fat mass in women with SHPT as compared with FHPT suggested that PTH excess may contribute to fat accumulation in Saudi postmenopausal women with vitamin D deficiency.

Disclosure of Interest: None Declared

P309 - BONE'S STRUCTURAL DESIGN DETERMINES ITS OWN DECAY

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Aims: Some women remodel their skeleton and lose bone rapidly after menopause while others do not. Regions with a low volumetric bone mineral density (vBMD) have a high surface/volume and so a larger internal surface for initiating remodelling and relatively less bone volume. We hypothesized that this design confers double jeopardy; the larger surface exposes the smaller bone volume to more remodelling.
Methods: In a cross-sectional study of 182 pairs of female twins aged 40 to 61 years, we investigated the relationship between bone remodelling markers osteocalcin, β-crosslaps and procollagen type 1 amino-terminal propeptide (Elecsys, Roche) and distal tibial and radial cortical and trabecular surface area and vBMD using high-resolution peripheral quantitative computed tomography (XtremeCT; Scanco Medical, Switzerland and the marching cubes method), in generalised estimating equation models.
Results: Compared to premenopausal women, postmenopausal women had a 0.5 to 1.5 SD higher remodelling markers, higher intracortical porosity, larger intracortical and endocortical surface area and so lower cortical vBMD, fewer trabeculae and

smaller trabecular surface area and so lower trabecular vBMD (all P<0.05). A 1 SD higher tibia intracortical surface area was independently associated with 0.22-0.29 SD higher remodelling markers; about half the 0.34-0.60 SD increment in remodelling markers across menopause (P<0.01). A 1 SD lower tibia trabecular surface area was associated with a 0.14 SD higher CTX only (P<0.05). Of the total variance in remodelling markers, intracortical surface area accounted for 3-13%, trabecular surface area for less than 5%, and menopause for 20-27%. A 1 SD higher remodelling marker was associated with a 0.16-0.31 SD lower tibia cortical vBMD and 0.10-0.12 SD lower trabecular vBMD. Intracortical and endocortical surface areas correlated with remodelling markers suggesting that remodelling on these surfaces increases them as the cortex thins and becomes more porous providing more surface for further remodelling. Trabecular surface area correlated inversely with remodelling markers suggesting that remodelling on trabecular surfaces removes them with their surface so less remodelling arises from the trabecular compartment.

Conclusions: Bone's structural design contributes to differences in remodelling after menopause. A low cortical vBMD increases access to remodelling, vulnerability to decay and is a target for treatment.

Acknowledgement: Funding: The Research Council of Norway

Disclosure of Interest: None Declared

P310 - FGF23 GENE POLYMORPHISM AND SERUM FGF23 IN KAWASAKI DISEASE (KD): POSSIBLE PREDICTORS OF SUBCLINICAL ATHEROSCLEROSIS

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Aims: Vascular endothelial damage is a key event in Kawasaki Disease (KD), an acute systemic vasculitis that causes a widespread arterial dysfunction. It has been reported that KD intimal lesions can become atherosclerotic plaques and KD is one of the risk factors for early onset of atherosclerosis. Phosphatonins are new hormones involved in the regulation of phosphate homeostasis and bone mineralization. FGF23 is the master phosphatonin, which act through FGFr1 present in vasculature and heart. An association between FGF23 and vascular dysfunction independent from alterations in mineral metabolism has been observed opening the possibility that FGF23 may have a direct role in the modulation of vascular function. We evaluated the serum levels of intact FGF23 in a group of KD patient and a group of Control. In addition we screened all patients for mutations in *FGF23* gene.

Methods: A group of 55 pts. with KD (32 male and 23 females, mean age 28.9 months) were enrolled in the study. 20 age and sex matched healthy children acted as controls. In all pts lipid profile was measured. The serum intact FGF23 concentration was measured by an ELISA assay. Genomic DNA was extracted from peripheral blood and the three *FGF23* exons, including the intron-exon boundary regions, were PCR-amplified and analyzed on ABI Prism 3100 Genetic Analyzer.

Results: Serum intact FGF23 was higher KD than in controls (26 ±3.9 vs. 9.6±2.13; p=0.02 pg/ml). Genetic analysis showed the presence of a described polymorphism in the exon 3 (rs79558676: NM_020638.2:c.716C>T) and a new C insertion in the intronic region between -36 and -37 nucleotide close to the exon 2 (rs3832879: NM_020638.2:c.212-37_212-36insC) in all 12 KD patients with CAA. Only 4 of the total patients without CAA carried the new insertion. Patients with CAA carried the new polymorphism had statistically significant high levels of serum FGF23 in comparison with patient with the polymorphism at the exon 3 (Mann Whitney U test: p=0.05). Finally by multiple logistic regression analysis we observed that FGF23 and LDL were the two relevant predictors for the risk of atherosclerosis (p= 0.012 and 0.042 respectively).

Conclusions: FGF23 is an important hormone that contributes to the development of cardiovascular damage in several diseases. The present model showed a possible role of FGF23 in the pathogenesis of atherosclerosis adding new information about the link between bone and cardiovascular diseases.

Disclosure of Interest: None Declared

P311 - THE IMPACT OF CEMENT STIFFNESS, BONE DENSITY AND FILLING VOLUME AFTER BALLOON KYPHOPLASTY AND THE RISK OF STRESS SHIELDING AND ADJACENT VERTEBRAL FRACTURES

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Aims: Recurrent fracture rates after vertebroplasty and balloon kyphoplasty are as high as 20%. Biomechanically, there is yet no conclusive evidence to prove that the refracture rate is due to the cement stiffness alone. In this simulation we analysed different cement stiffnesses, bone densities and filling volumes and investigated the stresses in a fracture model stabilised with balloon kyphoplasty.

Methods: A FEM of the lumbar spine was generated from CT scans. The spine model consisted of L2-L4 vertebral bodies including discs and ligaments. The cement volumes modelled were in the order of 15% and 30% of the total vertebral body volume. The spine was modelled such that the spinal fracture had already been reduced and the height of the vertebral body fully restored. The fractured cortex was simulated by decreasing the bone density in that region. Cement was placed within the bone (balloon kyphoplasty technique) and an interface layer between the cement and bone was created. Three different bone qualities were modeled, normal, osteopenic (T-score=-1.0) and osteoporotic (T-score=-2.5). A compressive load of 1500N was applied to the proximal endplate of lumbar vertebra L2. The compressive load was applied as a follower load, which permitted "toggle" of the

spinal column. An anterior shift of the centre of gravity of the upper body was simulated by increasing the moment arm of the applied load.
Results: Complete height restoration of the fracture minimised abnormal loading. Cement stiffness (0.5GPa versus 8.0GPa) did increase the likelihood of fracture, yet the volume of cement injected was only important when both endplates were in contact with the cement. Higher stiffness cement carries the load that previously travelled through the cortical bone and offloads the anterior and posterior regions of the vertebral body. This stress-shielding increases bone resorption and followed by collapse of the bone surrounding the cement.
Conclusions: Increased cement stiffness, cement filling and incomplete height restoration increase the risk of adjacent fractures. The stress shielding effect increases with increased osteoporosis resulting in local bone resorption and possible loss of correction / increased kyphosis. It seems that the void and cement volume caused by balloon kyphoplasty is increasing stress shielding with its consequences. Novel techniques preserving bone while enhancing the strength minimise that effect.

Disclosure of Interest: None Declared

P312 - BONE TISSUE MINERALIZATION IS MAINTAINED IN EARLY POSTMENOPAUSAL WOMEN WHILE TISSUE HARDNESS IS DECREASED

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Aims: The strength of bone depends not only upon bone volume and microarchitecture, but also on its mineralization, i.e., the degree of mineralization of bone (DMB) (1). Variables reflecting DMB and microhardness of bone were measured in 20 pairs of iliac bone biopsies taken from normal women both before and 12 months after final menses (mean interval between the two biopsies 60±24 months).
Methods: Embedded bone samples were cut into 100±1 μm-thick sections. DMB (g/cm^3), Heterogeneity Index of the distribution of DMB (HI g/cm^3) and Vickers microhardness (Hv kg/mm^2) were measured separately on cortical and cancellous bone (1).
Results: DMB and HI measured before menopause (1.08±0.09, 0.28±0.08, respectively) were not significantly different from those measured 12 months after final menses (1.09±0.08, 0.26±0.06, respectively). Hv was slightly but significantly (p=0.04) decreased 12 months after final menses (45.84±4.04) versus before menopause (47.90±2.85). DMB tended to slightly increase (1.5%), HI and Hv tended to slightly decrease (1.2 and 4.2±, respectively) across menopause. These modifications did not depend on the delay between the two biopsies and were similarly observed in cancellous, cortical and total bone. Present results are similar to control values of same age recently reported from human necropsies (1). On 6 pairs of the same biopsies (2), nanoindentation showed an absence of changes in bone hardness contrary to our results at tissue level. Histomorphometry and micro-CT findings in the biopsies taken 12 months after the final menses have demonstrated a doubling of bone remodeling rate, and a deterioration of microarchitecture (3,4).
Conclusions: Study of paired iliac samples from women before and 12 months after final menses illustrates that the secondary mineralization of bone is not modified in spite of changes in bone remodeling activity. Microhardness is decreased in postmenopausal women.
References: 1. Boivin et al, Bone 2008;43:532; 2. Polly et al, J Bone Miner Res 2008;23(S1):S366; 3. Recker et al, J Bone Miner Res 2004;19:1628; 4. Akhter et al, Bone 2007;41:111.

Disclosure of Interest: None Declared

P313 - ABSOLUTE RISK OF FRACTURE CALCULATED BY FRAX® REFLECTS BONE MECHANICAL PROPERTIES

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Aims: Fracture risk assessment by FRAX® algorithm is used to calculate the ten year probability of major osteoporotic fractures, however its correlation with bone mechanical properties and bone turnover is unknown**.** The aim of this study was to determine the association between absolute fracture risk calculated by FRAX®, bone mechanical properties and bone biochemical markers in subjects submitted to hip replacement surgery.
Methods: Patients submitted to hip replacement surgery were consecutively recruited. They were evaluated for clinical risk factors for fracture, a dual X-ray absorptiometry (DXA) was done and FRAX® was calculated. Laboratorial assessment of bone biochemical markers (bone specific alkaline phosphatase, osteocalcin, pro-collagen type 1 N-terminal propeptide, free deoxypyridinoline/creatininuria, collagen type 1 β C-terminal telopeptide, tartrate-resistant acid phosphatase 5b, and parathormone levels) was performed. Femoral epiphysis were collected and trabecular bone cylinders were drilled in order to perform compression mechanical tests in a mechanical test machine to analyse bone strength, toughness and stiffness.
Results: Seventy six patients, 74% women with a mean age of 71±11 years were enrolled. The reason for hip replacement surgery was fragility fracture (43%), coxarthritis (54%), high impact fracture (1%) and avascular necrosis (1%). 48% reported a previous fracture, 5% had family history of fracture and 7% had secondary osteoporosis, 8% were under corticosteroid therapy, 15% reported smoking habits and 15% had history of alcohol intake. 11% were under osteoporosis treatment. The average BMD was of 0.8±0.1 g/cm^3, T-score -2±1. The probability of a major osteoporotic fracture, calculated by FRAX®, was of 12.7±11.1% and for hip fracture of 5.9±8.1%. The ten year probability of a major fracture was negatively correlated with strength (R^2=-0,338, p=0,005), stiffness (R^2=-0,334, p=0,004) and toughness (R^2=-

0,261, p=0,027). We found the same results for ten year probability of having a hip fracture and bone mechanical properties. However, there was no correlation between FRAX® outputs and bone biochemical markers. As expected, analysis of the load-displacement curves showed a positive correlation between BMD and strength (R^2= 0,430, p=0,009) toughness (R^2= 0,407, p =0,014) and stiffness (R^2= 0,394, p=0,017).
Conclusions: These results indicate that the absolute risk of fracture calculated by FRAX® is strongly related with bone mechanical behaviour but not with turnover markers.

Disclosure of Interest: None Declared

P314 - APOLIPOPROTEIN E IS CORRELATED WITH BONE BIOMECHANICAL PROPERTIES AND FRACTURE RISK CALCULATED BY FRAX®

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Aims: Apolipoprotein E (apo E) interferes with hepatic clearance of vitamin K. This vitamin is a cofactor for the carboxylation of osteocalcin in bone. Several studies demonstrated an association between allelic variations of Apo E and fracture risk, bone loss and BMD. The aim of this work was to evaluate the relationship between serum Apo E, bone biomechanics and fracture risk calculated by FRAX®.
Methods: Patients submitted to hip replacement surgery were consecutively recruited. They were evaluated for clinical risk factors for fracture, a dual X-ray absorptiometry (DXA) was performed and FRAX® was calculated. Serum apolipoprotein E (apo E) was measured. Femoral epiphysis were collected and trabecular bone cylinders were drilled in order to perform compression mechanical tests in a universal mechanical test machine (Instron Corporation) to analyse bone strength, toughness and stiffness.
Results: Seventy (69% female patients with a mean age of 72±10 years were enrolled. The reasons for hip replacement surgery were fragility fracture (39%), osteoarthritis (59%), high impact fracture (1%) and avascular necrosis (1%). The mean body mass index was of 27, 4±5, 4 Kg/m^2 and no correlation was found with Apo E. The average femoral neck BMD was of 0.75±0.11 g/cm^3. The probability of a major osteoporotic fracture, calculated by FRAX®, was of 12±10% and for hip fracture of 5.0±8%. The mean value of Apo E was 40±10 mg/l with no difference between causes of surgery. Apo E was negatively correlated with BMD (R^2=-0,482, p=0,015) and with strength (R^2=-0,256, p=0,038), stiffness (R^2=-0,341, p=0,005) and toughness (R^2=-0,106, p=0,399). Finally, we found a positive correlation between Apo E and the ten year probability of a major osteoporotic fracture calculated by FRAX® (R^2=0,263, p=0,030) and hip fracture (R^2=0,238, p=0,051).
Conclusions: Serum Apo E is correlated not only with bone biomechanical properties but also with fracture risk calculated by FRAX®. Therefore, Apo E could be a surrogate marker for bone quality and fracture risk.

Disclosure of Interest: None Declared

P315 - CORRELATES BETWEEN LUMBAR SPINE BONE MINERAL DENSITY (BMD), ENERGY STATUS AND STEROID HORMONES IN MALE ENDURANCE ATHLETES

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Aims: Low BMD has been reported in male endurance runners, although the mechanism is unclear. Recent research indicates that energy status and oestrogen can influence male skeletal health. To determine relationships between biomarkers of energy availability, sex steroid concentrations and lumbar spine BMD in male endurance runners.
Methods: Male endurance athletes aged 20-55 years were recruited. Lunar iDXA (GE Healthcare) was utilised to measure body composition (percent fat, fat and lean tissue mass) and BMD at the total body, lumbar spine (L2-L4) and femoral neck. Participant demographics were assessed using a lifestyle questionnaire and height and body mass were measured. Biochemical markers included; serum testosterone (T), 17β-estradiol (E2), and energy status biomarkers (thyroid function, insulin-like growth factor-1 and cortisol).
Results: Among 35 participants (aged 33.2±8.0 years, BMI (kg/m^2) 21.8±2.1), low lumbar spine BMD (Z-score<-1.0) was evident in 6 (17%) and a further 14 (40%) athletes had below average scores (Z-score<0.0). Among all participants, E2 was significantly correlated with both L2-L4 Z-score and L2-L4 BMD (g/cm^2) (r=0.38-0.39; p=0.024 and p=0.021, respectively). L2-L4 Z-score and BMD also correlated with T (r=0.33 and 0.36; p=0.053 and p=0.033, respectively). No significant associations were evident between lumbar spine BMD variables and other biochemical or body composition measures (except lean tissue with lumbar BMD). E2 and T were correlated (r=0.53; p=0.01). Stepwise multiple regression models (E2, T and lean tissue as predictor variables) showed E2 to be the significant independent predictor of L2-L4 Z-score. Whereas, both E2 and lean tissue were significant predictors of L2-L4 BMD (adjusted r^2=12 and 21%, respectively)
Conclusions: Endurance training may be associated with low BMD in male athletes. The mechanism for this appears to be related to lower lean tissue mass and sex steroid concentrations. Further research, including markers of bone turnover, is required on the influence of steroid hormones on bone mass in male endurance athletes.

Disclosure of Interest: None Declared

P316 - THE IMPACT OF PHYSICAL ACTIVITY ON BONE SIZE AND TRABECULAR MICROSTRUCTURE AT WEIGHT BEARING SITES IS POSITIVELY ENHANCED BY PROTEIN INTAKE: A LONGITUDINAL STUDY FROM 7.4 TO 15.2 YEARS IN HEALTHY BOYS

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Aims: In healthy prepubertal boys, relatively high protein intake (PROT) was shown to enhance the positive impact of physical activity (PA) on bone mineral content (BMC). Environmental factors appear to have stronger influence on adult bone mass and strength before than after the onset of pubertal maturation. In order to further document this notion we analyzed whether the positive effect of protein intake on PA impact on bone, as recorded in prepubertal boys, remained of similar magnitude by the end of pubertal maturation.
Methods: BMC was measured at the femoral neck (FN) by DXA in a cohort of 176 boys at 7.4±0.4 and 15.2±0.5 yrs (±SD). Furthermore, microstructure of distal tibia was assessed by high resolution peripheral computerized tomography (HR-pQCT) at the age of 15.2 yrs. The cohort was segregated in 4 groups by the medians of PA and PROT intake as recorded at 7.4 yrs. Results are expressed in Z-scores for measured variables: by DXA at 7.4 and 15.2 yrs and by HR-pQCT at 15.2 yrs.
Results: With daily protein intake above (2.0 kg b.w.) vs. below (1.5 kg.b.w.) the median, an increase in PA, 315±71 vs. 167±37 kcal/d, was associated with greater FN BMC Z-score of similar magnitude at 15.2 (+0.49±0.14 (±SEM) vs. −0.27±0.16) and at 7.4 yrs (+0.41 vs.–0.22). This greater FN BMC under higher protein intake was tightly related to greater FN width Z-score at both 15.2 (+0.34±0.11 vs. −0.08±0.17) and 7.4 yrs (+0.35 vs. −0.10). At 15.2 yrs, daily protein intake above vs. below the median was also associated with greater impact of increased PA on cross-sectional area (CSA) of distal tibia, +0.52±0.16 vs. −0.32±0.14 Z-score (interaction PROT-PA: p=0.012). Significant PROT-PA interaction was also recorded at the distal tibia for periosteal diameter (p=0.016), trabecular number (p=0.043) and area (p=0.016).
Conclusions: In healthy boys the marked enhancing influence of relatively high protein intake on the impact of increased physical activity on femoral neck BMC and width can be observed both before pubertal maturation and 7.8 yrs later. This interaction of protein intake and physical activity also positively influences trabecular microstructure and geometry of the distal tibia. Overall these results are compatible with the notion that prepuberty is an opportune time to increase protein intake and physical activity, two important determinants of bone mass and strength acquisition. They should be considered in strategies worked out for early osteoporosis prevention.

Disclosure of Interest: None Declared

P317 - LOW LEVELS OF 25-HYDROXYVITAMIN D ARE ASSOCIATED WITH AN INCREASED RISK OF MULTIPLE FRACTURES DUE TO A SINGLE FALL IN OLDER WOMEN

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Aims: Low serum levels of 25-hydroxyvitamin D are quite common in older women and can contribute to cause fragility fractures, including fractures of the hip, both by increasing the risk of falling and by affecting bone strength. We hypothesised that low levels of 25-hydroxyvitamin D may also be associated with an increased risk of multiple fragility fractures due to a single fall. Our aim was to investigate the association between vitamin D deficiency and concomitant fractures of both hip and upper limb among elderly fallers.
Methods: We investigated 472 women with a fall-related hip fracture, whose mean age±SD was 80.6±7.5 years. Twenty-seven of the 472 women (i.e., 5.7%) had a concomitant fracture at the upper limb: in these 27 women a single fall resulted in both a hip fracture and a fracture of either distal radius (20 women) or proximal humerus (seven women). We assessed serum levels of 25-hydroxyvitamin D by immunoenzymatic assay 14.2±4.1 (mean±SD) days after surgical repair of the hip fracture in all the 472 women.
Results: A T-test showed that 25-hydroxyvitamin D levels were significantly lower in the 27 women with concomitant fractures of both hip and upper limb than in the remaining 445 women (with hip fracture only): mean±SD values were 11.7±10.4 ng/ml and 6.5±5.0 ng/ml respectively in the two groups (mean difference between groups 5.2 ng/ml: 95% CI 1.2 to 9.2; p=0.011). A binary logistic regression confirmed that lower levels of 25-hydroxyvitaimn D were significantly associated with multiple fractures due to a single fall (p=0.016), after adjustment for eight confounders, including age, body weight, body height, hip fracture type (cervical or trochanteric), concomitant neurologic impairment, concomitant cognitive impairment, previous (non-concomitant) upper limb fractures, previous fractures at the contralateral hip, and time between fracture occurrence and laboratory assessment.
Conclusions: We conclude that low levels of 25-hydroxyvitamin D were significantly associated with multiple fractures related to a single fall in older women. The association may be due to altered fall patterns or compromised bone strength caused by 25-hydrovitamin D depletion and further emphasizes the relevancy of both preventing and treating vitamin D deficiency in elderly women.

Disclosure of Interest: None Declared

P318 - WEB BASED LONG BONE FRACTURE HEALING ASSESSMENT TOOL AND ITS POTENTIAL ROLE TO FIND OUT HOW OSTEOPOROSIS AND ITS MEDICATION MAY INFLUENCE ON HEALING RATE

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Aims: The references have provided some evidence of altered fracture healing due to osteoporosis or its medication. The most of available data in literature studies are experimental on animals. Clinical trials in this field are not frequent. The grading or quantitation of fracture healing assessment remains uncertain among orthopaedic surgeons. The bone union is frequently defined on the basis of a combination of clinical and radiographic criteria or on the basis of radiographic criteria only. The purpose of the study was to present current status of development of Web based orthopaedic system dedicated to fracture assessment and clinical decision support that can be used for osteoporotic fracture healing evaluation.
Methods: An online web tool allowing to describe and analyze fracture healing process in details was developed and enabled for registered users. The system is the Web application that utilizes single server and Web Browser for Internet communication.
Results: Web based fracture healing assessment enhancement is based on an extended patient's database. Dedicated, anonymized medical records are collected. Every patient's record can be linked only to diagnosing radiologist or treating orthopaedic surgeon, who has exclusive access to data and results. Optical density analysis results are presented graphically as a healing curve. Consecutive sloping down ODV healing curves is characteristic for normal progress of regeneration. Irregular ODV curve may suggest fracture healing impairment. Data collected in data mart may finally show osteoporosis influence on fracture healing process when sufficient cohort of cases is stored.
Conclusions: Developed Web based telediagnostic decision support system serves for fracture healing assessment. It combines different functional modules including anonymous electronic health record with Orthopaedic Analytical System. Descriptive as well analytic tools allow its utility for monitoring of individual patients as well clinical trials. The results may show normal bone individual fracture healing curves slope to compare with osteoporosis compromised cases. Descriptive fracture healing evaluation due to its predefined multiple choice checkboxes may lead to better count its progress.
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P319 - OLIVE POLYPHENOL, OLEUROPEIN AND HYDROXYTYROSOL, ACCELERATE BONE FORMATION IN CULTURE AND MAINTAIN BONE DENSITY OF OVX-MICE

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Aims: The present study was designed to evaluate *in vitro* and *in vivo* effects of olive polyphenol, oleuropein and hydroxytyrosol, on the formation and maintenance of bone using cultured cells (osteoblasts and osteoclasts) and ovariectomized-mice.
Methods: MC3T3-E1 cells (mouse calvarial preosteoblastic cells) were used in this study. We measured proliferation of MC3T3-E1 cells with MTT assay and monitored osteoblastic differentiation markers such as ALPase activity and the deposition of calcium. In the case of measurement of osteoblastic differentiation, compounds were added to culture system at post proliferation. Osteoclasts were formed from splenic cells of 6-week old male mouse by the addition of sRANKL and M-CSF. BALB/c mice (6-week old) were ovariectomized and orally administered with oleuropein or hydroxytyrosol (1 mg/kg weight to 30 mg/kg weight) at 3-day intervals. After 28 days, bone density of femur was measured with X-ray CT system (LA Theta LCT-100; Aloka). The animal protocols and procedures were approved by the Institutional Animal Care and Use Committee of Toin University of Yokohama and Tokyo Women's Medical University.
Results: Oleuropein and hydroxytyrosol dose-dependently inhibited the proliferation of MC3T3-E1 cells. Oleuropein and hydroxytyrosol at 10^{-4} M inhibited approximately 60% and 25% compared with values of vehicle, respectively. Oleuropein at 10^{-5} M to 10^{-4} M stimulated the activity of alkaline phosphatase (day 14) and the deposition of calcium (day 18) in a dose-dependent manner. Hydroxytyrosol at 10^{-4} M did not affect the ALPase activity but stimulated the deposition of calcium. By contrast, oleuropein and hydroxytyrosol inhibited the formation of multinucleated osteoclasts in a dose-dependent manner. Furthermore, oleuropein and hydroxytyrosol inhibited the loss of bone density of femur in ovariectomized-mice.
Conclusions: Our results indicate that oleuropein and hydroxytyrosol accelerate the formation of bone *in vivo* by stimulation of the proliferation and mineralization of osteoblastic cells and inhibition of the formation of osteoclastic cells. Olive polyphenol, oleuropein and hydroxytyrosol, might prevent bone metabolic diseases.

Disclosure of Interest: None Declared

P320 - INCREASE IN BODY FAT AND RESTORATION OF MENSTRUATION IS ASSOCIATED WITH IMPROVEMENTS IN BONE MINERAL DENSITY OVER 5 YEARS IN PREMENOPAUSAL FEMALE ENDURANCE RUNNERS

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Aims: For almost three decades, there have been numerous observational reports of low bone mineral density (BMD) at the spine in female endurance runners. It has been proposed that the low BMD observed in runners may be irreversible, and this brings concern because low BMD during the years of peak bone mass accrual may increase the risk of osteoporosis in later years. The aim of this study was to assess whether BMD deficits in female runners can be reversed following menstrual, physiological or lifestyle changes, or if continued participation is detrimental to bone.
Methods: We conducted a 5.02±0.5 years follow-up of a cohort of 22 female endurance runners aged 29.5 ±5.1 years, 12 who were identified with low lumbar spine (LS) BMD (Z-score <-1.0) at baseline (Hind et al, 2006). BMD was measured using dual energy X-ray absorptiometry (Lunar iDXA) of the LS (L2-L4), total hip (TH) and total body (TB). Menstrual history and training information were obtained by questionnaire. Paired T-tests were used to assess changes, factor analysis was used to identify covariates, and univariate association analyses were adjusted for LBM.
Results: At baseline, 10 subjects reported amenorrhea, and 8 had resumed regular menstrual function by follow-up. There were group increases in LS and TB Z-score (P<0.03), associated with the increase in body fat (R^2=0.266, 0.346; P<0.05). Those with low LS BMD at baseline increased LS and TB Z-score (P<0.05), without reducing running volume (92.0±42.0 km/week). The increases in Z-scores were only associated with the increase in body fat (R^2=0.778, 0.402; P<0.05). In subjects who had restored menstruation (n=11), only body fat was associated with LS (R^2=0.741), TB (R^2=0.327) and TH (R^2=0.351) Z-score (P<0.05).
Conclusions: The improvement of body fat and resumption of menses may positively influence BMD recovery in female endurance runners in their third decade, regardless of training volume. The bone-fat link requires further investigation in the pathogenesis of female athlete bone health.

Disclosure of Interest: None Declared

P321 - OSTEOPROTEGERIN, SEX STEROIDS AND ENERGY STATUS BIOMARKERS IN MALE AND FEMALE ENDURANCE ATHLETES, AND ASSOCIATIONS WITH LUMBAR SPINE BONE MINERAL DENSITY

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Aims: Low bone mineral density (BMD) has frequently been reported in endurance athletes, and is often associated with low levels of sex steroids which are known to affect bone. Most research has been conducted in female athletes, although several studies have reported a similar sequel in male athletes. Recent research suggests that the OPG/RANKL system is also involved in bone metabolism. Osteoprotegerin (OPG) may have an important counter-regulatory role in the prevention of bone loss and maintenance of BMD in those who are deplete in sex steroids. We aimed to determine relationships between lumbar spine BMD, sex steroid concentrations and OPG in male endurance athletes.
Methods: Seventy eight male and female endurance athletes aged 20-55 years were recruited. Total body composition and lumbar spine (L2-L4) BMD were measured using dual energy X-ray absorptiometry (iDXA, Lunar GE Healthcare, UK). Participant demographics were assessed using a lifestyle questionnaire. Biochemical markers included OPG, serum testosterone (T), 17β-estradiol (E2), and energy status biomarkers. Groups were categorised into low, below average and above average lumbar spine BMD (Z-score<1.0; <0.0 and > 0.0).
Results: Low lumbar spine BMD (Z-score<-1.0) was evident in 15 athletes (19.2%) (9 female, 6 male). Among all athletes, there were no significant differences in OPG concentrations between lumbar spine Z-score categories. In females, significant trends for differences were evident for the following variables: body fat content (P= 0.013) BMI (P= 0.025), IGF-1 (P= 0.09), triiodothyronine (T3) and thyroxine. (P= 0.01 and P=0.03 respectively). Nine females reported amen/oligomenorrhea (4 had low BMD). No significant associations were found between current menstrual status and low BMD. In males, trends for differences were evident for E2 (P= 0.04) and thyroid stimulating hormone/T3 ratio (P= 0.08).
Conclusions: This preliminary data suggests that circulating OPG does not play a major counter-regulatory role in the maintenance of BMD in endurance athletes. Lumbar spine BMD in endurance athletes appears to be related to body fat content, sex steroid concentrations and energy status biomarkers.

Disclosure of Interest: None Declared

P322 - CAN 25-HYDROXYVITAMIND LEVELS AND PTH PREDICT CARDIOVASCULAR COMPLICATION IN TYPE 2 DIABETES?

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Aims: Primary or secondary hyperparathyroidism is associated with increased risk of cardiovascular disease. Vitamin D has been known to predictor of mortality. To find out whether parathyroid or vitamin D might be related to the development of atherosclerosis in type 2 diabetic patients, we measured serum level of 25-hydroxyvitamin D[25(OH) D_3], PTH and the carotid intima-media thickness (IMT).
Methods: This cross-sectional study includes one hundreds type 2 diabetic patients aged 40-80 years without history of coronary heart disease, revascularization or stroke. The serum level of PTH was measure by immunoradiometric assay, and carotid IMT was measured with high resolution B-mode ultrasonography
Results: The mean 25(OH) D3 was 54.9±34.5 ng/ml, 26% of patients have Vitamin D deficiency. PTH was 39.7 (12.4-172.9) pg/ml. Age (r=0.453), systolic Bp (r=0.230) were related to mean carotid IMT. On the basis of linear regression analysis, the age, HbA1c and microalbuminuria predict mean carotid IMT. Serum calcium and albumin were different among 3 groups classified by the tertile of 25(OH)D_3. PTH was correlated with serum creatinine, microalbuminuria and systolic blood pressure. In the lowest tertile patients have higher microalbuminuria, CRP and PTH concentrations independently serum creatinine level.
Conclusions: Our results have demonstrated that serum PTH and 25(OH)D_3 are not the determinant of carotid IMT in type 2 diabetic patients. This result suggests that PTH and vitamin D might be affect the complication of diabetes differently.

Disclosure of Interest: None Declared

P323 - INFLUENCE OF BODY COMPOSITION ON BONE MASS IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Aims: Despite known positive correlation between body mass and bone mineral density (BMD) and fracture risk, contribution of fat tissue and lean body mass (LBM) to BMD remains under debate. Significance of fat tissue distribution, particularly visceral fat accumulation is discussed in that matter. Both osteoporosis and obesity affect increasingly more patients, which results in measurable health and socioeconomic issues. The aim of the study was to investigate the relationships between fat mass, LBM, selected anthropometric parameters and both BMD and T-score in postmenopausal women with osteoporosis.
Methods: The study was performed in 100 female patients (mean age 68,8 years, range 52-86) of Endocrinology and Osteoporosis Outpatient Clinic at the University Hospital No 2 in Poznan, Poland. All of them were previously diagnosed with osteoporosis. Women underwent anthropometric measurements (height, weight, BMI, waist and hip circumference), followed by body mass composition analysis by means of bioimpedance method (Bodystat 1500), which revealed relative (%) and absolute (kg) fat content, as well as LBM. Femur and lumbar spine BMD were assessed using dual–energy X-ray absorptiometry (DXA, Lunar). Statistical analysis was performed using Statistica 6.0 software
Results: Mean femoral neck BMD was 0,743g/cm³ and T-score was -2,16SD. Mean lumbar spine BMD was 0,868 g/cm³ and T-score -2,5 SD. 14% of osteoporotic women were shown to have BMI >30kg/cm² (obesity), 40% - BMI:25-30 kg/m² (overweight), and in 46% patient BMI was normal (<25 kg/m²). In 65% of women waist circumference was >80 cm, which - according to IDF – is an abnormal value for white female Europeans. Statistically significant positive correlations between both femur and lumbar BMD and body mass as well as BMI were shown. Absolute fat content, waist and hip circumference were positively correlated with both femur BMD and T-score. On the other hand, lumbar BMD and T-score were proven to be also positively correlated with absolute LBM. Multiple regression analysis revealed that major determinant of femur BMD was relative fat mass ((R^2=0,48, p=0,03).
Conclusions: 1. In postmenopausal women high body mass as well as visceral obesity do not exclude low bone mineral density 2. Increase in fat mass may be an important factor positively influencing femur BMD but not lumbar BMD.

Disclosure of Interest: None Declared

P324 - REFERENCE RANGES FOR SERUM BONE TURNOVER MARKERS IN HEALTHY CHILDREN AND ADOLESCENTS

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Aims: Over the measurement of bone mineral mass, the knowing of bone turnover markers (reflecting the actual rate of turnover) has also a basic significance. The reference ranges of bone turnover markers in children have not yet been determined in Hungary. Our aim was to build them up.
Methods: Serum concentrations of ß-crosslaps (ßCL, I-type C-terminal octapeptid), osteocalcin (OC) and bone-specific alkaline phosphatase (BALP) were determined in fasting blood samples. The methods for BCL and OC were based on an electrochemiluminescent technique, while BALP was measured by using electrophoresis + lecithin precipitation. Blood samples have been collected from 514 healthy children (245 boys and 269 girls, ages from 4.5 to 18.5 years). The turnover markers were evaluated in comparison with chronologic age, with biologic (bone) age, with Tanner's stage of adolescence, and in boys with testis size. The average and standard deviation of the measured variables were calculated separately for each year of age in both genders. Following graphic delineation, a cubic equation was fitted to the averages and another one to the SDs.
Results: In dependence of chronologic age, the highest point of the reference curves for all three markers was found 4 years earlier in girls than in boys. Looking for Tanner's stages, the growing

spurt started earlier (Tanner's II) in girls than in boys (Tanner's III). Testis size followed Tanner's stages. In dependence of bone ages, the difference between genders was not more than 2 years.
Conclusions: Comparison of the Hungarian reference curves to the international reference data strongly supported the importance of the precise, country-specific normal values as they can be altered by the different chemical methods of measurement or by the different rate of adolescence country-by-country.

Disclosure of Interest: None Declared

P325 - PATHOLOGY OF LUMBAR SPINE IN WOMEN AGED BETWEEN 40-50 YEARS

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Aims: Low back pain is a common syndrome, encountered in about 80% of subjects in one or another stage of their existence, setting up especially between 30-50 years. The aim of this study was to highlight the impact on quality of life in patients with the diagnosis of low back pain due to lumbar discopathy and osteoporosis treated in the Rehabilitation Clinical Hospital from Baile Felix.
Methods: We performed a prospective randomized study on a total of 80 women aged between 40 -50 years with low back pain due to lumbar discopathy and osteoporosis, treated in our hospital between October 2008 - May 2009. We divided the 80 patients in 2 lots: lot I included 52 cases (65%) with back pain±residual radiculopathy of disc etiology confirmed by MRI, lot II consisted of 28 cases (35%) with a diagnosis of vertebral osteoporosis certified by DXA. The evolution of functional impact was followed in all cases. Life quality of patients from group I was evaluated with MOS SF-36 questionnaire. Lot I has been divided into two groups, according to the presence or absence of radiculopathy: group IA included 20 cases (38.46%) with pain but without radiculopathy of disc etiology, group IB included 32 cases (61, 5%) with lumbar radiculopathy of disc etiology. Evaluation of life quality of patients with back pain of disc etiology (Lot I) using SF-36 score revealed that it decreased to half of the standard value, *mean SF-36 score was* 53.67±17.53 with *variation between* 24 – 82. Evaluation of life quality of the patients from lot II, with osteoporosis diagnosed by DXA, was made with Qualeffo-41 questionnaire, developed by the International Osteoporosis Foundation (IOF) in its current form in December 1997 (table 1).
Results: Table 1. Average scores of all 41 areas investigated by Qualeffo questionnaire.

DOMAINS	VALUES	DEFICIT
Global score	49.82±5.78	49.82
Pain	60±0.85	60
Physical function	29.01±0.86	29.01
Social function	28.31±1.65	28.31
Health perception	72.61±0.64	72.61
Mental function	67.46±1.23	32.54

Conclusions:
· Average SF-36 (MOS - SF36 Health Survey) score revealed a severely impaired quality of life in patients with herniated lumbar disc during the activity period.
· Lumbar pain due to osteoporosis severely affects quality of life, issue detected by the Qualeffo-41 questionnaire.

Disclosure of Interest: None Declared

P326 - ICTP IS THE BEST PREDICTOR OF CARDIAC DAMAGE AND DYSFUNCTION AMONG BONE METABOLIC MARKERS AND HORMONES IN MEN: CHIBA (CORONARY HEART DISEASE OF ISCHEMIA AND BONE ASSOCIATION) STUDY

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Aims: To determine whether or not bone metabolic markers predict cardiac damage and dysfunction in patients with coronary heart disease and, if so, which is the best.
Methods: We recruited 308 males (64.5±11.7 y.o.) who visited the cardiovascular unit of our department for coronary angiography, excluding those with renal insufficiency (Cr>2.0). They had either established CHD or CHD-like symptoms. Besides biochemical parameters including Cr (eGFR), Ca, P, LDL-C, HDL-C, TG, high-sensitivity (hs)-CRP, BS, HbA1c and CPR (C-peptide), we measured bone markers including serum ICTP, βCTX, NTX, TRACP-5b, PINP, N-mid osteocalcin (OC) and BAP; hormones such as intact PTH and 25(OH)vitamin D; and proBNP as a marker for cardiac damage. We also evaluated cardiac function by ultrasound cardiography (LVEF: left ventricular ejection fraction) and systemic atherosclerosis by ABI (ankle/brachial pressure index) and baPWV (brachial/ankle pulse wave velocity).
Results: The results indicated that proBNP most strongly and positively correlated with ICTP ($r=0.504$, $p<0.001$)(mean±SD, 4.3±3.8). All the other bone markers except BAP also showed a significant correlation. Multiple regression analysis indicated that ICTP, PTH, age and Cr independently contributed to proBNP, with the strongest contribution by ICTP. Similar analysis revealed that ICTP, HbA1c and TRAP were independent determinants of LVEF. The number of coronary lesions correlated with hsCRP and HbA1c, and marginally with NTX, but not significantly with any other bone marker. When we divided the subjects into four groups according to ICTP values, the top quartile had higher proBNP, lower LVEF and higher values of other bone markers than the other quartiles. ICTP also showed a significant correlation negatively with ABI and positively with baPWV, indicating association with atherosclerosis. Although ICTP is produced in a manner dependent on MMPs, which plays a role in atherosclerotic plaque instability, circulating proMMP-9 did not correlate with ICTP.
Conclusions: These results support the known association between cardiovascular diseases and bone markers, and further demonstrate for the first time that ICTP is the best predictor of cardiac damage and dysfunction in male subjects with (potential) CHD. Our data further suggest an interesting possibility that el-

evated ICTP in these subjects may be in part derived from atherosclerotic lesions and/or remodeling heart with aberrant fibrosis in a manner dependent on local MMPs.

Disclosure of Interest: None Declared

P327 - DIFFERENT PATTERNS OF AGE-RELATED CHANGES IN BMD/GEOMETRY/BIOMECHANICAL PROPERTIES ACCORDING TO VARIOUS SITES OF THE PROXIMAL FEMUR

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Aims: In order to evaluate the effect of antiosteoporotic agents at the proximal femur, information on the age-related changes in BMD/geometry/biomechanical properties at distinct sites of femoral neck (FN), trochanter (TROCH) and shaft (FS) may be helpful.
Methods: CT scanning of the proximal femur was performed on 59 postmenopausal women aged 54 to 84 (67.0±7.4) twice during a 2-year period. The same CT scanner (Aquilion16, Toshiba) and the same X-ray scan conditions were used and data were analyzed using QCT Pro (Mindways) program. Both cross-sectional data and longitudinal± changes per year were analyzed.
Results: 1. Cross-sectional FN-Total BMD (r=-0.39, p<.005) and total mass (r=-0.47, p<.0005) significantly decreased with aging, while total CSA (r=-0.08, ns) did not change. Cortical CSA (-0.028cm^2/year; r=-0.51, p<.0001) and cortical mass (r=-0.46, p<.0005) significantly decreased with aging, while cortical BMD (-0.997mg/cm^3/year; r=-0.15, ns) did not change. Cortical thickness decreased (-0.025mm/year; r=-0.46, p<.0005) and bone perimeter increased (0.014mm/year; r=+0.23, p<.05) significantly with aging.

2. Cross-sectional FS-Cortical BMD (-1.96mg/cm^3/year; r=-0.29, p<.01) and cortical CSA (-0.011cm^2/year; r=-0.26, p<.05) significantly decreased with aging, while bone perimeter did not change.

3. Biomechanical properties At FN, cross-sectional moment of inertia (CSMI) (r=-0.36, p<.005) and section modulus (SM) (r=-0.41, p<.005) significantly decreased with aging. These changes were much greater at TROCH (r=-0.33, p<.05 for CSMI and r=-0.40, p<.005 for SM), and smaller at FS (r=-0.17, ns for CSMI, r=-0.28, p<.05 for SM).

4. In longitudinal analysis,± changes in cortical CSA (r=+0.39, p<.005), total CSA (r=+0.31, p<.05) and FN BMD (r=+0.29, p<.05) increased significantly with aging. On the other hand, ±changes in FN cortical BMD decreased with aging (r=-0.20, ns), especially in women aged over 65 (r=-0.40, p<. 05) n=37.
Conclusions: Different patterns of age-related changes in BMD and geometry were noted between FN and FS. Cortical BMD was maintained higher at FS than FN from early postmenopause through advance age, although its decline was greater at FS than FN. Bone size did not change at FS, while it significantly increased along with thinning of the cortex at FN. These distinct patterns of age-related changes may have impact on the type of hip fracture and/or the site-specific effects of antiosteoporotic agents.

Disclosure of Interest: None Declared

P328 - EVALUATION OF VITAMIN D STATUS IN FMF PATIENTS

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Aims: This study was an investigation of vitamin D status during attack-free periods in familial Mediterranean fever (FMF) patients
Methods: Thirty -two adult patients (19 female, 13 male) with FMF and thirty matched healthy controls (20 female, 10 male) were enrolled in the study. Erythrocyte sedimentation rate (ESR), fibrinogen, serum 25-hydroxyvitamin D, Ca, P, ALP and C-reactive protein (CRP) levels were measured in both groups. In FMF patients, clinical and laboratory assessments were performed during an attack-free period.
Results: Serum 25-hydroxyvitamin D levels of FMF patients and controls were 17.40 (10.06-42.12) and 17.46 (11.94-37.62) ng/ml, respectively. No statistically significant differences were found between FMF patients and controls in terms of serum 25-hydroxyvitamin D, Ca, P and ALP levels (p>0.05). In addition, ESR, fibrinogen, and serum CRP levels were similar in both groups.
Conclusions: Vitamin D status may not differ from those of healthy controls during attack-free periods in FMF patients. Further research is needed to provide a more in depth understanding of vitamin D status.

Disclosure of Interest: None Declared

P329 - VITAMIN D LEVELS IN PATIENTS WITH BEHCET'S DISEASE

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Aims: This study was carried out to investigate the serum 25-hydroxyvitamin D levels of patients with Behcet's disease
Methods: Thirty -two patients (18 female, 14 male) with Behcet's disease and thirty-one matched healthy controls (20 female, 11 male) were enrolled in this study. In laboratory analysis, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), serum 25-hydroxyvitamin D, Ca, P and ALP levels were measured in both groups
Results: In patients with Behcet's disease, 25-hydroxyvitamin D values were significantly lower than those of the healthy controls (p< 0.01). Serum 25-hydroxyvitamin D levels of patients and controls were 13.76 (4.00-35.79) and 18.97 (12.05-36.94) ng/ml, respectively. However, serum ESR and CRP levels were significantly higher than those of the controls in patients (p< 0.05). Serum Ca, P and ALP levels were similar in both groups (p>0.05).
Conclusions: Our results suggest that serum 25-hydroxyvitamin D levels decrease in patients with Behcet's disease. Further studies needs to define the relationship between vitamin D status and inflammation in Behcet's disease

Disclosure of Interest: None Declared

P330 - PRETRANSPLANTATION BONE TURNOVER MARKERS PROGNOSTIC VALUE OF DENSITOMETRICALLY DETERMINED BONE STATUS 1 YEAR AFTER LIVER TRANSPLANTATION

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Aims: To test the prognostic value of bone turnover markers before LTx as an early indicators of TBBMD and TBBMC increase exceeding LSC value.

Methods: 17 cholestatic children (1-2.4 years) classified for liver transplantation (LTx) were enrolled into the study. Serum levels of bone formation (osteocalcin – OC, procollagen type 1 N-terminal propeptide – P1NP) and bone resorption (collagen type 1 crosslinked C-telopeptide – CTx) markers were measured using Elecsys analyzer (Roche Diagnostics, Poland) before LTx. Bone status (total body bone mineral density and content – TBBMD, TBBMC) was measured before and 6, 12, 18 months after LTx by DXA. Least significance change (LSC) for TBBMD and TBBMC was used for evaluation the skeletal response for LTx. LSC was calculated using 33 measurements of pediatric whole body phantom. The expected rates of bone accrual were based on reference data for Polish children. TBBMD and TBBMC at 6, 12, 18 months after LTx were applied to LSC for age-matched healthy children and expressed as multiplicity of LSC. The Fisher's exact test with 2x2 contingency table was used for testing the prognostic value of bone turnover markers levels before LTx. The positive response of bone status was defined as TBBMD and TBBMC increase exceeding LSC.

Results: OC and CTx (but not P1NP) levels before LTx correlated with multiplicity of LSC for TBBMD (but not for TBBMC) 1 year after LTx (r=0.698, p=0.017; r=0.607, p=0.048, respectively). Fisher's exact test revealed that OC and CTx levels higher than 30 ng/ml and 0.430 ng/ml, respectively, both assessed before LTx, significantly (p<0.02) predicted positive bone response expressed as an increase in TBBMD that exceeds LSC.

Conclusions: Our data suggest that bone turnover markers can predict compensatory BMD accrual 1 year after LTx. However, further studies based on larger population are needed to confirm predictive value of bone turnover markers as an early predictors of true/biologic change in bone mass and density after LTx.

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Disclosure of Interest: None Declared

P331 - VITAMIN D STATUS, BONE AND CARTILAGE METABOLISM IN PRETERM AND TERM INFANTS

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Aims: To assess the bone and cartilage metabolism in preterm and term infants in relation to vitamin D status.

Methods: Serum levels of bone formation (OC, P1NP), bone resorption (CTX) (Roche Diagnostics Elecsys Analyzer 2010), and growth plate activity marker (NT-proCNP) (Biomedica, Poland) were determined twice in 85 preterm (V1 Hbd 40±2, and V2 Hbd 53±1) and in 32 term neonates (V1 Hbd 42±1and V2 Hbd 54±1). Vitamin D status was evaluated by serum levels of 25(OH)D (Roche Diagnostic Elecsys Analyzer 2010) and defined as vitamin deficiency <20 ng/ml or sufficiency >20 ng/ml.

Results: Vitamin D supplementation was started from 3rd week of life. At V1 vitamin D deficiency was observed in 28% preterm infants and 100% term infants.3 months later at V2 93% preterm infants and 94% term infants were vitamin D sufficient. Independent of vitamin D status preterm infants had higher P1NP levels (at V1: 5632.00 ng/ml vs. 3886.00 ng/ml; p=0.003 and at V2: 3358.00 ng/ml vs. 2399.50 ng/ml; p=0.000) and lower CTX level (at V1: 0.933 ng/ml vs. 1.595 ng/ml; p=0.000 and at V2: 0.784 ng/ml vs. 1.085 ng/ml; p=0.001). Serum level of bone formation marker OC were not significantly different in preterm and term neonates independent of vitamin D status (at V1: 101.00 ng/ml vs. 88.78 ng/ml; p=0.155 and at V2: 118.40 ng/ml vs. 156.15 ng/ml; p=0.052). Growth plate activity as measured by NT-proCNP were not significantly different in vitamin D deficient preterm and term infants but significantly higher in preterm neonates with vitamin D sufficiency (at V1: 83.40 pmol/L vs. 72.18 pmol/L; p=0.478 and at V2: 60.42 pmol/L vs. 33.99 pmol/L; p=0.000).

Conclusions: Vitamin D deficiency (25(OH)D serum level <20ng/ml) observed at birth in 100% term infants profoundly increased growth plate activity to levels comparable to preterm neonates. Vitamin D sufficient preterm infants (25(OH)D serum level >20ng/ml) have more proanabolic bone and cartilage metabolism expressed as serum formation marker (P1NP), ratio of serum formation/resorption markers (P1NP/CTX ratio) and growth plate activity marker (NT-proCNP) in comparison to vitamin D sufficient term infants.

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Disclosure of Interest: None Declared

P332 - THE IMPACT OF HORMONE REPLACEMENT THERAPY ON THE RELATIONSHIP BETWEEN OSTEOPOROSIS AND LIPIDS IN POSTMENOPAUSAL WOMEN: OUR INITIAL DATA (2000-2004) AND PRELIMINARY RESULTS (2005-2009)

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Aims: There is a possibility that hormone therapy improves osteoporosis not only via direct effect of oestrogens on bone tissue, but also via lowering the lipids that may have detrimental effect on bone tissue. The aim of this study was to assess the effect of various regimens of hormone therapy on lipids and osteoporosis and the correlation between lipids and osteoporosis under given hormone treatment.

Methods: In this study we have incorporated two sets of data. The first set comprises three hundred and thirty five women (n=335) which participated in this open study from 2000 till 2004 and were assigned to receive orally (a) CEE (n=29), (b) Tibolone (n=75), (c) CEE/MPA (n=57), (d) E2/NETA (n=72), (e) raloxifene (n=64) and (f) no therapy (control) (n=68) for at least 12 months. The second set represents the preliminary results of the continuation of this study during the period 2005-2009. The postmenopausal women that have been till now analysed are 150 and are divided as follows: (a) CEE (n=12), (b) Tibolone (n=31), (c) raloxifene (n=29), (d)E2/NETA (n=18) and (e) no therapy (control) (n=14). At baseline and 12 months blood samples were analyzed for lipids and lipoproteins (total cholesterol, triglycerides, HDL, LDL, Lipoprotein (a), Apolipoprotein-A1, Apolipoprotein–B) and DXA was also performed for the measurement of BMD of the lumbar spine.

Results: 1. Data 2000-2004: In most variables a negative relationship between BMD and lipids was observed. In the raloxifene group only LDL reached statistical significance (*p=0.0031).* In the tibolone group again only LDL reached statistical significance (*p=0.038).* In the E2/NETA group none reached statistical significance. In the CEE/MPA group statistical significance was reached by total cholesterol, LDL and Lp(a) (*p=0.008, 0.007, 0.047 respectively).*

2. Preliminary results 2005-2009: There is a trend for most lipids variables to correlate inversely with lumbar BMD t-score. As in the previous phase of our study, the main exception is raloxifene, which increases HDL and triglycerides. The most pronounced effect has been observed in the tibolone group, where the correlation between the BMD and total cholesterol – LDL reached statistical significance (respectively, *p=0,021, p=0,002).*

Conclusions: In this study it has been observed that there is a trend in almost every medication group towards an inverse correlation between lipids and BMD. The effect is more prominent in the tibolone group, as it is pointed out by both sets of data.

Disclosure of Interest: None Declared

P333 - THE RELATIONSHIP BETWEEN WNT SIGNALING PATHWAY GENE POLYMORPHISMS AND PRODUCTION OF OSTEOPROTEGERIN AND SOLUBLE RECEPTOR ACTIVATOR OF NF-KB BY WHOLE BLOOD CELLS

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Aims: To investigate the relationship between single nucleotide polymorphism (SNP) in Wnt signal pathway genes, and production of osteoprotegerin (OPG) and soluble receptor activator of NF-κB ligand (sRANKL) by whole blood cells in postmenopausal Korean women.

Methods: Low density lipoprotein receptor-related protein (LRP) 5 c266 A>G and c3893 C>T, frizzled (FZD) 6 c1033 A>C, axin II c148 C>T, T cell factor (Tcf) 1 c766 G>A, and adenomatous polyposis coli (APC) c5465 T>A polymorphisms were analyzed by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP), direct sequencing, and Taqman assay in 141 postmenopausal Korean women. The production of OPG and sRANKL by lipopolysaccharide-stimulated whole blood cells were also measured.

Results: The production of OPG and sRANKL by lipopolysaccharide-stimulated whole blood cells, and their ratio of $RANKL^{x1,000}$/OPG were not different according to the LRP 5 c266A>G and c3893C>T, FZD 6 c1033A>C, axin II c148C>T, Tcf 1 c766G>A, and APC c5465T>A polymorphisms. There were also no significant differences in the production of OPG and sRANKL, and their ratio of $RANKL^{x1,000}$/OPG among combined genotypes of LRP c266A>G and c3893C>T polymorphisms.

Conclusions: LRP 5 c266A>G and c3893C>T, FZD 6 c1033A>C, axin II c148C>T, Tcf 1 c766G>A, and APC c5465T>A polymorphisms do not affect the production of OPG and sRANKL by lipopolysaccharide-stimulated whole blood cells.

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Disclosure of Interest: None Declared

P334 - STRUCTURAL DECAY OF CORTICAL BONE; DON'T THROW OUT THE BABY WITH THE BATHWATER

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Aims: Assessment of age-related structural decay of cortical bone is confined to the assessment of cortical area and thickness

of the residual compact-appearing cortex. Advancing age is accompanied by intracortical remodelling which results in severe intracortical porosity which leaves chaotically connected cortical remnants and is responsible for most of the bone loss during ageing. We hypothesized that inclusion of cortical remnants will better reflect the effects of ageing on cortical bone than parameters limited to the residual compact-appearing cortex.
Methods: The distal radius and tibia were imaged using HRpQCT (Scanco Medical) in 55 women aged 19 to 98 years. Cortical thickness (Ct Th) and area (Ct Area), total and cortical volumetric density (Ct D, vBMD) were measured. Further analyses were done using a newly developed software ($Strax_{1.0}$) which allows assessment of the compact-appearing cortex and cortical remnants. The thickness of the inner decayed layer of cortical remnants to the ratio of the thickness of remnants to the thickness of the entire cortical mass (compact plus remnant area), denoted as percentage of cortical remnants, was measured. The porosity of the entire cortical mass (compact-appearing + remnants) was also measured.
Results: All parameters decreased as age advanced. However, the decline of parameters that include the cortical area that consists of cortical remnants exceeded that of the decline in compact appearing cortex. In multivariate analysis, advancing ageing was more strongly associated with a rise in the proportion of cortex that is remnants (r=0.43, p=0.005) than the decline in cortical thickness (r=0.27, NS). The age-related increase in porosity that includes porosity of the compact appearing cortex plus porosity producing remnants (r=+ 0.75) was greater than the decrease in Ct Area (r=-0.53, p<0.05), CoD r=- 0.52, p<0.05) or vBMD (r=-0.75 p= 0.02) (p values compare Rs).
Conclusions: Inclusion of cortical remnants captures the age-related structure decay of the cortex better than existing parameters. This new approach is likely to allow identification of individuals at risk for fracture beyond currently existing parameters.
Acknowledgement: This study was partly supported by from an unrestricted grant from IOF and Servier

Disclosure of Interest: None Declared

P335 - DELAYED CORTICALIZATION BY CONDENSATION OF PERIPHERAL TRABECULAE OF THE DISTAL GROWTH PLATE CONTRIBUTES TO BONE FRAGILITY IN CHILDHOOD

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Aims: Forearm fractures affect one in three children, predispose to further fractures in childhood and in adulthood. The structural basis of the underlying bone fragility in childhood is poorly defined
Methods: We imaged the distal radius and tibia using high-resolution peripheral computed tomography in 19 boys and 11 girls with distal radial fractures and 66 male and 66 female age-matched controls. Cortical thickness (Ct Th) and area (Ct Area), and total and cortical volumetric density (Ct D, vBMD) were measured by HR-pQCT (Scanco). In addition, we used a new software ($Strax_{1.0}$) to further assess bone structure at the distal tibia in 11 boys with fractures and 13 age and maturity controls. $Strax_{1.0}$ separates bone compartments into trabecular, inner (ITZ) and outer)OTZ) transitional zones, and compact cortical bone. The inner zone is adjacent to trabecular bone, which it resembles while the outer zone resembles cortical bone. This subdivision captures the gradual transition between trabecular bone and the cortex. As cortical bone at the metaphyses, where most fracture in childhood occur, is formed by condensation of trabeculae from the marrow space, we hypothesized that delayed trabecular condensation produces a thin outer transition zone in children with fracture (Wang et al, JBMR 2009). The zones quantified using $Strax_{1.0}$ were expressed as percentages of the total cross sectional area - percent cortical area, OTZ, ITZ and cortical mass (i.e. compact cortex + transition zone).
Results: At both the distal radius and distal tibia, Ct Th, Ct area, Ct D and vBMD did not differ in cases and controls of either sex. Similarly, the total transitional zone (inner plus outer) did not differ in absolute terms in boys with fractures relative to controls (366 vs. 323 mm; NS). By contrast, boys with fractures had a reduced percent total transition zone (4.34 vs. 5.03%; p=0.01), which was mostly the result of a smaller percent OTZ (3.87 vs. 3.22%; p=0.02, i.e. 16.8%). There was no deficit in the ITZ (1.25 vs. 1.67%; NS). As a result of the reduced OTZ, boys with fracture had a reduced percent cortical area (17.1 vs. 21.1%; p=0.05) and percent cortical mass (26.19 vs. 21.77%; p=0.03).
Conclusions: Delayed corticalization by condensation of peripheral trabeculae of the growth plate may contribute to bone fragility during childhood.
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Disclosure of Interest: None Declared

P336 - PRIMARY OSTEOARTHRITIS NO LONGER PRIMARY: THREE SUBSETS WITH DISTINCT ETIOLOGICAL, CLINICAL AND THERAPEUTIC CHARACTERISTICS

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Aims: Osteoarthritis (OA) has been historically divided into primary and secondary. Primary OA is defined as an idiopathic condition developing in previously undamaged joints in the absence of an obvious causative mechanism. During the last few years, a large amount of new and valuable evidence has provided new insights into the biochemistry and molecular biology of cartilage, subchondral bone and other articular tissues which suggest distinct etiopathogenetic mechanisms in some forms of primary OA. Here, we propose an etiopathogenic classification of primary OA in the light of the significant progress in the understanding of the disease.

Methods: A review of the literature was carried out by searching the Medline and PubMed databases from 1952 to November 2008 using the following key words: genetic alteration, heritability, estrogen, menopause, and aging either alone or in various combinations with joint, cartilage, subchondral bone, synovium, ligaments, muscle, tendons, OA and osteoporosis.
Results: Numerous studies have shown that genetic alterations, menopause-related estrogen deficiency, and aging play crucial roles in the molecular pathophysiological events involved in the process of cartilage and joint damage and thus, in OA development. We propose here based on results of these extensive studies to classify primary OA into three distinct though interrelated subsets: Type I OA, genetically determined; Type II OA, estrogen hormone dependent; and Type III OA, aging related. These three distinct biological processes in concert with the two main risk factors obesity and joint overload or trauma would induce the expression of the disease in a given individual.
Conclusions: The three proposed subsets of OA display distinct etiological, clinical and therapeutic characteristics and should therefore no longer be considered as "Primary OA".

Disclosure of Interest: None Declared

P337 - PGE2 MODULATES THE SYNTHESIS OF OPG AND RANKL IN THE ARTICULAR CARTILAGE OF PATIENTS WITH KNEE OSTEOARTHRITIS

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Aims: The system OPG/RANK/RANKL is the principal modulator of bone remodeling, although its regulation in the adjacent articular cartilage during OA is unknown. Our aim was to explore if PGE2 synthesis inhibition modulates OPG and RANKL synthesis in the cartilage of OA patients. We also investigated if PGE2 modify this system in human osteoarthritic chondrocytes (HOC) in culture.
Methods: A 3-month controlled, clinical trial was carried out on 20 patients with severe knee OA scheduled for total knee replacement surgery (Mankin score 11.4±0.4). Ten patients were treated with Celecoxib (CBX) (200 mg/24h), while OA patients who did not want to be treated served as the control group (CTR). After surgery, the articular cartilage was processed for western blot, real time PCR and immunohistochemical studies. In human osteoarthritic chondrocytes (HOC) in culture we also examined the effects of PGE2 on OPG/RANK/RANKL synthesis, and explored which of its surface receptors was involved in the PGE2 action.
Results: In the cartilage of OA patients, CBX did not modify OPG or RANK synthesis, while it significantly inhibited RANKL synthesis, thus increasing the ratio OPG/RANKL in comparison with CTR. By immunohistochemistry, we observed that OPG and RANKL were mainly expressed in chondrocytes in all cartilage zones, although a clear pericellular and extracellular signal was also observed. Unexpectedly, vessels crossing the tide mark, the tide mark-embedded chondrocytes, and some cells in the calcified cartilage, stained positively for RANKL. No differences in the protein distribution between the two groups of patients were observed. In HOC in culture, PGE2 elicited a dose and time-dependent increase in the synthesis of OPG and, to a significantly higher extent, those of RANKL. Confocal microscopy revealed that PGE2 induced RANKL transport to the cell membrane. EP2/EP4 agonists reproduced PGE2 actions on OPG and RANKL induction, while EP1/EP3 agonists had no effect.
Conclusions: These data indicate that PGE2 regulates the expression and the release of the key mediators of bone metabolisms by articular chondrocytes. Long-term NSAID treatment that inhibited local PGE2 concentration also inhibited the resorptive signal synthesized by chondrocytes, especially RANKL synthesis. The role of this mediator in OA cartilage metabolism is still unknown, although it would allow the cartilage to control the activity of subchondral bone cells in a paracrine fashion.

Disclosure of Interest: None Declared

P338 - RESTRICTION OF BISPHOSPHONATE-ASSOCIATED OSTEONECROSIS (ONJ) TO THE JAW-DEVELOPMENTAL BIOLOGY CONSIDERATIONS AND JAW BONE SPECIFIC CYTOKINE EXPRESSION

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Aims: ONJ is restricted to the jaw. The ONJ-affected sites are associated with hypercalcified bone and prolonged wound healing. The formal pathology of ONJ is unknown. Restriction of ONJ to the jaw bone might be caused by developmental biology related differential interaction of aminobisphosphonates with cranial neural crest derived jaw bone compared to mesenchymal stem cell derived extracranial bone. Sustained expression of the osteoproliferative transcription factor Msx-1 can be found in jaw bone only. Description of bone homeostasis and wound healing related mediators Msx-1, BMP-2/4, TGFβ1 and its downstream effectors Smad 2/3 and Smad-7 in ONJ-sites are missing at present. The aim of the study was to evaluate the expression of Msx-1, BMP-2/4, TGFβ1, Smad 2/3, Smad-7 and Galectin-3 in ONJ-affected sites compared to healthy jaw bone.
Methods: 20 ONJ samples and 20 control specimen of healthy jaw bone were processed for immunohistochemistry of paraffin embedded tissue. Targeting BMP-2/4, Msx-1, TGFβ1, Sox-9, Rank(L), Smad 2/3, Smad 7 and Galectin-3 an autostaining-based APAPP-staining kit was used. Semiquantitative assessment was performed measuring the ratio of positively stained cells/ total amount of cells (labelling index, ANOVA-Test) in ONJ samples (bone and soft tissue) compared to control jaw bone.
Results: A significant suppression ($p<0.05$) of Msx-1 and Rank(L) and a significantly increased ($p<0.05$) expression of BMP-2/4 was seen in bone samples of the ONJ-sites compared to normal jaw bone. In the ONJ-related soft tissue a significant suppression ($p<0.03$) of TGFβ1, Smad 2/3 was detected, whereas Smad-7, Galectin-3 and Sox-9 were significantly ($p<0.05$) increased in ONJ compared to healthy mucosa.
Conclusions: Suppression of Msx-1 by aminobisphosphonates might explain the development of local osteopetrosis and restric-

tion of ONJ to the jaws since Msx-1 has been shown to be expressed in cranial neural crest derived bone only. Results indicate an interaction of TGFβ1 and BMP-2/4 pathway during bone and oral mucosa regeneration, which is impaired by aminobisphosphonates. Comparative analysis of developmental biology related differences of osteoblast-osteoclast homeostasis in cranial neural crest derived bone compared to mesenchymal stem cell derived bone could explain a variety of bone disorders, restricted to the maxillofacial bone structures.

Disclosure of Interest: None Declared

P339 - ASSOCIATION OF HIGH THYROID PEROXIDASE AUTOANTIBODIES AND DECREASED BONE MINERAL DENSITY IN EUTHYROID PERIMENOPAUSAL WOMEN

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Aims: Thyroid gland is susceptible to autoimmune reactions that lead to autoimmune diseases. According to the recent findings the patients with autoimmune disorders have the predisposition to decreased bone density. High serum levels of thyroid hormone (fT4) and low levels of thyroid-stimulating hormone (TSH) are associated with reduce bone mass, particularly, in postmenopausal women. The aim of the study was to evaluate whether the presence of thyroid peroxidase autoantibodies (anti-TPO) was associated with changes in bone metabolism in perimenopausal euthyroid women.
Methods: We followed 17 anti-TPO-positive euthyroid women (7 premenopausal and 10 menopausal patients). Age - 52,6±6,3 yrs, body mass index - 26,8±5,3 kg/m^2, duration of menopause – 6,75±4,6 yrs. TSH - 2,32±1,1 mIU/ml, fT4 – 15,9±2,4 pmol/l, anti-TPO – 442 [147,1;464] IU/ml. 17 anti-TPO-negative euthyroid age-, body mass index-matched women were enrolled in the control group (5 premenopausal and 12 menopausal subjects). TSH – 2,46±1,0 mIU/ml, fT4 – 15,79±2,5 pmol/l. Menopausal duration – 6,55±4,5 yrs. Detailed history was taken from each patient. Ionized and serum calcium levels; the markers of bone formation (serum N-MID osteocalcin (OC)) and bone resorption (cross-linked C-telopeptide (CTX)) have been assessed. Bone mineral density (BMD) was measured at spine (L1-L4) and femoral neck (FN) using DXA. The threshold for osteopenia was set at – 1,0, for osteoporosis was set at – 2,5.
Results: Ionized and serum calcium levels, OC, CTX were not significantly different. 11 (64,7%) anti-TPO-positive euthyroid patients had reduced BMD (2 subjects with osteoporosis and 9 with osteopenia). Osteopenia was diagnosed in 2 (11,7%) anti-TPO-negative euthyroid women (c^2=7,971, p=0,005). Anti-TPO-positive group has significantly lower BMD at L1-L4 (p=0,04), T-score (p=0,049) and at FN (p=0,02), T-score (p=0,04) compared to control group. The level of anti-TPO positively correlated with BMD at L_1-L_4 (r=0,57).
Conclusions: Anti-TPO-positive euthyroid perimenopausal women have decreased BMD compared to anti-TPO-negative subjects. Our data demonstrated the possible influence of thyroid autoimmunity on bone metabolism and necessity of monitoring the anti-TPO-positive patients for both thyroid disorders and more aggressive BMD changing.

Disclosure of Interest: None Declared

P340 - GENANT CLASSIFICATION "BLIND ZONE": A CLINICAL REPORT OF SERIOUS OSTEOPOROTIC VERTEBRAL DAMAGE

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Aims: To report a case of serious abnormality in vertebral body shape which is not included in Genant classification (*J Bone Miner Res 1993*) and not clearly pinpointed at standard X-ray examination.
Methods: This study involved the case of a 64-year-old woman with a low back pain, hypocalcemia and low levels of vitamin D. The outcome of the Body Mass Densitometry was a T-score of -4,57 SD, revealing a serious osteoporosis. Further investigations about bone structure were conducted with radiological examinations (plain X-ray and computerized tomography - CT) of the axial skeleton, particularly the dorsal and lumbar spine.
Results: Plain radiographs showed two vertebral compression fractures between D12 and L2); CT (bone scanning) confirmed the presence of the wedge-shaped vertebrae (D12 and L2) but, moreover, highlighted the collapse of the central area of superior and inferior plates of L1. This findings demonstrated that there was an impairment of the vertebral body's structure related to osteoporosis. After another and more accurate assessment of standard X-ray of L1 two lines encompassed in the vertebral margins (which had not any morphological abnormalities), due to the concave depressions inside the vertebral bodies, were detected. We also suggest that this deformity could be a condition foregoing a severe and uniform vertebral compression ("pancake" vertebrae).

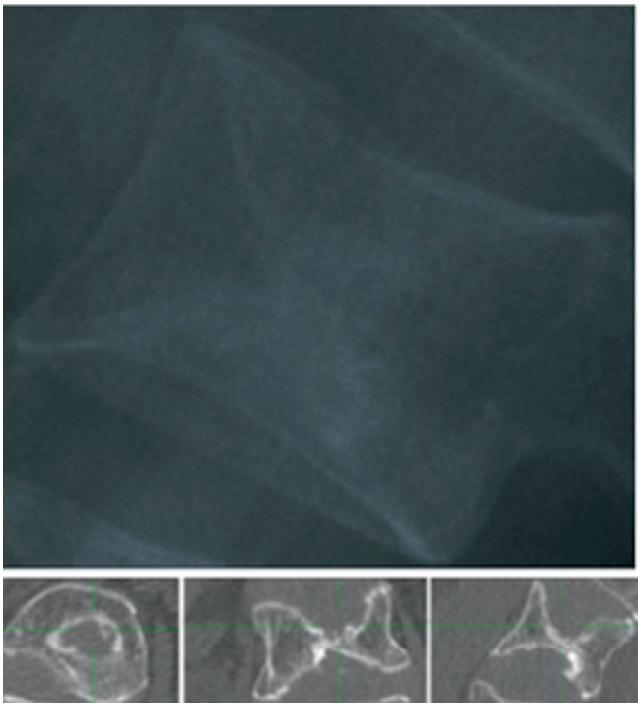

FIGURE: Above: (X-Ray) L1 shows normal margins but there are two lines encompassed in the vertebral margins; *Below*: (CT) L1 axial, coronal and longitudinal view.

Conclusions: When evaluating a dorso-lumbar spine in an osteoporotic patient it should be considered the possibility of a severe structural impairment even in those vertebral bodies with a projected line below and between the medial borders of the vertebral ring. Moreover a follow-up of such vertebrae could confirm if we have described the morphological stage before a vertebral flattening.

Disclosure of Interest: None Declared

P341 - THE ASSOCIATION BETWEEN THE GENERIC AND DISEASE-SPECIFIC QUALITY OF LIFE QUESTIONNAIRE AMONG WOMEN WITH OSTEOPOROSIS AND VERTEBRAL FRACTURES

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Aims: The purpose was to assess whether 'QUALEFFO-41' and GHQ-20 would be feasible for measuring the Health related quality of life (HRQOL) of women with established osteoporosis and at least one vertebral fracture, as well as assessing the concurrent validity of 'QUALEFFO-41' and GHQ-20 and if the two HRQOL measurements differentiated between those with good or bad mobility and balance as well as those using analgesics or not.
Methods: A cross-sectional study of 89 women, 60 years or more participated. HRQOL were evaluated by a generic instrument known as GHQ-20 and a disease specific instrument for osteoporosis, QUALEFFO-41. Mobility and balance were tested maximum speed, 'Functional Reach(FR)'and use of walking aid or not.
Results: Cronbach's α coefficient for HRQOL range from 0.92-0.61. Significant correlation between 'QUALEFFO-41: total score' and 'GHQ-20: total score' was 0.49 and between 'GHQ-20: total score' and scores of 'QUALEFFO-41' the significant correlation ranged from 0.28 to 0.62. Those in the 75± group with the highest maximum walking speed, longest FR distance, not using walking aid or analgesics reported better HRQOL more frequently related to the disease specific measurement than those in the 25± group having a slower maximum walking speed, shorter FR, using walking aids or analgesics.
Conclusions: Our results showed that disease-specific and a generic HRQOL instruments are not redundant when applied together and that the disease-specific 'QUALEFFO-41' and the generic GHQ-20 measure different aspects of HRQOL.

Disclosure of Interest: None Declared

P342 - CALCIUM IN THE SECOND URINE DOES NOT REPLACE 24-H URINE CALCIUM AS SCREENING TEST

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Aims: Calcium in the second morning urine is a simple test to assess calcium excretion in patients with osteoporosis, but there are doubts about the correlation with calcium in urine for 24 h, which is the reference test. The aim of this study was to compare concentrations of calcium in the second morning urine and 24-h samples in patients studied in an osteoporosis consulting. Many patients were receiving calcium supplementation treatments.
Methods: Urine samples were collected from 99 patients, 92 women and 7 men, aged 30-80 years (mean 63±10 yr). The second morning urine (fasting sample urine) was collected immediately after the end of the 24-h collection. The statistical tests used were the Pearson coefficient and kappa coefficient.
Results: The range of calcium excretion in urine over 24 hours was 35-524 mg (mean 192±103 mg), the Ca/Cr ratio in the urine of 24 hours was 0.01-0.48 mg/mg (mean 0.201±0.098 mg/mg); the Ca/Cr ratio in the second urine was 0.01-0.62 mg/mg (mean 0.223±0.141 mg/mg). There were 24 patients with hypercalciuria (urine calcium >250 mg/day in women and >300 mg/day in males). The coefficient of correlation between fasting urine Ca/Cr ratio and 24-h urine Ca /Cr ratio was 0.661 ($p<0.001$) and between fasting urine Ca/Cr ratio and 24-h urine calcium was 0.465 ($p<0.001$). In the group of patients with hypercalciuria, the coefficient of correlation between fasting urine Ca/Cr ratio and 24-h Ca /Cr ratio was 0.681 ($p<0.001$), but there was no correlation between fasting urine Ca/Cr ratio and 24-h urine calcium ($r=0.318$, $p=0.13$). The kappa coefficient between fasting urine Ca/Cr ratio and 24-h Ca /Cr ratio was 0.511 ($p<0.001$) and between fasting urine Ca/Cr ratio and 24-h urine calcium was 0.158 ($p=0.068$).
Conclusions: Conclusions. In clinical practice in osteoporosis, fasting urine Ca/Cr ratio shows good correlation with 24-h Ca /Cr and acceptable correlation with 24-h urine calcium in the overall patient population. However, in patients with hypercal-

ciuria we found no correlation between fasting urine Ca/Cr ratio and 24-h urine calcium. Based on these results, fasting urine Ca/Cr ratio can not replace 24 h urine calcium as screening test for excretion of calcium.
References: 1. JA Blázquez et al, Calcif Tissue Intl 2006;78(S1): S128.

Disclosure of Interest: None Declared

P343 - KINETIC ASSESSMENT OF BONE LOSS BY IN VIVO MICROCT IN AN ANIMAL MODEL OF LOCALIZED DISUSE INDUCED BY THE CLOSTRIDIUM BOTULINUM TOXIN

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Aims: Microcomputed tomography (microCT) has been extensively used ex-vivo for the study of trabecular bone loss in osteoporotic patients and in animal models of osteoporosis. More recently, in vivo microCT have been developed to study bone loss and morphological changes in the same animal at different time intervals. The aim of the present study was to assess the morphological changes in the trabecular network of rats with a localized disuse induced by an injection of botulinum toxin (BTX).
Methods: Twelve rats were used and divided into 2 groups. The first group received a single BTX injection in the quadriceps to induce paralysis of the right hind limb (immobilized); the left hind-limb served as a non-immobilized limb control (non-immobilized). The second group received a saline injection in the right hind limb and was used as control. In vivo microCT was performed under general anesthesia at day 0, 14 and 28 days using a Skyscan 1076 in vivo X-ray microtomograph with a resolution of 18µm. All animals were sacrificed at 28 days. Right and left tibias were embedded undecalcified for histochemical identification of TRAcP osteoclasts and assessment of osteoblastic activity after double calcein labeling.
Results: 3D reconstruction images of the right inner side of the left and right tibia at each of the 3 time points were compared for each rat. Typical progression of bone loss in the same rat was presented. Trabecular bone loss was evidenced as earlier as 14 days on 2D and 3D images. At 28 days, localized disuse has affected both lateral and central trabecular compartment and also cortical bone with a thinning of cortices. At 28 days, BV/TV was roughly -30% less compared to BV/TV from the non-immobilized tibia. Histological assessment of bone resorption and formation showed that bone loss (clearly evidenced at 28 days) was associated with a significant increase of osteoclast number and a decrease of bone formation rate.
Conclusions: In vivo microCT is an accurate method that allows following the trabecular and cortical modifications in animal models of osteoporosis.

Disclosure of Interest: None Declared

P344 - FRAGILITY FRACTURE RISK – RISK FACTORS

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Aims: It was noticed that the probability of occurrence of an osteoporotic fracture either of the hip or a major one increases with the increasing of the number of risk factors, directly affecting patient's quality of life. The study aimed to detect the risk for a generalized fracture and for a hip fracture using FRAX® algorithms, in a group of patients with osteoporosis.
Methods: The study included a group of 82 patients investigated by DXA for detecting osteoporosis admitted in the Rehabilitation Clinical Hospital of Baile Felix between July 2008 - May 2009, with a mean age of 61.6±8.8 years, ranging between 44 and 81 years. All patients were assessed by DXA at the Diagnostic Center Maria using Lunar Prodigy Advance (PA 130775) GE Healthcare device.
Results: Patients with vertebral osteoporosis obtained a mean lumbar T-score of -2.80, score that was -3.1 in cases with generalized osteoporosis and -2.38 in patients with osteopenia. 46.1% of cases with vertebral osteoporosis had 3 risk factors, but as for osteopenia, 51.9% of cases had only one risk factor. The distribution of risk factors in patients with osteoporosis is presented in table 1. In order to assess the risk factors for osteoporosis, the 82 new cases have completed the IOF *One-Minute* Osteoporosis *Risk* Test 2007, a questionnaire comprising 19 questions. The mean for the risk factors was 2.75, with limits from 1 to 6.

Table 1. The distribution of risk factors in patients with osteoporosis

RISK FACTORS	**VOP**	GOP	Op	TOTAL LOT %
PARENTS with OP n=31;LOT N=82	15(48%)	9(29%)	7(22.5%)	37%
EARLY MENOPAUSE n=55;LOT N=82	24(43%)	16(29%)	15(27%)	67%
KYPHOSIS and HEIGHT DECREASE n=44LOT N=82	23(52%)	15(34%)	6(13.6%)	44%
SMOKING n=8;LOT N=82	3(37%)	1(12.5%)	4(50%)	9.75%
SECUNDARY OSTEOPOROSIS n=20;LOT N=82	10(50%)	7(35%)	3(15%)	24.4%

VOP- vertebral osteoporosis, GOP- generalized osteoporosis, Op- osteopenia

Fracture risk was established with the aid of FRAX® tables according to the number of risk factors and hip T-score assessed by DXA. Considering the entire lot, this risk was 2.76 for a major osteoporotic fracture and 1.57 for a hip fracture.
Conclusions: Quantification of fracture risk influences therapeutic decision and informing patients about this risk contributes to the prevention of fractures in compliance with life-style and therapeutic measures recommended by the doctor.

Disclosure of Interest: None Declared

P345 - EFFECT OF DENOSUMAB TREATMENT ON BONE HISTOLOGY AND HISTOMORPHOMETRY: THE FREEDOM AND STAND STUDIES

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Aims: The effect of denosumab, a fully human monoclonal antibody to RANKL, on bone histology and histomorphometry was assessed in subgroups of women enrolled in 2 phase 3 trials of denosumab.

Methods: In FREEDOM, 92 subjects (45 placebo, 47 denosumab) underwent transiliac crest bone biopsy: 68 at 24 months, 47 at 36 months, and 23 at both time-points, producing 115 biopsies (62 placebo, 53 denosumab). Bone biopsies were performed at 12 months in a substudy of STAND, a separate trial of postmenopausal women with low bone mass previously treated with alendronate, randomized to continue alendronate (21 biopsies) or transition to denosumab (15 biopsies).

Results: In FREEDOM, qualitative bone histology showed normally mineralized lamellar bone in all samples. Absence of osteoid was observed in 5 denosumab-treated subjects. Tetracycline labelling was present in all placebo and in 64% of denosumab biopsies. Double-labelling in trabecular bone was observed in 94% of placebo and 19% of denosumab biopsies. Static and dynamic measures of bone formation were substantially reduced with denosumab (Table). Resorption was also markedly decreased: median osteoclast number was 0.08/mm in placebo and 0.00/mm in the denosumab group. Micro-CT assessments of trabecular structure were not significantly different between groups. In STAND, findings in denosumab-treated subjects were similar to the FREEDOM study, and turnover indices tended to be lower than in alendronate subjects (significant for mineral apposition rate and eroded surface).

Histomorphometry Data from FREEDOM Study: 24 and 36 Months Combined

Index	n	Placebo	n	Denosumab
Trabecular bone volume (%)	38	12.5 (9.4-17.4)	38	13.5 (10.3-15.9)
Cortical width (mm)	43	0.765 (0.536-1.099)	47	0.658 (0.444-1.068)
Osteoid surface (%)	38	6.81 (3.61-10.1)	38	0.385 (0.160-1.22)*
Mineral apposition rate (μm/day)	37	0.75 (0.66-0.83)	7¶	0.30 (0.30-0.50)*
Bone formation rate (%/year)	37	14.6 (8.6-21.8)	7¶	0.4 (0.2-0.8)*
Activation frequency ($year^{-1}$)	37	0.200 (0.120-0.330)	7¶	0.002 (0.001-0.004)*
Eroded surface (%)	38	1.04 (0.55-1.88)	38	0.15 (0.00-0.69)*

Data are median (interquartile range); *Significantly different from placebo, P≤0.0003, Wilcoxon rank sum test; ¶Measurable in fewer subjects due to absent tetracycline labels

Conclusions: Denosumab treatment is associated with reduced numbers of fractures over 3 years and no untoward effects on bone were observed. The clinical significance of absent labels in the denosumab group remains to be determined.

Disclosure of Interest: I. Reid Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, P. Miller Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, J. Brown Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, D. Kendler Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, A. Fahrleitner-Pammer Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, I. Valter Grant / Research Support from: Amgen, K. Maasalu Grant / Research Support from: Amgen, M. Bolognese Grant / Research Support from: Amgen, Consultant / Speaker's bureau / Advisory activities with: Amgen, G. Woodson Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, H. Bone Grant / Research Support from: Amgen, Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, Board member of: Merck, B. Ding Employee of: Amgen, Stock ownership or royalties of: Amgen, R. Wagman Employee of: Amgen, Stock ownership or royalties of: Amgen, J. San Martin Employee of: Amgen, Stock ownership or royalties of: Amgen, M. Ominsky Employee of: Amgen, Stock ownership or royalties of: Amgen, D. Dempster Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck

P346 - EFFECTS OF DENOSUMAB DISCONTINUATION ON BONE HISTOLOGY AND HISTOMORPHOMETRY

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Aims: Denosumab, an investigational fully human monoclonal antibody to RANKL, reduces bone turnover, increases bone mineral density (BMD), and decreases risk for vertebral, non-vertebral, and hip fractures in postmenopausal women with osteoporosis (Cummings SR, et al. 2009). Biopsies from subjects on current denosumab therapy (1 to 3 years) were consistent with low bone turnover (Reid I, et al. 2009). While the effects of denosumab on bone turnover markers and BMD are reversible with treatment cessation (Miller PD, et al. 2008; Bone HG, et al. 2008), the effects of denosumab discontinuation on bone histology and histomorphometry are not known. Thus, a cross-sectional transiliac crest bone biopsy study was initiated and the interim results are presented here.

Methods: Eligible subjects completed all denosumab doses in a phase 3 trial and were not administered any osteoporosis treatment for ≥ 12 and<36 months. Transiliac crest bone biopsies were obtained for histology and histomorphometry evaluation along with biochemical markers of bone turnover.

Results: To date, data from 4 subjects are available. Subjects' age range was 54 to 65 years. Tetracycline labeling was performed 21-27 months after denosumab discontinuation. All 4 biopsies were of excellent quality and were adequate for all evaluations. Biopsies showed normal histology without evidence of pathology. Double

tetracycline labels were present in all specimens. Rate-dependent histomorphometric variables, including mineral apposition rate and bone formation rate were near or within the reference range established in the laboratory where the biopsies were evaluated (Table).

Table. Dynamic Variables of Bone Remodeling for 4 Subjects

	Reference Range, Mean (SD)	Subject 1	Subject 2	Subject 3	Subject 4
Mineral Apposition Rate, µm/day	0.89 ± 0.18	0.78	0.72	0.69	0.63
Bone Formation Rate, %/yr	26.2 ±16.4	30.9	27.3	13.8	34.5

Conclusions: In four subjects who discontinued denosumab treatment for ≥12 months, bone biopsies data show evidence of normal remodeling at the tissue level and absence of pathological findings.

References: 1. Cummings SR et al, New Engl J Med 2009;361:756; 2. Reid I et al, J Bone Miner Res. 2009;24(S1):S9; 3. Miller PD et al, Bone 2008;43:222; 4. Bone HG et al, J Clin Endocrinol Metab 2008;93:2149.

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P347 - DICKKOPF-1 DOES NOT PREDICT BONE MINERAL DENSITY GAIN IN OSTEOPOROTIC WOMEN ON BISPHOSPHONATES

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Aims: There is almost no data about the potential use of serum Dickkopf-1 protein (Dkk-1), a potent inhibitor of bone formation, in osteoporosis. The aim of our study was to seek for correlation of serum Dkk-1 levels with change in bone mineral density (BMD) over 1-year period in osteoporotic female population treated with bisphosphonates.

Methods: We followed 51 postmenopausal women with newly diagnosed osteoporosis, who had been treated with weekly risedronate or monthly ibandronate plus calcium and vitamin D3 supplements for 1 year. Blood samples for determination of Dkk-1 and C-terminal crosslinking telopeptide of type I collagen (CTX) were collected at the time of the diagnosis with first BMD measurement and after 3 months. BMD measurement was then repeated after 1 year of treatment. Baseline Dkk-1 and CTX values in patients were also compared to a group of 45 age and sex matched healthy controls.

Results: Patients had significantly higher baseline Dkk-1 and CTX levels than healthy controls. In patients, serum levels of Dkk-1 at baseline were negatively correlated to baseline BMD at any site, but not to CTX. BMD gain at spine and total hip after 1 year of treatment was neither significantly correlated to serum Dkk-1 levels at baseline, nor to serum Dkk-1 levels after 3 months.

Conclusions: Serum Dkk-1 levels do not seem to be useful as an early predictor of BMD gain determined by DXA after 1 year of osteoporosis treatment with bisphosphonates.

Disclosure of Interest: T. Kocjan: None Declared, G. Hawa Employee of: Biomedica Group, S. Maitzen Employee of: Biomedica Group, A. Lukas Employee of: Emergentec, S. Mencej: None Declared, J. Marc: None Declared, J. Prezelj: None Declared

P348 - BONE MARROW LESIONS, CARTILAGE LOSS, AND PAIN IN KNEE OSTEOARTHRITIS (OA): RESULTS FROM A RANDOMIZED CONTROLLED CLINICAL TRIAL USING MRI

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Aims: MRI-detected subchondral bone marrow lesions (BML) are frequently seen in OA of the knee depicting acute and chronic changes in this tissue. They have been shown to predict cartilage loss and to correlate with pain. However, the literature remains contradictory about the latter. Furthermore, we lack knowledge about treatment effects on BML. We assess, in a multicentre randomized double-blind phase III clinical trial evaluating the effect of licofelone vs. naproxen on knee OA, the presence of and change in BML over time and their relationship to cartilage volume loss, meniscal extrusion, and pain.

Methods: Knee OA patients were selected from the dataset of a recently published trial [1]. 161 patients completed the study according to protocol. MRI was performed at baseline, 6, 12, and 24 months. Pain levels were assessed using the WOMAC questionnaire.

Results: Both treatment groups showed increased BML scores compared to baseline in global knee (both treatments combined: 0.71±1.85, $p<0.0001$, 24 months) and in all subregions, except for the medial tibial plateau where the BML score in the licofelone group remained stable at 12 (-0.01±0.37) and at 24 months (-0.01±0.65) vs. an ongoing increase in the naproxen group (0.15±0.58, $p=0.04$; 0.21±0.74, $p=0.06$, respectively). In multivariate regression analysis, licofelone treatment predicted reduction in BML score in the medial tibial plateau (β estimate=-0.27, $p=0.02$) and severe meniscal extrusion predicted progression (β estimate=0.26, $p=0.03$). BML scores at baseline statistically correlated with cartilage volume (medial, r=-0.24, $p=0.002$; lateral, r=-0.28, $p=0.0003$; femoropatellar, r=-0.28, $p=0.0003$). In the global and medial compartments, BML score increases correlated with

cartilage loss at 12 months (r=-0.18, p=0.03; r=-0.19, p=0.02, respectively). No correlation was found between BML and WOMAC pain scores with the exception of an inverse correlation in the femoropatellar compartment at 6 (r=-0.22, p=0.006) and 12 months (r=-0.24, p=0.002).
Conclusions: BML scores were found to increase over time, likely reflecting an accumulation of chronic changes in subchondral bone tissue. Correlation between BML and cartilage volume at baseline underlines a close relationship between them. Reduction in BML might be due to the unique action of licofelone not only on cyclooxygenases but also on lipoxygenase. In contrast to previous reports, no positive relationship was found between BML score and pain.
References: 1. Raynauld JP et al, Ann Rheum Dis 2009;68:938.

Disclosure of Interest: L. Wildi: None Declared, J. Raynauld Consultant / Speaker's bureau / Advisory activities with: ArthroVision Inc., J. Martel-Pelletier Consultant / Speaker's bureau / Advisory activities with: ArthroVision Inc, Board member of: ArthroVision Inc., Stock ownership or royalties of: ArthroVision Inc, F. Abram Employee of: ArthroVision Inc., M. Dorais Consultant / Speaker's bureau / Advisory activities with: ArthroVision Inc., J. Pelletier Consultant / Speaker's bureau / Advisory activities with: ArthroVision Inc., Board member of: ArthroVision Inc., Stock ownership or royalties of: ArthroVision Inc.

P349 - REDUCED BASIS METHODS FOR FAST EVALUATION OF ILIAC CREST TRABECULAR BONE ELASTIC PROPERTIES

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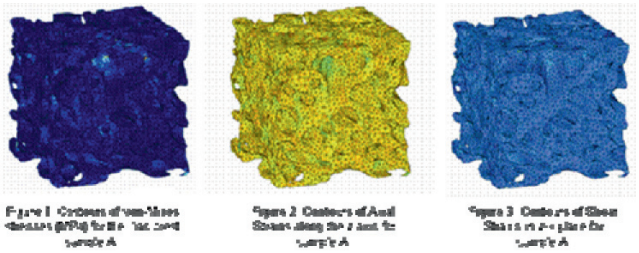
Aims: Age-related reduction in the bone mass causes an increase in the fracture risk of elderly populations. Finite element analysis (FEA) is generally used for indirect evaluation of mechanical properties of trabecular specimens but computationally expensive. In this study, we propose the reduced basis (RB) methods [1,2] which correlate well with the typical FEA results with a considerable gain in computational speed.
Methods: Three cylindrical iliac crest specimens (diameter: 7.5 mm, length: 10~12 mm) were obtained from osteoporotic subjects and scanned for mCT images. An in-house linear elastic FEA code based was used to perform the analysis. Subsequently, a FEA solution library was constructed for each of the specimens by varying the material property parameters: the tissue elastic modulus and Poisson's ratio. Then the average computational speed gain obtained by the RB methods for the samples and their accuracy relative to the FEA were evaluated. The spatial distribution of von-Mises stresses, axial strains and shear strains were studied for a fixed set of material properties.
Results: The von-Mises stresses tend to occur at sharp corners, where a narrow piece of trabeculae is required to transfer the load (Fig. 1). It was also observed that most of the elements were in the linear zone of stress-strain curve as most of the corresponding strains were less than 1± in compression and 0.8± in tension) (Fig. 2 and 3). Computational speed gains greater than 2000 were obtained for all the specimens for a compromise of less than 1% accuracy in the maximum value of von-Mises stress, assuming the FEA solution to be the standard for comparison.



Conclusions: The research question posed in the study was whether the application of reduced basis methods results in substantial decrease in computational time while the solutions being as accurate as FEA. The computational gains greater than 2000 times were obtained for all the samples for a slight reduction (<1%) in the accuracy of maximum value of von-Mises stress. The relative error in the maxima of the von-Mises stresses became smaller than 10^{-6} for all the samples as the number of basis vectors is increased to seven. The results support our hypothesis of obtaining real-time reliable solutions using reduced basis methods for this problem.
References: 1. Zawa K et al, J Biomech 2009;42:634; 2. Patera AT et al, MIT Pappalardo Graduate Monographs in Mechanical Engineering, 203, 2006.

Disclosure of Interest: None Declared

P350 - REDUCED TRABECULAR BMD AND CORTICAL THICKNESS ACCOMPANIED BY INCREASED OUTER BONE CIRCUMFERENCE IN METACARPAL BONE OF RHEUMATOID ARTHRITIS PATIENTS

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Aims: To assess 3-dimensional bone geometry and density at the epiphysis and shaft of the third metacarpal bone of RA patients in comparison to healthy controls with the novel method of peripheral quantitative computed tomography (pQCT).
Methods: PQCT scans were performed in 50 female RA patients and 100 healthy female controls at the distal epiphyses and shafts of the third metacarpal bone, the radius and the tibia. Reproducibility was determined by coefficient of variation. Bone densitometric and geometric parameters were compared between the two groups and correlated to disease characteristics and medications.
Results: Reproducibility of different pQCT parameters was between 0.8% and 2.5%. RA patients had 12%>19% lower trabecular BMD (p≤0.001) at the distal epiphyses of radius, tibia and metacarpal bone. At the shafts of these bones RA patients had 7%>16% thinner cortices (p≤0.03). Total CSA at the metacarpal bone shaft of patients was larger (between 5% and 7%, p<0.02), and Metacarpal Index (MI) was reduced by 13%. These significant differences between RA an controls remained after adjustment for

muscle volume. Disease duration correlated negatively with total and trabecular BMD at the distal radius and tibia as well as shaft cortical thickness at the tibia and metacarpal bone ($p<0.05$). DAS correlated negatively with metacarpal shaft cortical thickness and MI and cumulative glucocorticoid dose correlated negatively with MI ($p<0.05$). Erosiveness by Ratingen score correlated negatively with trabecular and total BMD at the epiphyses and shaft cortical thickness of all measured bones ($p<0.05$).
Conclusions: The proposed pQCT protocol is reliable and allows measuring juxta-articular trabecular BMD and shaft geometry at the metacarpal bone. The results document reduced trabecular BMD and thinner cortices at peripheral bones, and a greater bone shaft diameter at the metacarpal bone suggesting RA specific bone alterations.

Disclosure of Interest: None Declared

P351 - DISPROPORTION BETWEEN CALCIUM AND VITAMIN D LEVEL IN VITAMIN D DEFICIENCY INDUCED SEIZURE IN AN OLDER PATIENT

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Aims: Vitamin D deficiency remains an issue in the older population and this may be widely unrecognized among physicians. The role of Vitamin D is vital not just in bone strength and calcium homeostasis, but plays an important role in regulation of over 200 genes in the body. Vitamin D deficiency may be enhanced by intravenous Bisphosphonate infusion.
Methods: We present a case report of a 81 years old lady with history of recurrent admissions with generally unwell for 6 months duration, decreased mobility, recurrent falls, loss of appetite, weight loss, joint pain and lethargy. 3 days later during her admission she remained very confused and sustained fall and a witnessed 2 episodes of grand-mal seizures, with LOC, but no tongue biting or incontinence of urine. She had treatment with intravenous Ibandronate 3mg with 3 doses prior to onset of her symptoms for treatment of her osteoporosis, which may have precipitated her hypocalcaemia.
Results: The patient calcium level was 1.97 mol (normal range 2.2-2.6mmol), Alkaline Phosphatase 167 IU/L (normal range 120 -450 IU/L). ECG widespread inverted T waves, but negative TroponinT level. Her chest x-ray and CT brain showed age related atrophy and periventricular ischaemic changes. She had elevated parathyroid level (PTH) of 34 her serum vitamin D level was 20. She had treatment with iv calcium infusion during seizure attack and followed by adequate vitamin D replacement.
Conclusions: This patient symptom significantly improved as the Vitamin D deficiency was corrected. Her seizure was related to her Hypocalcaemia, though not as low as one would expect to cause seizure and tetany in this case. This case and other similar previously reported cases support the diagnosis of bisphosphonate induced hypocalcaemia and risk of osteomalacia in patients treated for osteoporosis. Vitamin D deficiency is often overlooked when treating osteoporosis. This case highlights the need for awareness of potential side effects after i.v. bisphosphonate infusion. It is recommended to assess calcium, vitamin D and PTH status, and prior to commencement of treatment.

Disclosure of Interest: None Declared

P352 - INFLUENCE OF PREGNANCY ON BONE MASS IN SICKLE CELL ANEMIA

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Aims: To study the effect of pregnancy on bony skeleton in patients with sickle cell anemia (SCA).
Methods: Consecutive adult female SCA patients who were treated at outpatients clinics of King Fahd University Hospital, Al-Khobar, Saudi Arabia, between January and July 2007, were the subjects of study. Patients age, number of pregnancies, duration after pregnancy was documented. Weight and height was recorded to calculate body mass index (BMI). Blood was collected for hematology and biochemistry. Bone mineral density (BMD) measurement was done using dual energy X-ray absorptiometry (DXA) at upper femur and lumbar spine.
Results: Thirty-eight patients were evaluated. There were 20 patients who had delivered (Group A) and 18 were nulliparous (Group B). The average age in group A was 27.55±4.9 years and group B it was 26.30±2.1 years. Sixty-five percent of patients in group A were osteoporotic as compared to 27.7% in group B ($p=0.01$). In group B, osteopenic patients were 38.9% versus 20% in group A ($p=0.2$). Osteoporosis in both groups was highest at lumbar spine as compared to the hip region (*P= 0.001)*. BMD was lower in parous women when compared to the nulliparous women. There was no significant difference in the studied hematological parameters which included the percentage of sickle haemoglobin and the hemoglobin level between normal, osteopenic and osteoporotic patient.
Conclusions: This study shows that SCA female patients suffer from low bone mass in young age, secondly in the pre-pregnant status the prevalence of osteopenia is lower and pregnancy induces osteoporosis.

Disclosure of Interest: None Declared

P353 - BONE TURNOVER DISORDER IMPROVES IN THE FIRST YEAR AFTER LIVER TRANSPLANTATION

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Aims: Chronic liver diseases and liver transplantation are major risk factors of metabolic bone disorders and reduced bone mass. The aim of this study was investigation of bone metabolism in liver transplant recipients.
Methods: Blood sampling plan included: surgery day (tx), 14 days, 3, 6 and 12 months afterwards. All patients had identical

surgical and immunosuppressive treatment. Study comprised 72 patients (54 men, 22 women, age 51.3 years, range 16-71) at different stages of follow-up (lethal outcome in 7 patients). Bone related parameters were measured by commercial kits: bone formation markers (osteocalcin, procollagen 1 propeptide P1CP, bone alkaline phosphatase BALP); bone resorption marker (crosslinked collagen 1 telopeptide CTX); osteoprotegerin (osteoclast suppressor secreted by osteoblasts and other tissues, OPG) and 25-OH D.

Results: Initially bone formation markers were decreased, bone resorption and osteoprotegerin were increased, and 25-OH D deficiency was present. In the follow-up bone formation markers osteocalcin and BALP increased, P1CP slightly decreased but all remained within normal range. High bone resorption decreased and reached normal values after 6 months, with similar osteoprotegerin decrement. 25-OH D deficiency remained with further decrease at 3 months.

(normal range)	tx	14 d	3 m	6 m	12 m
	X/SD (n=) Wilcoxon paired test vs. tx				
Osteocalcin (10-30 ug/L)	5.1/11.1 (66)	5.3/4.5 (48) p=0.001	16.1/14.1 (25) p=0.0005	30.1/27.7 (14) p=0.03	18.9/9.7 (10) p=0.02
P1CP (70-163 ug/L)	155/95 (49)	111/47 (41)	119/54 (21) p=0.02	129/73 (13)	79/37 (10) p=0.03
BALP (12-40 IU/L)	18.6/10.5 (68)	21.3/9.2 (48) p=0.0005	20.9/11.9 (23)	25.9/11.2 (13)	21.7/10.3 (9)
CTX (<0.65 ug/L)	1.02/0.81 (72)	1.08/0.65 (51)	0.85/0.55 (25)	0.74/0.54 (13)	0.50/0.30 (10) p=0.008 vs. 14 d
OPG	10.7/7.6 (65)	5.3/4.5 (48) p=0.001	5.3/3.6 (25) p=0.002	3.9/1.8 (13) p=0.003	4.6/2.9 (9) p=0.04
25-OH D (>75 nmol/L)	35/16 (66)		25/19 (25) p=0.02		28/19 (11)

Conclusions: Bone turnover disorder in patients treated by liver transplantation was characterised by decreased bone formation and increased resorption, with normalization trend within the first post-transplant year. Decrease of initially high bone resorption corresponded to osteoprotegerin levels. High osteoprotegerin at surgery might be a consequence of inflammatory cytokines (e.g. IL-6) and/or compensatory mechanism for high bone resorption. Continuous vitamin D deficiency did not compromise normalisation trend of bone turnover, but should be considered a risk factor for skeletal integrity.

Disclosure of Interest: None Declared

P354 - TWO YEARS FOLLOW-UP IN BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS PATIENTS ON RITUXIMAB

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Aims: Rheumatoid arthritis (RA) is characterized by systemic inflammation, which is accompanied by bone loss. Furthermore, RA is known to be associated with periarticular osteoporosis. The anti-TNFa biologic agents have been found to counteract the bone loss, which accompanies the process of RA. However, the effect of other biologic agents on the bone in RA has not been investigated. The aim was to study the effect of treatment with the biologic agent rituximab on bone mineral density in the lumbar spine and the hip in patients with RA.

Methods: A group of 23 patients, 20 women and 3 men, aged 37-72 years, with RA were studied. All the patients fulfilled the American College of Rheumatology criteria for RA diagnosis and had resistant RA, not responding to the administration of disease-modifying agents for a period of at least 6 months. The patients were given rituximab, as a cycle of two 1000 mg intravenous infusions on days 1 and 15, every 6 months. Methotrexate was administered to all patients. Low dose corticosteroids (5-7.5 mg prednisolone) were also administered. In all patients bone mineral density in the lumbar spine and the hip was measured before treatment with rituximab and 1 and 2 years later. Biochemical markers of bone turnover were also performed.

Results: No improvement in bone mineral density was observed during treatment with rituximab. No correlation of bone mineral density with the improvement in inflammation indices (ESR, C-reactive protein) and the clinical indexes DAS28 and HAQ was observed.

Conclusions: Prolonged treatment with rituximab in RA improves the clinical and laboratory picture of the disease, not however, inhibiting the bone mineral density alteration known to be associated with the disease and its treatment.

Disclosure of Interest: None Declared

P355 - TWO YEARS FOLLOW-UP IN BONE MINERAL DENSITY IN RHEUMATOID ARTHRITIS PATIENTS ON ABATACEPT

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Aims: Rheumatoid arthritis is currently treated with biologic agents. The anti-TNFa biologic agents have been found to counteract the bone loss, which accompanies the process of RA. However, the effect of other biologic agents on bone mineral density in RA has not been investigated. The aim was to study the effect

of treatment with the biologic agent abatacept on bone mineral density in the lumbar spine and the hip in patients with RA.
Methods: A group of 32 patients, 27 women and 5 men, aged 47-68 years, with RA were studied. All the patients fulfilled the American College of Rheumatology criteria for RA diagnosis and had resistant RA, not responding to the administration of disease-modifying agents for a period of at least 6 months. The patients were given abatacept, as an intravenous infusion every month. Methotrexate was administered to all patients. Low dose corticosteroids (5-7.5 mg prednisolone) were also administered. In all patients bone mineral density in the lumbar spine and the hip was measured before treatment with rituximab and 1 and 2 years later. Biochemical markers of bone turnover were also performed.
Results: No improvement in bone mineral density was observed during treatment with abatacept. No correlation of bone mineral density with the improvement in inflammation indices (ESR, C-reactive protein) and the clinical indices DAS28 and HAQ was observed.
Conclusions: Prolonged treatment with abatacept in RA improves the clinical and laboratory picture of the disease, not however, inhibiting the bone mineral density alteration known to be associated with the disease and its treatment.

Disclosure of Interest: None Declared

P356 - EARLY AND SUCCESSFUL MANAGEMENT OF A PATIENT WITH PAGET'S DISEASE OF BONE WITH ALENDRONATE

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Aims: Paget's disease of bone is a chronic skeletal disorder and it is characterized by increased bone turnover resulting in the bone becoming enlarged and weakened. The aim was to describe the case of a patient with Paget's disease of bone who responded rapidly to the administration of alendronate.
Methods: A male patient, aged 49 years was admitted for the investigation of an increased alkaline phosphatase without clinical symptoms. In a routine laboratory evaluation alkaline phosphatase was 380 U/l. Further investigations revealed a PTH level of 42.6 pg/ml (normal values <65 pg/ml), bone fraction of blood alkaline phosphatase 205 U/l (normal values <41.3 U/l), prostate specific antigen 1.42 ng/ml (normal values <4.0 mg/ml) and blood calcium 9.0 mg/dl. Bone scintigraphy with 99mTc was performed and revealed increased osteoblastic activity in the upper of the lumbar spine. An MRI of the lumbar spine was performed which showed enlargement of L1 and L2 vertebrae at the level of the facet joints and the body of the vertebrae, findings compatible with Paget's disease.
Results: Alendronate 70 mg was administered in a weekly basis. A month later a new laboratory evaluation revealed normal blood alkaline phosphatase levels. In a follow-up period of 6 months biochemical indices of Paget's disease remained within the normal limits.
Conclusions: Alendronate proved extremely successful in improving the abnormal laboratory findings of Paget's disease of bone.

Disclosure of Interest: None Declared

P357 - BONE LOSS IN WOMEN WITH HYPOTHYROIDISM TREATED WITH LEVOTHYROXINE

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Aims: The effects of thyroid hormone on bone density and bone strength, as well as risk of osteoporosis are still being debated. The aim of this study was to evaluate the effect of levothyroxine on the bones of women accepting this medication.
Methods: This study consisted of four groups: I group 41 premenopausal women with hypothyroidism in the age of 20 - 45 years with the disease duration up to the 5 years; II group 36 premenopausal age-matched young women without hypothyroidism; III group 52 postmenopausal women with hypothyroidism in the age of 45 - 60 years with the disease duration 5- 10 years; IV group postmenopausal age-matched 47 women without hypothyroidism. Women with hypothyroidism were medicated with levothyroxine (75 to 125 μg/day) and have TSH within normal rang. Bone mineral density (BMD) measurements were accomplished by quantitative ultrasound technique Sunlight Omnisense 7000S. Results were interpreted in accordance with criteria adopted by the WHO by T-score.
Results: In the I group the mean BMD was decreased in 14% of patient. T-score: distal 1/3 radius -1.5± 0.06; midshaft tibia -1.4±0.06; proximal phalanx of the third finger – 1.7±0.08 reflecting different degrees of osteopenia from moderate to severe. In the II group BMD was decreased in 9.8%. T-score: -1.3±0.07; -1.1±0.05; -1.4±0.06. In the III group BMD was decreased in 47%. T-score: -2.6± 0.06; - 2.5 ±0.06; -2.9±0.08; in the IV group BMD was decreased in 44.6%. T-score: -2.5± 0.08; -2.8±0.06; -2.7±0.07 respectively.
Conclusions: There was no difference of BMD in all studied groups with and without hypothyroidism that suggests no significant effect of levothyroxine on bone mineral density when medicated patient have TSH in normal ranges. If osteoporosis is a concern, attention should be paid to risk factors, exercise, diet, calcium and vitamin D supplementation, and if necessary, additional medications for treatment of osteoporosis can be considered.

Disclosure of Interest: None Declared

P358 - EFFECTIVENESS OF BISPHOSPHONATES IN OSTEOPOROSIS WOMEN TREATED WITH GLUCOCORTICOID: A SUB ANALYSIS OF THE CLEAR STUDY

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Aims: A recent observational study[1] has confirmed that the effectiveness of the 3 most used bisphosphonates (alendronate, risedronate, ibandronate) matches the efficacy for fracture reduction reported in their randomized trials in postmenopausal women. We report, for the first time, their effectiveness for fracture reduction in a sub group of patients treated with glucocorticoids (GC).
Methods: A cohort of women aged ≥65 years starting one of the three bisphosphonates and receiving a GC (450 mg prednisone-equivalent pills within±90 days of cohort entry), were analyzed using the same "pre-post" study design to assess if the clinical fracture incidence decreased with adherence to an individual bisphosphonate. 'Pre" was defined by the fracture incidence during the first 3 months of treatment and "post" by the fracture incidence on the subsequent 1-year follow-up on therapy.
Results: Of the 210,157 patients initiating bisphosphonate therapy, a total of 11,829 received a GC (alendronate 5%, ibandronate 6%, risedronate 6%). Relative to the "pre" period, the incidence of clinical fracture was lower in the "post" period at vertebral and non-vertebral sites with both alendronate and risedronate. No difference in fracture incidence was observed with ibandronate, but the sample size was smaller.

	Non Vertebral sites	Vertebral sites
Alendronate (n=6,359)		
Fracture reduction	33%	59%
Relative fracture risk	0.67	0.41
95%Confidence interval	0.50 - 0.90	0.30 – 0.56
Risedronate (n=4,648)		
Fracture reduction	28%	54%
Relative fracture risk	0.72	0.46
95%Confidence interval	0.52 – 1.00	0.32 – 0.66
Ibandronate (n=822)		
Fracture reduction		
Relative fracture risk	2.34	1.04
95%Confidence interval	0.79 – 6.92	0.47 – 2.32

Conclusions: These results infer the effectiveness of alendronate and risedronate in GC treated patients.
References: [1]Abelson. A et al. Osteoporos Int 2009
Acknowledgement: Funding for this study was provided by the Alliance for Better Bone Health (an alliance between Warner Chilcott Company, LLC and sanofi-aventis, U.S.)

Disclosure of Interest: None Declared

P359 - SODIUM ALENDRONATE THERAPY IN TYPE I AND II OSTEOPOROSIS

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Aims: We followed the efficacy of Sodium Alendronate therapy in type I and type II osteoporosis over 1 year of treatment in the Outpatients and Inpatients Department of Rehabilitation and Rheumatology Clinic Timisoara.
Methods: . We selected 50 patients, females, aged between 45 and 75 years, 40 from urban medium and 10 from rural medium; 45 had type I osteoporosis and 5 had type II osteoporosis (over 70 years of age). The methods were clinical (anamnesis, physical examination), biological, following the serum resorption bone markers (urinary hydroxyproline, alkaline phosphatase), the serum synthesis bone markers (acid phosphatase), urinary calcium, urinary N telopeptide, osteocalcin and bone densitometry, performed at the beginning of treatment, at 6 months and after 1 year.
Results: After 6 months and 1 year of treatment with Sodium Alendronate we noticed an increasing in T score of maximum 0,2 standard deviations. We also noticed a decrease of articular and dorsal pain and insignificant changing of the biological data.
Conclusions: 1. The medication was well tolerated by the patients, without any adverse reactions. 2. The Sodium Alendronate therapy resulted in increasing the bone mass, assessed by heel ultrasound (T score) by maximum 0,2 standard deviations after 6 months and 1 year of treatment, while clinical symptomatolgy was improved. 3. The optimal results were obtained in that group of patients who withdrawed the risk factors and associated kineto therapy.

Disclosure of Interest: None Declared

P360 - MICROHARDNESS OF CANCELLOUS BONE IN PROXIMAL EPIPHYSIS OF TIBIA ON BACKGROUND OF ARTHRITIS OF KNEE JOINT

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Aims: Measuring of microhardness (MH) of trabeculae of cancellous bone in tibial proximal epiphysis on background of knee joint arthritis.
Methods: The animals selected were separated into 7 groups: 1st group comprised intact rats, the 2nd group received prednisone *per os* in dosage of 1.061 mg/kg. The rats of the groups 4 through 7 were injected with talc suspension into the knee joint cavity. In a month after intervention, the 5th group received Calcemin (Ca), the 6th group received doubled dosage of Ca and the 7th group received Ca Advance (Adv). The observation terms were 10, 30 and 90 days after administration of the correction drugs. Microhardness measuring was performed by means of microhardness testing machine PMT-3.
Results: In the 2nd group, MH decreased as follows: by 10.90% by the 10th day, by 12.79% by the 30th day and by 15.12% by the 90th day of observation. In animals with arthritis, MH decreased

by 7.19% by the 10th day and by 9.33% by the 90th day. MH in the animals of the 4th group was lower than those in the 1st group by 12.84% at the 10th day, by 17.90% by the 30th day and by 24.80% by the 90th day. Moreover, MH in the 4th group was significantly lower than those of the 2nd group – by 11.41%.In the 5th group, MH was lower than those of the 1st group and were not significantly different from those of the 4th group. By the 90th day, MH in this group were higher than that of the 4th group by 18.04% yet they were lower than those of the 1st group by 11.24%. In the 6th group, MH at the 90th day was higher than those of the 4th group by 18.61% yet lower than those of the 1st group by 10.80%. Thus, increased Ca dosage did not produce significant effect. In the 7th group, MH values were not significantly different than those of the 1st group yet in all observation terms they were lower by 7.62-8.54%. Obviously, in this case the values almost approached to baseline values, which is due to higher concentration of microelements in Ca Adv, in part boron.

Conclusions: *Per os* prednisone administration leads to progressing decrease of microhardness of cancellous bone. Injection of talc suspension into joint cavity seems to have the same effects. Combination of these two factors results in potentiated negative effects on microhardness of cancellous bone. Ca has dosage independent positive effects on the condition though they were observed by the 90th day of observation. Ca Adv in this case appears to be more effective.

Disclosure of Interest: None Declared

P361 - ASSOCIATION BETWEEN PREVALENT FRACTURE AND LOW LEAN MASS IN YOUNG ADULT PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS

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Aims: The study was aimed to investigate factors contributing to risk of fracture in young adults with juvenile idiopathic arthritis (JIA).

Methods: Bone mineral density at lumbar spine, hip and total body, and body composition (DXA, GE Prodigy), and tests of lower extremity function were measured in 23 patients with JIA (mean age, 25.3±6.1years) and 52 matched healthy controls (mean age, 24.5±3.6 years). Patients were not treated with anti-TNFα drugs; 5 were treated by methotrexate, 4 by sulfasalazine, 3 by leflunomide, 13 by glucocorticoids.

Results: JIA was diagnosed at mean age of 9.9±4.9 years, mean duration of the disease was 15.4±8.4 years. Clinical and laboratory activity of JIA was documented in all patients (DAS 28, 6.1±1.3). Low bone mass (less than -2 SD Z score) was documented in 61% patients with JIA (in 71% patients treated with glucocorticoids and in 22% patients without glucocorticoids). During their disease, 22% of patients with JIA experienced a low-impact fracture. In contrast, only 5.8% of healthy controls experienced fracture after injury. In JIA patients, results of the chair-rise test were significantly poorer as compared with healthy controls. The lean body mass explained for 23% of variability of fractures. This association remained significant after adjustment for height, sex and low bone mass.

Conclusions: Our results confirm low bone mass in patients with JIA and point to the importance of low lean mass in the assessment of risk of fracture.

Acknowledgement: The study was supported by grants GA84208 and MZd 000237280.

Disclosure of Interest: None Declared

P362 - BONE MINERAL DENSITY AND VITAMIN D STATUS WITH IDIOPATHIC PARKINSON'S DISEASE

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Aims: Parkinson's Disease is a neurodegenerative disease that is mostly seen in elderly people and characterised by tremor, rigidity, akinesia, loss in postural reflexes, immobility and falls. Although the restriction in movement and immobilisation may accompany the disease, in later stages and may cause to decrease the mechanical stress and load necessary for the osteoblastic function. Moreover vitamin D deficiency may develop in immobilised patients due to the lack of sunshine. The objective of this study was to evaluate the bone mineral density and 25(OH)D levels in ambulatory patients with idiopathic Parkinson's disease and to compare the results with those obtained from the control group.

Methods: Forty-eight patients admitted to the outpatient unit of Istanbul Physical Medicine and Rehabilitation Training Hospital with the diagnosis of idiopathic Parkinson's disease were included in the study. Control group consisted of 50 age and sex matched subjects. Bone mineral density (BMD) was measured from the lumbar spine (L1-4) and bilateral femoral neck regions by using DXA (GE/ Lunar DPX Pro Madison, Wisconsin). Serum 25(OH) D and parathormone levels were measured. The SPSS for Windows 16.0 bundled software was used for statistical analysis.

Results: Twenty-six women and 22 men were participated in the study. Femur neck BMD value and T-score in the patient group were statistically significant lower than the control's ($p<0,001$). There was no statistically significant difference between the lumbar spine BMD values of the groups ($p>0,05$). Vitamin D values in the patient and control groups were 27,5ng/ml, 33,8ng/ml, respectively ($p<0,01$). Parathormone values in the patient and control groups were 66,73pg/ml, 55,14 pg/ml, respectively ($p<0,001$). There was a correlation between the duration of the disease and BMD values (r:-0,569, $p<0,01$). A positive correlation was observed between the 25(OH) D and BMD values (r:0,402, $p<0,01$).

Conclusions: This study revealed that the proximal femur BMD values and 25(OH)D levels were lower in ambulatory patients with idiopathic Parkinson's disease than those the control groups'. Bone loss was higher in the patients with severe disease and/or long disease duration. Bone density and serum vitamin D meas-

urement and planning the treatment program might be useful in Parkinson's Disease.

Disclosure of Interest: None Declared

P363 - COMPARATIVE STUDY OF THE QUALITY OF LIFE WITH PATIENTS SUFFERING FROM COXARTHRITIS AND COXITHIS, RESULTS OF RHEUMATIC POLYARTHRITIS AND ANKYLOSING SPONDYLITIS

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Aims: This study is aimed to compare the quality of life with patients suffering from coxarthritis and coxithis, results of rheumatic polyarthritis and ankylosing spondylitis.
Methods: It were selected 192 patients. The patients have been divided into three lots, according to the diagnosis such as: lot I – patients with coxarthritis, n=144; lot II – patients with coxithis PR, n=42; lot III – patients with coxithis SA, n=46. The authors have evaluated the quality of life, using the questionnaire HAQ. The evaluations have been made at the hospitalization, at the end of hospitalization, after six months and after one year. The data processing has been made using the ANOVA test.
Results: The average values of the HAQ score at hospitalization, at the end of hospitalization and after one year are presented in the tables below.
Conclusions:

HAQ At hospitalization	Arithmetical mean	Middle	Standard deviation	Average deviation	Dispersion	Extension	Coefficient of variation
Coxithis PR	2,11	2,12	0,57	0,42	0,33	2,13	27,05
Coxarthritis	1,27	1,38	0,69	0,59	0,48	2,88	54,16
Coxithis SA	1,75	1,78	0,72	0,57	0,52	2,62	41,07

ANOVA Test	HYPOTHESIS		INVARIABLES				CALCULATED VALUES	
	H_0	H_1	?	df_1	df_2	F critic	F	P
	$m_1 = m_2$	$m_1 \neq m_2$	0,05	2	229	**3,04**	28,26	0,000
CONCLUSION	P <= 0.05. Statistically, the results differ significantly. The null hypothesis is rejected							

Disclosure of Interest: None Declared

P364 - OBSERVATIONAL ITALIAN STUDY ON SEVERE OSTEOPOROSIS (ISSO): EVALUATION OF BASELINE CHARACTERISTICS AND QUALITY OF LIFE IN POSTMENOPAUSAL FEMALES AND MALES

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Aims: These data describe the characteristics and quality of life of Italian patients with severe osteoporosis experiencing ≥1 vertebral and/or non vertebral fragility fractures, starting from new osteoporosis treatment.
Methods: At entry, 783 patients (709 females and 74 males, mean(sd) age 72.9(8.8) were enrolled in 57 investigator sites. Baseline data included demographics, medical history, osteoporosis status, prior and current therapies and back pain. HR-QoL was assessed using the European quality of life questionnaire (EQ-5D). ANOVA was used to describe the relationship between back pain and EQ-5D.
Results: Historical vertebral fractures were reported in 715 patients, median(min:max) 3(1:6), 64.5% of whom had at least one severe fracture. Non-vertebral fractures were reported by 37.5% of patients. Previous anti-osteoporosis therapy was taken by 73.8% of enrolled patients, mostly bisphosphonates. The mean(sd) EQ-5D health state value (HSV) was 0.58(0.25) and the VAS was 49.2(23.6); 94.9% of patients reported back pain in the previous 12 months. During the last month, back pain was severe in 25.7% of patients and caused minor/moderate and severe limitations in daily activities during the last month in 65.5% and 16.2% of patients, respectively. Occurrence of non-vertebral fractures was associated with a significant reduction in quality of life, both of EQ-5D HSV (p<0.001) and VAS (p=0.025), whereas vertebral fracture was not associated with a QoL reduction (EQ-5D

HSV, p=0.712; VAS, p=0.224). A significant difference in EQ-5D HSV was observed between patients with different numbers of previous fractures (p=0.016). Back pain was associated with reduced quality of life (EQ-5D HSV: 0.58(0.25) with vs. 0.79(0.20) without pain, p<0.001), and EQ-5D VAS score (48.7±23.3 with vs. 61.0±31.5 without pain, p=0.02); as well as frequency and severity of back pain during the last month (EQ-5D HSV and VAS, all p<0.001).

Conclusions: Patients evaluated in ISSO study had severe osteoporosis, with high fracture risk, moderate-to-severe back pain and poor HRQoL. Back pain and number of previous fractures were associated with significant reduction of HRQoL.

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P365 - PARKINSON DISEASE AND OSTEOPOROSIS IN PATIENT WITH VISUAL LOSS

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Aims: Parkinson's disease and visual loss subjects characterising activity limitation provides such a balance dysfunction, there is the variance bone mineral density had osteoporosis or osteopenia.

Methods: Investigating thirty patients with association bone mineral density-Parkinson disease -visual loss. These persons woman an sixty years old about had bone mineral density measure by DXA measured in trochanteric and lumber spine; preventing loss bone and disability controlled by Unified Parkinson disease rating scale. We studied the influence physical impairment in women with Parkinson's disease and visual loss assessing: leg tremor, leg agility, leg rigidity and postural stability, walking speed, walking endurance and leg muscle strength.

Results: 15 patient with P,'s.d. and visual loss had osteoporosis, ten had osteopenia, five patient no bone density problems;1)patients with Parkinson's disease had lower significantly walking velocity, reduce walking, endurance and leg muscle strength, the patient with P's d. and v.l. had lesser bone density and lower walking velocity reduce walking endurance than the control group with no problem bone density.

Conclusions: Parkinson's disease and visual loss a common cause of disability in about sixty years old and secondary osteoporosis; there was a positive significant correlation between and body mass Index and negative correlation with age, severity of P'd

References: Kamanli A et al, Clin Exp Res 2008;20:277; Pangny MK, J Rehabil Med 2009;41:223; Colenbrander A, Fleeher D, J Vision Rehab 1990;4:1.

Disclosure of Interest: None Declared

P366 - PREVENTING BONE LOSS IN POSTMENOPAUSAL WOMEN WITH LOW BONE MASS AND LOW-TRAUMA FOREARM FRACTURES

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Aims: To evaluate the efficacy of early therapeutic intervention in preventing bone loss and reducing the risk of future fragility fractures in postmenopausal women with low bone mass and a history of forearm low-trauma fractures.

Methods: 34 postmenopausal women aged from 51-56 were admitted in our hospital for low-trauma forearm fractures and treated with closed reduction and AO external fixation. 12 of this patients had a medical history of pharmacological therapies (chronic glucocorticoid therapy) or medical condition with potentially negative effects on bone mass. After the orthopedic intervention, bone mineral density (BMD) was measured at lumbar

spine and proximal femur using dual-energy X-ray absorptiometry with results suggestive for low bone mass. 20 of this patients (especially those with osteoporotic risk factors) were included in to a program aiming to prevent further bone loss using different therapeutic strategies (hormonal replacement therapy or bisphosphonate therapy associated with calcium and vitamin D supplements) and the rest of 14 women had received only calcium and vitamin D supplements. They all made periodical medical checks and radiological evaluation at 6 weeks, 3,6,12 and 18 months postoperator. DXA scan was performed in all patients 2 years after initial evaluation.
Results: At 3-4 month after orthopedic intervention, all patients had a favorable fractures healing without pseudarthrosis, osteoporotic therapy having no influence on this healing process. In all patients we performed BMD measurements at 2 years after initiating therapy, with DXA scan showing a tendency of losing bone mass in the group of patients without pharmacological therapy (8 patients-57,14%) and with stable BMD (8 patients-40%) or increasing BMD (12 patients -60%) in the group receiving pharmacological therapy.
Conclusions: Early pharmacological intervention in women with low-trauma fractures and low bone mass may be beneficial in reducing the risk of further fractures and improving life quality.

Disclosure of Interest: None Declared

P367 - RESURFACING TOTAL HIP REPLACEMENT- A THERAPEUTICAL APROACH IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND HIP ARTHROSIS

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Aims: Patients with incipient hip arthrosis may benefit from a relative new therapeutical approach using resurfacing total hip replacement but in those with associated osteoporosis this type of surgical intervention is contraindicated given the poor quality of osteoporotic bones .We assessed the efficacy of osteoporotic pharmacological therapy to improve bone quality and bone strength in postmenopausal women diagnosed with hip arthrosis and osteoporosis thus facilitating the hip surgical intervention.
Methods: We evaluate 20 postmenopausal women aged from 53-60 years diagnosed with osteoporosis according to WHO criteria using dual-energy X-ray absorptiometry (DXA) for bone mineral density measurements and having also incipient hip arthrosis .The surgical approach was delayed for 12 months and all patients had received bisphosphonate therapy with calcium and vitamin D supplements. In all patients DXA scans were performed after 12 months of therapy.
Results: Surgical intervention with resurfacing total hip replacement was performed in 12 of 16 patients with evidence of increasing BMD, 4 of them showing elements of rapid advance hip arthrosis to a stage that made this type of intervention impossible. We choose not to use this technique in the group with stable BMD (4 patients).All 12 women surgical treated had a favorable postoperator outcome without experiencing a femoral neck fracture during the surgical intervention or during the 12 months follow-up. All 20 patients continued to receive bisphosphonate therapy.
Conclusions: In postmenopausal women with osteoporosis and associated hip arthrosis, improving bone mass and bone quality with bisphosphonate therapy is needed and important in order to permit hip arthroplasty using the technique of resurfacing avoiding the risk of intra-operator fractures and with favorable postoperator long-term outcome.

Disclosure of Interest: None Declared

P368 - SECONDARY OSTEOPOROSIS IN RHEUMATOID ARTHRITIS PATIENTS WITH KIDNEY INSUFFICIENCY

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Aims: It has been clearly stated that systemic bone loss contribute substantially to co-morbidity in rheumatoid arthritis. Our main concern is to determine whether RA patients suffering from kidney insufficiency have a poor secondary osteoporosis outcome.
Methods: The initial group included 46 women with RA, established moderate kidney impairment and osteoporosis (diagnosed through whole body BMD by dual energy X-ray absorptiometry –DXA, with a mean value of T-score – 4.26±0.65). All patients were evaluated regularly, every 3 to 6 months for 6.5 years through disease activity score on 28 joints (DAS284v), plasma urea and creatinine concentration and clearance, BMD every year, abdominal ultrasound every 6 months. They were compared to a second control group including 39 female RA patients diagnosed with osteoporosis with a similar BMD mean value of T-score(- 4.38± 0.46) and they showed no sign of kidney impairment whatsoever and were assessed by the same criteria as the first group. All patients were affected by stage III and IV RA, had similar DAS28 4v values at baseline (5.67±0.74) and received the same bisphosphonate treatment (risedronate or ibandronate) associated with recommended intake doses of calcium and vitamin D.
Results: At the end of the first study year, BMD showed similar value range for the two study groups (mean T-score value of -4.26±0.38) and no severe kidney impairment for the initial study group was to be found (range of Cl_{cr} kept between 40-60 mL/minute). Over the next 2 years BMD (T-score) proved little if no improvement in the first study group as compared to controls (-4.17±0.68 versus – 3.75± 0.58, $p<0.001$) even if regular osteoporosis treatment was maintained in all cases. At the end of the study, we found poor osteoporosis outcome in RA patients versus controls, with no adequate response to bisphosphonate therapy (T-score mean value – 4.06± 0.75 versus controls – 2.75±0.87, $p<0.001$). Variate regression analysis has also revealed that the presence of kidney insufficiency in RA patients is an independent prediction factor for poor osteoporosis outcome ($R2=0.734$, $p<0.001$).
Conclusions: The attempt to treat secondary osteoporosis in patients diagnosed with RA and associated kidney insufficiency might not have the same efficiency rate as expected.

Disclosure of Interest: None Declared

P369 - EFFECTS OF CYCLOSPORINE, TACROLIMUS AND RAPAMYCIN ON FEMORAL MICROSTRUCTURE IN HEALTHY MALE ADULT RATS

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Aims: One of the factors which can contribute to the severe bone loss alter transplantation is the direct action of immunosuppressive agents on bone cells. In a previous work we found that tacrolimus (FK-506) administration produced a decrease in femoral (F) and lumbar (L) bone mineral density (BMD). Rapamycin (RAPA) only decreased FBMD and Cyclosporine (CsA) did not affect L or FBMD. It is known that microtomography is a more sensitive technique than BMD for the assessment of bone mass. The aim of this work has been to study the effects produced by CsA, FK-506 or RAPA on femoral microstructure in healthy male adult rats.
Methods: Forty eight (12/group), 5-month-old male Wistar rats were used. CsA (2mg/Kg/day), FK-506 (3mg/Kg/day), RAPA (1.25mg/Kg/day) or water (0.5ml/rat/day, control group) were administered by oral gavage for 3 months. Two or 4 h after sacrifice. Femoral distal trabecular and cortical microstructure were evaluated by microcomputed tomography in the dependences of Trabeculae.
Results: Trabecular volume fraction (BV/TV) decreased significantly only in the FK-506 group (-16.8%, $p<0.05$) compared to control group due to an increase in trabecular separation (39.3%, $p<0.002$) and a decrease in trabecular number (-21.3%, $p<0.005$) without changes in trabecular thickness. Instead of a significant reduction in femoral BMD in RAPA group, no significant changes were found in femoral trabecular microstructure. Nevertheless, a detrimental effect of this drug was found in the femoral cortical structure, with reductions in cortical area (-9.75%, $p<0.05$) and rotational inertia moment (IM) (-39.34%, $p< 0.002$). This decrease in cortical structure, but not in the trabecular one, is the responsible of the decrease observed in FBMD in these rats. CsA also affected to F cortical structure, decreasing cortical area (-7.1%, $p<0.05$) and rotational IM (-14.5%, $p<0.05$). FK-506 did not affected to F cortical structure.
Conclusions: With respect to femoral microstructure: FK-506 administration decreased trabecular volume fraction without affecting cortical structure. RAPA decreased cortical structure without changes in BV/TV and cyclosporine only produced a little decrease in cortical. This is reflected in an important loss of FBMD after FK-506 treatment, a minor loss after RAPA, and no loss after CsA treatment.
Acknowledgement: Grants FIS PI06/0025 and Wyeth Laboratories.

Disclosure of Interest: M. Rubert: None Declared, M. Montero: None Declared, J. R. Caeiro: None Declared, D. Guede: None Declared, M. Martín-Fernández: None Declared, M. Diaz-Curiel: None Declared, C. De la Piedra Grant / Research Support from: Wyeth Laboratories

P370 - COMPARATIVE EFFECTS OF CYCLOSPORINE, TACROLIMUS AND RAPAMYCIN ON HUMAN OSTEOBLAST APOPTOSIS AND OPG, RANKL AND IL6 LEVELS

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Aims: One of the factors which can contribute to the severe bone loss after transplantation is the direct action of immunosuppressants on bone cells. In a previous work we found that tacrolimus (FK-506) administration produced a decrease in femoral (F) and lumbar (L) bone mineral density (BMD). Rapamycin (RAPA) only decreased FBMD and Cyclosporine (CsA) did not affect L or FBMD. The aim of this work was to study the effects produced by CsA, FK-506 and RAPA on osteoblasts apoptosis and release of IL6, a known activator of bone resorption. The OPG/RANKL ratio was also studied, as an important regulator of bone remodelling.
Methods: Human osteoblasts were obtained from five different men undergoing orthopaedic surgery and were cultured in DMEM supplemented with 20% FBS. The concentration of immunosuppressants used in this work was those considered as acceptable or high in serum patients under a clinical point of view. The different stimuli (high dose and clinical dose) were added to the culture after 24h of incubation in serum absence: RAPA 50ng/ml and 12ng/ml, FK-506 20ng/ml and 5ng/ml, CsA 1000ng/ml and 250ng/ml. Apoptotic cell death was quantified by flow cytometry of DNA content in permeabilized, propidium iodide-stained cells. IL6 was measured by an ELISA (Quantikine Human IL6, R&D Systems, Minnesota, USA). mRNA expression of OPG, RANKL, and IL6 was measured after 1h, 3h, 6h, 16h and 24h of addition of drugs, by quantitative RT-PCR.
Results: The degree of apoptosis of human osteoblasts increased significantly after 24 h of incubation with both doses of RAPA and FK-506. CsA did not exert any effect on osteoblasts apoptosis. After 24 h a significant increase in IL6 released to the culture medium was observed in presence of both doses of FK-506 and the high dose of RAPA. After 48 h both doses of FK-506 and RAPA produced a significant increase in the released IL6. CsA did not exert any effect on IL6 levels. The three studied immunosuppressants at both doses produced an increase in the IL6 mRNA expression. All studied drugs produced a decrease in OPG/RANKL ratio.
Conclusions: The bone mass loss observed in patients treated with immunosuppressants could be due to the direct effect of these drugs on bone cells. Three mechanisms are involved in this bone loss: The increase of osteoblasts apoptosis and the released IL6 and the decrease of OPG/RANKL ratio.
Acknowledgement: Grant FIS PI06/0025

Disclosure of Interest: None Declared

P371 - INFLUENCE OF THYROID HORMONES ON BONE MINERAL CONTENT IN MIDDLE AGED WOMEN

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Aims: Determine the bone mass in middle aged women who receive suppressive doses of thyroid hormone
Methods: Case and control study which included 113 women, between 4059 years old, who attended the Osteoporosis and Climacteric Clinic and the Oncology Institute both in Havana Cuba. After receiving their consent, each woman was interviewed and her clinical chart reviewed to ruled out the presence of any disease that may affect her bone quality. In addition in 43 women treated with thyroid hormones and in 70 without treatment dual X ray absorptiometry (DXA) was done in the lumbar and forearm regions (LEXXO, France) whose results included the T-score (interpreted according WHO criteria) and bone mineral density (BMD). Statistical analysis: Central measure tendencies. Pearson and Sperman correlations were used . A value of p<0, 05 for statistically significant differences.
Results: The BMD in vertebral column and forearm were 0,929 vs. 0,8856 (p<0, 05) and 0,536 vs. 0,6226 (p<0, 05) depending on use or non use of thyroid hormones, It was observed that the greater the period of use of thyroid hormones, the lower mineral content in both anatomical sites: although the affectation was greater in the forearm (p<0, 05). The risk of bone fracture due to fragility (Osteopenia + osteoporosis) was 43% and 45,7% in the vertebral and 34,8 and 42,7% in forearm respectively for women with and without thyroid hormones treatment (p<0, 05) for both groups
Conclusions: Treatment with suppressive doses of thyroid hormones reduces BMD but no necessary increase the risk of osteoporosis.

Disclosure of Interest: None Declared

P372 - THE WEIGHT BEARING PARAPLEGIC ARM

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Aims: Subjects with spinal cord injury lose muscle and bone mass, but increase body fat in areas below the level of neurological injury. On the other hand, paraplegia is associated with continued use of upper extremities. The purpose of this study was to investigate the changes of composition of paraplegic upper limb according to the neurological level of injury.
Methods: The study included thirty paraplegics in chronic phase (> 1.5 years) with complete paraplegia (AIS A) who were divided according to the neurological level of injury in group A (n=16, high paraplegia: above thoracic (T) 7 neurological level of injury (NLoI) with age: 33±16 years, duration of paralysis (DoP): 6±6 years, and group B (n=15, low paraplegia, T8-T12 NLoI with age: 39±14 years, DoP: 5.6±6 years, which were compared with 33 healthy controls (group C) of similar anthropometric characteristics. All were examined by whole body DXA (Norland XR 36, Norland Corp., USA) regarding the local (arm) bone density, muscle mass and fat.
Results: Bone density was found statistically significant between groups (p=0.008) and pair-wise comparisons revealed statistically significant differences between high vs. low paraplegia group and controls (p=0.028, p=0.01, respectively). A negative correlation was found in the high paraplegia group of muscle to fat mass (p=0.009, r=-0.67). Muscle mass was increased by 2% and fat mass decreased 26% in high paraplegics compared with low paraplegics.
Conclusions: These results suggest the occurrence of significant changes in the composition of weight bearing paraplegic arm.

Disclosure of Interest: None Declared

P373 - THE PARTICULARITIES OF BONE METABOLISM IN MEN WITH PROLACTIN-SECRETING ADENOMAS

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Aims: The aim was to study bone metabolism and bone mineral density (BMD) in hyperprolactinaemic males.
Methods: 25 men with prolactinomas and 17 healthy men were examined. Concentrations of general calcium, ionized calcium, osteocalcin, C-terminal telopeptide were enlisted. BMD were examined by DXA (Prodigy, GE Lunar). All patients were treated by cabergoline in median dose 1,5 mg per week. Median of attendance was 1,75 years.
Results: median of prolactin in men with prolactinomas was 10151 mU/l [3557,5; 38100], median of testosterone level - 4,75 nmol/l [2,45; 7]. There were no statistically significant differences between osteocalcin and C-terminal telopeptide levels in control group and hyperprolactinaemic men. BMD of L_1-L_4 (p=0,000052) and in total hip (p=0,002718) was significantly lower, than in control group. The frequency of osteoporosis was statistically higher than in control group (p=0,0154). Through 24 month prolactin level descended to 389 mU/l (p<0,01) and testosterone level advanced to 13.7 nmol/l (p=0,0217). Significant BMD increasing in hip and greater trochanter was noticed (p=0,003 and 0,027 respectively). The decrease of osteoporosis in L_1-L_4 frequencies (95% CI-0,45; 0,01) and of osteopenia in L_1-L_4 (95% CI-0,45; 0,12) was noted and of osteopenia in femoral bone (95% CI – 0,41; 0,09).
Conclusions: Hyperprolactinaemia in males is accompanied by BMD decreasing in bodies of vertebra and in proximal department of femoral bone by the side of healthy men without significant deviations of bone-formation- and bone-resorption-markers. Normalization of prolactin and testosterone levels conduces to BMD increasing.

Disclosure of Interest: None Declared

P374 - THE INFLUENCE OF THE NEUROLOGICAL LEVEL OF INJURY IN BONE'S MINERAL CONTENT AND MECHANICAL PROPERTIES, LEAN MASS AND FAT MASS IN PARAPLEGIA

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Aims: To investigate the influence of the neurological level of injury (NLoI) in bone's mineral content (BMC) and mechanical properties, lean mass (LM) and fat mass (FM) among paraplegics

Methods: Thirty complete paraplegics were separated in group A (15 men, high paraplegia) and group B (15 men, low paraplegia) in comparison with 10 healthy men as control group (C). In all subjects stress strain index (SSI) at 14% (SSI2) and 38% (SSI3) of the tibia length and the difference δSSI 3-2 (SSI3–SSI2), by peripheral quantitative computed tomography (pQCT, Stratec XCT 3000, Stratec, Pforzheim, Germany) and values of lower limbs' BMC, LM and FM (g) by whole body dual X-ray absorptiometry ((DXA, Norland XR 36, Norland Corporation) were measured.

Results: Bone strength parameters, BMC and LM were statistically decreased, but no difference was found in FM, compared to controls. A correlation between the duration of paralysis, age and δSSI 3-2 was found in group of low paraplegics (r=0.53, p=0.027 and r=0.5, p=0.04, respectively). Duration of paralysis was strongly correlated with FM in high paraplegics' lower limbs (r=0.5, p=0.05).

Conclusions: Because of the non significant duration of paralysis the paraplegic groups act different in mechanical properties of the tibia and lower limbs' body composition.

Disclosure of Interest: None Declared

P375 - BONE MASS EVALUATION AMONG WOMEN PREVIOUSLY SUFFERED FROM GESTATIONAL DIABETES MELLITUS

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Aims: Various bone metabolic disorders were published in different types of diabetes mellitus. Women previously suffered from gestational diabetes mellitus (GDM) have a high lifetime risk for type 2 diabetes. While the data about bone disorders are controversial in diabetes, the authors assessed the parameters of bone mass and bone quality in women previously suffered from gestational diabetes mellitus in comparison to controls.

Methods: Follow up study was performed including 108 women (age: 34.4±4.1ys [mean±SD]) after delivery (3.2±0.6ys). 69 women were in the GDM group (age: 34.9±4.4ys, BMI: 25.8±5.8 kg/m^2) and 39 women without carbohydrate metabolic disorders were on the control group whose pregnancies were in the same period (age: 33.4±3.5ys, BMI 24.3±4.3 kg/m^2; P NS). Bone mass (g/cm^2) was measured by dual photon absorptiometry (DXA, Lunar Prodigy, General Electric Company) in the lumbar spine and femoral neck. Bone ultrasound parameters were determined in the calcaneus (Lunar Achilles Insight, General Electric Company), and in the distal phalanges (DBM Sonic, IGEA, Italy). The densitometric and ultrasound results were categorised according to the T-score values, recommended by WHO and Hungarian guidelines. The results were evaluated by the Chi-square and T-test, with the level of significance set at 0.05 (SPSS 11.0).

Results: The GDM patients had lower (but not significantly) osteodensitometric values (GDM vs. control: lumbar 2-4 spine 1.25±0.11 vs. 1.27±0.13 g/cm^2, femoral neck 1.03±0.13 vs. 1.06±0.12 g/cm^2). Bone ultrasound result did not differ significantly between the two groups (GDM vs. control: calcaneus BUA 88.7±11.8 vs. 86.4±29.1 dB/MHz, phalanx SOS 2097.0±41.7 vs. 2110.5±42.9 m/s). Osteopenia/osteoporosis revealed in 24 cases among the 69 GDM patients, and in 8 cases from 39 controls (P=0.08). Pathological ultrasound values were found in 4 cases in the control and in 10 patients in the GDM group (P=0.3). In case of 3 and 9 women (respectively) only ultrasound results were pathological without DXA abnormalities (P=0.3).

Conclusions: Bone mineral density and bone ultrasound parameters did not differ significantly between GDM and control patients, however lower bone mass and worse bone quality could be presumed among women previously suffered from GDM. More patients and further tests are needed to confirm our assumption.

Disclosure of Interest: None Declared

P376 - OSTEOPOROSIS IN PATIENTS WITH MULTIPLE SCLEROSIS: PROPOSED THERAPEUTIC AND DIAGNOSTIC PROTOCOL

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Aims: Despite the increased number of risk factors in patients with multiple sclerosis (MS) there are no guidelines on the measurement of bone density and also there is no real ranking system similar to that for postmenopausal women. Therefore its more appropriate to use the term low bone mass instead of osteoporosis or osteopenia and also take into account the Z-score obtained from the measurement of bone densitometry. Although in the international literature the term osteoporosis is used and patients are classified according to criteria by WHO for postmenopausal women.

Methods: The diagnostic evaluation for osteoporosis should include

· the patient's history (disease-attendant complications, drug-using corticosteroids, alcohol, smoking and information about the duration of the disease, the mobilization, the use of devices)

· anthropometric parameters (age, body mass index)

· clinical examination (clinical assessment of mobility-functionality and spasticity)

· imaging control (measured by DXA bone density in the spine, hip and / or the tibia p QCT)

· hormone control, biochemical control (markers of bone turnover blood and urine).

Results: Treatment is focused at osteoporosis treatment and prevention of future fractures and may include the following:

1) Pharmaceutical treatment with bisphosphonates that have been studied in patients with brain and spinal cord lesions and had positive effects on bone parameters.

2) Use of calcium supplements (under monitoring of kidney function) and vitamin D.

3) Advisory regarding the disease, the particularities of this population group and recognition of fractures.

4) Education to prevent falls.

5) Physical therapy program that includes: 1) range of motion exercises to avoid restriction of mobility, 2) loading exercises to reduce bone loss, 3) retraining standing and therapeutic walking with orthoses, 4) use of passive – active mobilization bicycle,

6) Dietary interventions to improve the dietary intake of calcium and nutrition indicators.

Conclusions: Based on the literature regarding osteoporosis in MS we suggested a diagnostic and therapeutic protocol assessment and treatment of osteoporosis in patients with multiple sclerosis

Disclosure of Interest: None Declared

P377 - CHANGES OF BONE DENSITY IN PEDIATRIC PATIENTS WITH B THALASSEMIA MAJOR AFTER ALLOGENIC HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Aims: B Thalassemia Major is a hemoglobin disorder that effects bone in patients. It can be cured by hematopoietic stem cell transplantation (HSCT) that by itself can deteriorate bone status. Our study assessed the effect of HSCT on growing bone of thalassemic pediatric patients.

Methods: Bone mineral density (BMD) of 20 pediatric thalassemic patient, from 3 classes of disease (mean age: 7.4±3.8 y/o), tested before, 6 and 12 months after HSCT with a Norland XR-46 devices. No one had Z-score less than -2.

Results: Mean of BMD of femur and spine in the beginning of study was 0.599±0.116 g/cm2 and 0.461±0.086 g/cm2, respectively. After HSCT, at 6 and 12 months, mean of BMD of femur was 0.607±0.119 g/cm2 and 0.616±0.111 g/cm2, respectively. Mean of BMD of spine, six and 12 months of transplantation was 0.479±0.080 g/cm2 and 0.501±0.093 g/cm2, respectively. Changes of BMD of patients was not significant 6 months and 12 months after transplantation and BMD of no patient decreased to Z-score<-2. Class 3 thalassemia had no negative effect on BMD. We didn't find, also, significant relation between corticosteroid use and BMD changes in patients.

Conclusions: BMT of pediatric thalassemic patients has not positive or negative significant affects on BMD of patients.

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Disclosure of Interest: None Declared

P378 - QUANTITATIVE PROTEOMIC ANALYSIS OF INHIBITION OF OSTEOBLAST DIFFERENTIATION AND PROLIFERATION BY HIGH DOSE DXAMETHASONE

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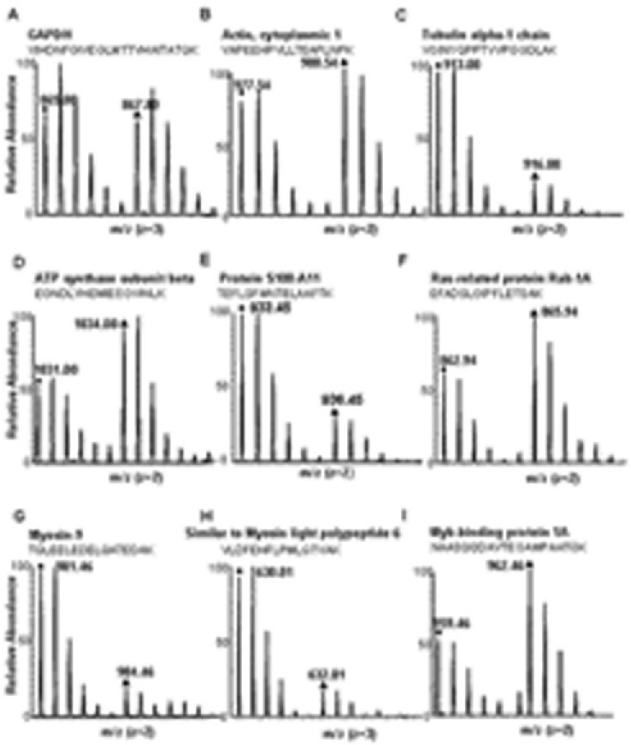
Aims: The impairment of osteoblast differentiation and bone formation is one of the main explanations of GCs-induced osteoporosis (GCOP). Stable-isotope labeling by amino acids in cell culture (SILAC) enables accurate quantitative proteomic analysis of protein changes in cells. This development has prompted investigations of the possible uses of SILAC for exploration of the underlying mechanism of GCOP.

Methods: Osteoprogenitor MC3T3-E1 cells were treated with or without 10^{-6} M DXAmethasone (DEX) for 7 days and the differentiation and proliferation abilities of the cells were measured. The protein level changes were analyzed using SILAC and liquid chromatography-coupled tandem mass spectrometry (LC-MS/MS).

Results: In this study, 10^{-6} M DEX inhibited both osteoblast differentiation and proliferation in osteoprogenitor MC3T3-E1 cells on day 7. We found that 10^{-6} M DEX increased the levels of tubulin (TUBA1A, TUBB2B, and TUBB5), IQGAP1, S100 proteins (S100A11, S100A6, S100A4, and S100A10), myosin proteins (MYH9, MYH11), while inhibited the protein levels of ATP synthase (ATP5O, ATP5H, ATP5A1, and ATP5F1), G3BP-1, and Ras related proteins (Rab-1A, Rab-2A and Rab-7) in MC3T3-E1 cells.

Conclusions: Several members of the ATP synthases, myosin proteins, small GTPase superfamily, and S100 proteins may participate in the process of GCs-induced inhibition of osteoblast differentiation and proliferation in osteoblast progenitor cells. Such protein expression changes may be of pathological significance in coping with GCOP.



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Disclosure of Interest: None Declared

P379 - QUANTITATIVE PROTEOMIC ANALYSIS OF DEHP-ENHANCED OSTEOCLASTOGENESIS IN RAW 264.7 CELLS BY SILAC

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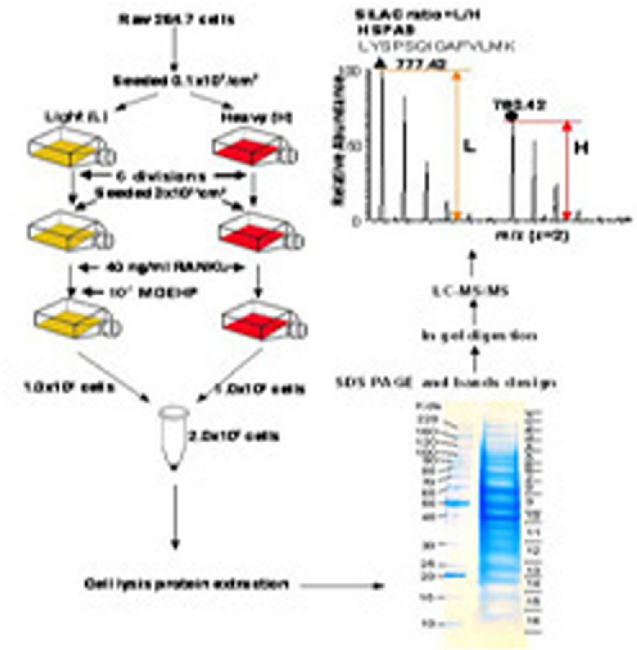
Aims: The di-(2-ethylhexyl) phthalate (DEHP), commonly used as plasticizers for polyvinylchloride (PVC) plastics, is an environmental endocrine disruptor to the reproductive and developmental systems. In addition, DEHP is an estrogenic industrial compound, and the estrogens is critical in regulating osteoclastogenesis. However, the effect of DEHP on osteoclastogenesis remains unknown.
Methods: We investigated the effect of DEHP on osteoclastogenesis and cell proliferation in RAW 264.7 cells on day 6. We further explore the mechanism of DEHP-induced regulation of osteoclastogenesis using quantitative proteomic analysis based on Stable-isotope labeling by amino acids in cell culture (SILAC).
Results: We demonstrated that DEHP dose-dependently enhanced osteoclastogenesis and inhibited cell proliferation in RAW 264.7 cells on day 6. Additionally, we identified 1596 proteins, most of them upregulated by 10^{-7} M DEHP treatment, using liquid chromatography-coupled tandem mass spectrometry (LC-MS/MS). We also found that the ATP-synthesis-related proteins such as HADHA, NDUFS1, NDUFB7, NDUFB5, COX5A, COX4I1, MTCO2, ATP5H, ATP5O, and ATP5A1 were significantly upregulated. In addition, the lysosomes such as CTSS, LYZ1, LYZ2, ATP6V0C and ATP6V1E1 were upregulated but the CTSD was downregulated.



Conclusions: In conclusion, the DEHP may dose-dependently enhanced osteoclastogenesis through increasing ATP generation and lysosome enzymes production. This mechanism may be of pathological significance because the enhanced osteoclastogenesis may consequently affect osteoblastogenesis and bone formation, especially in infants or children with higher risks of DEHP exposure.
References: 1. Andrade AJ et al, Toxicology 2006;228:85; 2. Ge RS et al, J Androl 2007;28:513; 3. Ong SE et al Mol Cell Proteomics 2002;1:376.

Disclosure of Interest: None Declared

P380 - THE RELATIONSHIP BETWEEN LEPTIN AND BONE METABOLISM IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Aims: Aim: the objective of this study to evaluate serum leptin levels and it's the possible relations with bone turnover and osteoclastogenesis markers, and bone mineral density (BMD) values in COPD.
Methods: Materials and methods: 54 patients with COPD ages 44 to 58 years were examined. BMD at the lumbar spine (LS) and

femoral neck (FN) and body fat mass (BFM) were measured by dual-energy X-ray absorptiometry using a Lunar Prodigy Densitometer (USA). Patients' individual BMD values were expressed as T-score. Serum leptin, osteoprotegerin (OPG-osteoclastogenesis marker), CrossLaps (CL-marker of bone resorption), osteocalcin (OC-marker of bone formation) were measured in the blood. Control group consisted of 32 age-matched healthy individuals.
Results: Results: Osteopenic syndrome (t-score<-1 SD) was observed in 48/54 (85±) patients with COPD. COPD patients had lower BMD values at the FN (p<0,001) and LS (p<0,01). Serum level OC were decreased and CL were increased in COPD (p<0,01 and p<0,05, respectively). Serum leptin levels were decreased in COPD and showed a negative correlation with BFM (r=-0,47, p<0,05) and positively associated with body mass index (BMI) (r=0,52, p<0,002), LS BMD (r=0,58, p<0,01) and FN BMD (r=0,48, p<0,05) in the COPD group. Serum leptin correlated positively with OC (r=0,45, p<0,04) and OPG (r=0,43, p<0,05) but negatively with CL (r=-0,53, p=0,043).
Conclusions: Conclusion: these results suggest that serum leptin affect bone metabolism and could be implicated in the bone regulation of OPG-RANKL system in COPD.

Disclosure of Interest: None Declared

P381 - FRAGILITY FRACTURES IN CHILDREN WITH MENINGOMYELOCELE

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Aims: Physical inactivity and motor deficits of lower extremities resulting from spinal surgery in children with meningomyelocele (MMC) may lead to secondary osteoporosis. The objective of this cross-sectional study was to assess bone mass and body composition, and to evaluate risk factors for fractures in these patients.
Methods: In 30 patients (15 girls, 15 boys) with MMC, aged 6-17 years (mean 10.9±2.8), history of fractures was investigated and clinical, anthropometric and locomotor assessment were performed. Laboratory tests i.e. serum parathormone (PTH), alkaline phosphatase (ALP), calcium and phosphate levels, and 24-hour urinary calcium excretion) were carried out using standard methods. Total body and lumbar spine (L_1-L_4) bone mineral content (BMC) and density (BMD) were measured using dual energy X-ray absorptiometry (DXA). The analysis of total and subregional BMC and body composition (% fat, fat content, lean mass) was also performed.
Results: Of the 30 children with MMC, 12 (40%) had sustained clinically significant fractures with femoral shaft being the most common fracture site. Five children demonstrated repeated/multiple fractures (17% of studied group). Fracture prevalence was independent of the anatomical spine location of hernia, locomotor activity (wheelchair, walking) or BMD. A higher body fat content was found in MMC patients with fractures compared with those without fractures (Fat%: 36.2±17.2 vs. 22.4±9.4; p=0.03) whereas no differences between the groups were observed in BMI, total or subregional BMC/BMD or lean mass. Children with fractures also demonstrated significantly greater 24-h calciuria than those fracture-free (p=0.03), despite no differences in renal function, PTH, ALP and serum calcium/phosphate levels. The rate of calciuria also correlated with number of fractures (R=0.62, p=0.03).
Conclusions: Clinically significant fractures in children with MMC are common, affect mainly lower extremities and, therefore, are medical problem to be considered when rehabilitating these patients. Fractures in the peripheral skeleton of immobile children with MMC may result not only from inadequate activity, but also from metabolic disorders associated with excessive renal calcium loss or a relative increase of fat mass. These data suggest that the two mechanisms are, at least partly, responsible for an increased fragility in MMC.

Disclosure of Interest: None Declared

P382 - PSEUDOHYPOHYPERPARATHYROIDISM – CASE REPORT

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Aims: Pseudohypoparathyroidism (PHP) is a rare hereditary disease, characterized by a reduced sensitivity of the PTH-receptors. A single epidemiologic study, performed in Japan, had reported a prevalence of 3.4 cases/1 million. The disease has two forms: type I (with 3 subtypes: Ia, Ib and Ic) and type II. The persistent hypocalcaemia in pseudohypoparathyroidism may lead to secondary hyperparathyroidism with osteoporosis.
Methods: We present the case of a 43-years-old woman (P.F.) hospitalized in Endocrinology Clinic Tg.Mures for pain at vertebral column and lower extremities, walking difficulties due to bilateral femoral fractures consolidated viciously, with pseudoarthroses. The patient presents the characteristic phenotype of Albright's hereditary osteodystrophy (AHD), including short stature (height: 150cm), obesity (BMI: 33,3kg/m2), rounded face, shortened neck, regional hyperpigmentation of the face, brachydactily, genu valgum.
Results: The cranial CT-scan showed microcalcifications of the lenticular nuclei and calvarial hyperostosis. The presence of AHD, the absence of mental retardation and other endocrinopathies rather plead for PHP type Ib. The presence of osteoporosis with T-score<–2SD complicated with femoral fragility fractures, vertebral deformations and fracture on D11, as well as the increasing levels of PTH (49.9pg/mL, then 120.37 and 123.1; n.r.:15-65pg/mL) associated with hypocalcaemia, indicate a PHP complicated with secondary hyperparathyroidism, i.e. pseudohypohyperparathyroidism. Our patient also presents PCOS and metabolic syndrome.
Conclusions: The patient is treated with high doses of calcium and vitamin D3, and is recommended to use the calcium sensitizer cinacalcet in daily doses of 30-60 mg.

Disclosure of Interest: None Declared

P383 - ZOLEDRONIC ACID IMPROVES HEALTH-RELATED QUALITY OF LIFE IN PATIENTS WITH HIP FRACTURE: RESULTS OF HORIZON-RFT

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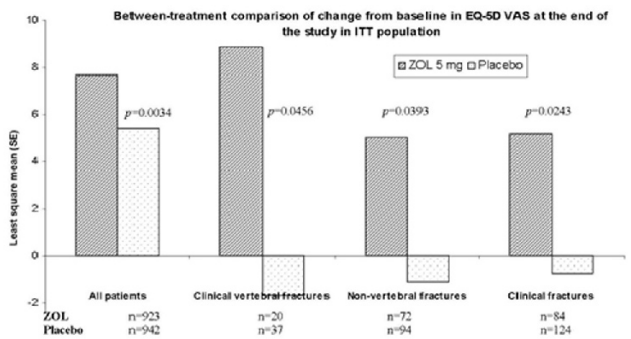
Aims: In HORIZON-RFT, annual i.v. zoledronic acid (ZOL) 5 mg infusion significantly reduced the rate of new clinical fractures and all-cause mortality compared with placebo.[1] A pre-defined exploratory objective of the same study was to analyze the benefits of ZOL *vs.* placebo on Health-related quality of life (HRQoL) using the EQ-5D health questionnaire in selected countries.

Methods: In this randomized, double-blind, placebo-controlled trial 2127 patients were randomized to single infusion of ZOL 5 mg (n=1065) or placebo (n=1062) within 90 days after surgical repair of low-trauma hip fracture, followed by annual infusions up to 3 years, with a median follow-up time of 1.9 years. HRQoL was measured using EQ-5D-Visual Analogue Scale (VAS) and -utility scores (EuroQol instrument) at end of the study. Analysis of covariance model included baseline EQ-5D status, region and treatment as explanatory variables.



Results: At baseline, patients (mean age: 75 years; 24% men and 76% women) were well-matched between treatment groups with mean EQ-5D VAS of 65.82 in ZOL group and 65.70 in placebo group. At the end of the study, mean change from baseline in EQ-5D VAS was greater for ZOL *vs.* placebo in all patients (7.67±0.56 *vs.* 5.42±0.56), and in subgroups of patients experiencing clinical vertebral fractures (8.86±4.91 *vs.* -1.69±3.42), non-vertebral fractures (5.03±2.48 *vs.* -1.07±2.16), and clinical fractures (5.19±2.25 *vs.* -0.72±1.82) with treatment difference significantly in favor of ZOL (Figure). EQ-5D utility scores were comparable for ZOL and placebo groups but more patients on placebo consistently had extreme difficulty in mobility (1.74% for ZOL *vs.* 2.13% for placebo; p=0.6238), self-care (4.92% *vs.* 6.69%; p=0.1013) and usual activities (10.28% *vs.* 12.91%; p=0.0775).

Conclusions: In addition to reducing the risk of vertebral, hip, and non-vertebral fractures, treatment with ZOL significantly improved overall quality of life in patients with low-trauma hip fracture.

References: 1. Lyles KW et al. N Engl J Med. 2007;357:1799.

Disclosure of Interest: J. Adachi Grant / Research Support from: Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, Pfizer, Procter & Gamble, and Roche, Consultant / Speaker's bureau / Advisory activities with: Amgen, AstraZeneca, Eli Lilly, GlaxoSmithKline, Merck, Novartis, Pfizer, Procter & Gamble, Roche, Sanofi-Aventis, and Servier, K. Lyles Grant / Research Support from: Novartis, the Alliance for Better Bone Health (Sanofi-Aventis and Procter & Gamble), and Amgen, Consultant / Speaker's bureau / Advisory activities with: Novartis, Procter & Gamble, Merck, Amgen, GTx, GlaxoSmithKline, Eli Lilly, and Bone Medical, C. Colón-Emeric Grant / Research Support from: Novartis and the Alliance for Better Bone Health, Consultant / Speaker's bureau / Advisory activities with: Novartis, S. Boonen Grant / Research Support from: Eli Lilly, Novartis, Pfizer, Procter & Gamble, Sanofi-Aventis, and Roche–GlaxoSmithKline, Consultant / Speaker's bureau / Advisory activities with: Amgen, Eli Lilly, Merck, Novartis, Procter & Gamble, Sanofi-Aventis, and Servier, C. Pieper Grant / Research Support from: Novartis, C. Mautalen Consultant / Speaker's bureau / Advisory activities with: Novartis, L. Hyldstrup Grant / Research Support from: Eli Lilly, Novartis, Pfizer, Nycomed, Roche, and GlaxoSmithKline, Consultant / Speaker's bureau / Advisory activities with: Novartis, Eli Lilly, and Nycomed, Merck, Eli Lilly, Nycomed, Novartis, Novo Nordisk, and Servier, C. Recknor Grant / Research Support from: Procter & Gamble, Consultant / Speaker's bureau / Advisory activities with: Procter & Gamble, Roche, and Eli Lilly, GlaxoSmithKline, Merck, and Aventis, L. Nordsletten Grant / Research Support from: Biomet, Consultant / Speaker's bureau / Advisory activities with: Novartis, DePuy and Wyeth, C. Bucci-Rechtweg Employee of: Novartis, G. Su Employee of: Novartis, E. Eriksen Consultant / Speaker's bureau / Advisory activities with: Novartis, Eli Lilly and Amgen, Employee of: Novartis during the design and initiation of the study, J. Magaziner Grant / Research Support from: Novartis and Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, Eli Lilly and Novartis

P384 - POSSIBLE BENEFITS OF STRONTIUM RANELATE IN COMPLICATED LONG BONE FRACTURES

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Aims: Strontium ranelate is a treatment of postmenopausal osteoporosis having demonstrated its efficacy to decrease the risk of vertebral, non-vertebral and hip fractures. Since pre-clinical results showed the beneficial effect of strontium ranelate in frac-

ture repair we attempted to use this molecule in clinical situations where such effect was key in the resolution of fracture complications. Two clinical cases of complicated long bone fractures treated with strontium ranelate are described.

Methods: CASE REPORTS

Results: PATIENT 1. A 63-year-old female patient suffered a fracture of the shaft of the tibia. Weeks after the immobilisation in a cast the alignment was lost. Fixation of the tibia was done with plate and nails. Re-intervention became necessary due to the failure of the material. An external fixator was applied. Four months later the fixator was removed. Established pseudoarthrosis was observed on control radiographs. Strontium ranelate was prescribed and re-intervention planned. By the next control visit radiographic consolidation of fracture was observed with a resolution of pain and clinical symptoms.

PATIENT 2. A 25-year old male patient suffered a fracture of the radius treated with open reduction and internal fixation. Four weeks after the intervention the patient complained of strong pain. The radiograph revealed resorption of the bone at the fracture site. With respect to our favorable previous experience, we prescribed strontium ranelate and an analgesic treatment. Six weeks later the radiograph showed bony bridging and the patient had no pain.

Conclusions: Osteoclast and osteoblast activity are both necessary in the remodeling phase of bone healing. An imbalance in catabolic and anabolic activity may lead to clinical complications such as pseudoarthrosis and bone resorption at the fracture site. Pharmacological treatments promoting the positive balance of bone metabolism may also play a beneficial role in the bone healing process. We observed positive change of trends in the clinical and radiological evolution of these cases after the introduction of treatment. These cases warrant further investigation of the potential beneficial effect of strontium ranelate in bone healing.

References: Habermann et al. J Bone Miner Res 2008;23:206; Li et al. Osteoporosis Int 2009 [Epub ahead of print]

Disclosure of Interest: D. Alegre Consultant / Speaker's bureau / Advisory activities with: scientific consultant, L. Azevedo: None Declared, C. Ribeiro: None Declared, A. Faria: None Declared, J. Correia: None Declared, C. Sousa: None Declared, L. Almeida: None Declared

P385 - IBANDRONATE FOR POSTMENOPAUSAL OSTEOPOROSIS: FOCUS ON BONE RESORPTION BIOMARKER

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Aims: to evaluate the effectiveness of ibandronate (IBN) in postmenopausal osteoporosis (PMOP) by measuring its effects on cross-linked C-terminal telopeptides of type I collagen (CTx, ECLIA β-CrossLaps), a biomarker of bone resorption.

Methods: 12 months observational prospective study on 72 PMOP (fulfilling the World Health Organization criteria) treated with 150 mg once monthly oral IBN. Both lumbar spine and hip DXA (Hologique QDR) and CTx assessment were done in all PMOP at baseline, 6 and 12 months of anti-resorptive therapy. Mean change (%) in CTx and bone mineral density (BMD) from baseline to 6 and 12 months have been used to define response.

Statistical analysis was performed in SPSS-12, $p<0.05$. **Results:** about 90% of PMOP were categorized as responders after 12 months of treatment; statistically significant decrease in CTx levels has been demonstrated after 6 and 12 months of IBN: -54.7% (range -66% to -43%) and -62.1 (range -72% to -51%) ($p<0.05$); besides, statistically significant increase in BMD has been reported at 12 months ($p<0.05$).

Conclusions: IBN administration in PMOP has rapid and sustained effect on bone turnover as reflected by the decrease in CTx levels after 6 and 12 months of treatment. Data are supported by changes in mean BMD after one year under IBN in both spine and hip.

Disclosure of Interest: None Declared

P386 - ALENDRONATE FOR POSTMENOPAUSAL OSTEOPOROSIS: FOCUS ON BONE RESORPTION BIOMARKER

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Aims: to evaluate the effectiveness of alendronate (ALN) in postmenopausal osteoporosis (PMOP) by measuring its effects on cross-linked C-terminal telopeptides of type I collagen (CTX-1, ECLIA β-CrossLaps), a bone resorption biomarker.

Methods: 12 months observational study on 65 PMOP receiving 70 mg of oral ALN once weekly. All PMOP were evaluated according to a predefined protocol including: (i) axial (lumbar spine and hip) Dual X-Ray Absorptiometry (Hologic, QDR) and (ii) serum CTX-1 levels; assessments were done at baseline, 6 and 12 months of anti-resorptive therapy. Mean change (%) in CTX-1 levels and bone mineral density (BMD) from baseline to 6 and 12 months have been used to define response. Statistical analysis was performed in SPSS-12, $p<0.05$.

Results: about 90% of PMOP were categorized as responders after 12 months of treatment; statistically significant decrease in CTX-1 levels has been demonstrated after 6 and 12 months of ALN: -59.7% (range -65% to -40%) and -69.2 (range -77% to -50%) ($p<0.05$); besides, statistically significant increase in BMD has been reported at 12 months ($p<0.05$).

Conclusions: ALN administration in PMOP has rapid and sustained effect on bone turnover as reflected by the decrease in CTX-1 levels after 6 and 12 months of treatment. Data are supported by changes in mean BMD after one year under ALN in both spine and hip.

Disclosure of Interest: None Declared

P387 - EFFICACY OF ORAL IBANDRONATE VERSUS 3 MG INTRAVENOUS IBANDRONATE

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Aims: Ibandronic acid is a potent, nitrogen-containing bisphosphonate used in the treatment of osteoporosis; it is available like 150 mg film-coated tablet for once monthly oral administration and 3 mg intravenously every 3 months. There is strong patient preference for once-monthly regimen and a favourable impact on therapeutic adherence. Intravenous ibandronate formulation is indicated for all patients who are unable to take oral medicine. This study evaluates the efficiency of ibandronate after 1year of oral / i.v. administration for osteoporosis in postmenopausal women.
Methods: We present the results of a retrospective study which included 2 groups of women that were registered in The National Programme of Osteoporosis. The first group consisted of 50 women with oral administration of ibandronate; the other group of 25 women received ibandronate intravenously for an year. The average age was 64.51 y.o. in the first group and 65.7 y.o. in the second one, in postmenopausal period for 13/18 years, with a T-score of 3.43 +0.66 SD /3.5+0.7SD at the beginning of the study.
Results: After one year of therapy the biological parameters as calcemia and alkaline phosphatase improved and the bone turn–over markers-cross-laps and osteocalcin-decreased (reduction of 50% for cross laps and 33% for osteocalcin in the oral regimen and of 38± for cross-laps and 9,5% for osteocalcin in the i.v. regimen). Both oral and i.v. ibandronate significantly increased bone density at the spine (4.3% and 5.8% vs. baseline with oral and intravenous ibandronate, respectively) Significant increases were also observed for total hip bone density (1.9% vs. baseline for the oral formulation and 2.6% vs. baseline for the i.v. administration). Percentage of patients with no change or increase from baseline in bone mineral density was high in both groups (Lumbar spine 94% for the oral formulation vs. 96% for i.v. and Total hip 92% vs. 84%). There were no recurrent fractures and no serious adverse events reported in either one of the groups.
Conclusions: In conclusion both formulations of ibandronate were shown to improve the quality of life, to reduce the risk for recurrent fractures and increase of bone mineral density after one year of therapy. IV ibandronate was shown superior to the oral formulation regarding lumbar BMD, total hip BMD and the percentage of BMD responders.

Disclosure of Interest: None Declared

P388 - INVESTIGATION OF ANTI-INFLAMMATORY AND CHONDROPROTECTIVE EFFECTS OF NASAL SALMON CALCITONIN TREATMENT IN KNEE OSTEOARTHRITIS: RANDOMIZED CONTROLLED STUDY

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Aims: This study was to evaluate effects of nasal salmon calcitonin treatment in knee OA on the functional condition, levels of Nitric Oxide (NO) found in the serum associated with cartilage degeneration, Malondialdehite (MDA) Interleukin 1 B (İL-1β), Matrix Metalloproteinase-3 (MMP-3), C-terminal telopeptide type II collagen (CTX-II), and on cartilage thickness assessed by Magnetic Resonance Imaging (MRI).
Methods: 50 female patients that were diagnosed with knee OA and postmenopausal osteoporosis were divided into two groups in a randomized manner. Group 1 that included 30 persons was given 200IU/day nasal salmon calcitonin, 1200mg/day calcium, 800IU/day vitD3 treatment and home exercise program, and the group 2 that comprised of 20 persons was given 1200mg/day calcium, 800IU/day vitD3 treatment and home exercise program for 6 months. The patients were assessed in terms of resting, activation, painful walking with Visual Analogue Scale (VAS), pain, stiffness, total parameters with WOMAC, 20 m walking time, serum inflammatory mediator levels (IL-1 B, NO, MDA, MMP-3), CTX-II in 24-hour urine, and knee joint cartilage thickness results by MRI
Results: Significant improvement was observed in VAS resting, walking, activation ($p<0.001$), WOMAC pain, total ($p<0.001$) and WOMAC stiffness ($p<0.05$) in group 1, and VAS resting, walking ($p<0.05$), WOMAC total ($p<0.05$) values of group 2. In the comparison between the groups, a statistically significant difference was found only in VAS activation value in favor of the group 1 ($p<0.05$). Only in group 1 demonstrated a statistically significant improvement after the treatment in 20-meter walking time parameters ($p<0.001$). A significant difference was not established between the groups. Only in NO and CTX-II levels from the serum inflammatory mediators a statistically significant decrease was observed in group 1 following the treatment at a higher degree ($p<0.001$). Between these groups, a statistically significant difference was found only in serum NO levels in favor of group 1 ($p<0.001$). As a result of the assessment of joint cartilage thickness by MRI, a statistically significant improvement was established only in medial femoral condil of the patients in group 1 after the treatment ($p<0.05$).
Conclusions: The results of our study demonstrated that nasal salmon calcitonin treatment is effective in the symptomatic treatment of patients with knee OA, and it contains anti-inflammatory and chondroprotective effects as well.

Disclosure of Interest: None Declared

P389 - EFFECTS OF TERIPARATIDE ON VERTEBRAL BODY BIOMECHANICS IN POSTMENOPAUSAL WOMEN TREATED PREVIOUSLY WITH RISEDRONATE OR ALENDRONATE: A QCT-BASED FINITE ELEMENT STUDY

P. Zysset [1,*], E. Quek [2], B. Borah [3], G. Gross [4], J. Stewart [5], T. Lang [2], Y. Chevalier [1]

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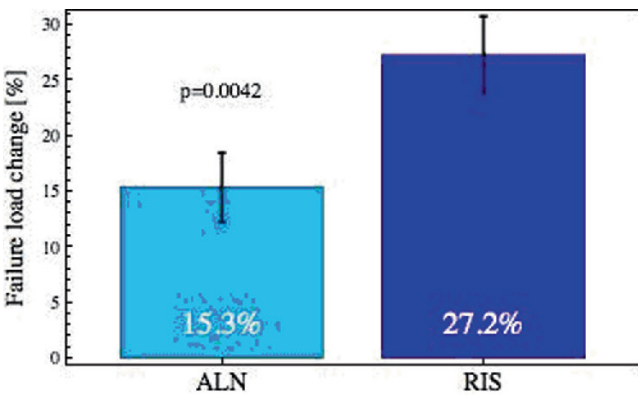
Aims: The clinical trial OPTAMISE showed differences in the responsiveness to teriparatide as a function of the prior bisphosphonate exposure in the vertebral bodies of postmenopausal women. The finite element (FE) method allows for patient-specific evaluation of the mechanics of bones, which plays a key role in fracture risk. The aim of this study was to use a QCT-based FE method to assess how prior therapy with alendronate (ALN) and risedronate (RIS) influences the biomechanical effect of teriparatide in the vertebrae of these women.

Methods: A representative subset of patients (n=171) were chosen from the OPTAMISE study (1). These patients received at least two years of prior treatment with either ALN or RIS and had QCT scans of L1 at baseline and after 12 months of teriparatide therapy. The L1 reconstruction was cropped, segmented and reoriented for comparison between the baseline and 12-month images. Following a validated procedure, voxel-based non-linear FE models were created from the calibrated images and subjected to axial compression (2). Both vertebral stiffness and strength were obtained from the computed force-displacement curves. Independent FE models of the trabecular core and cortical shell were also created and their stiffness and strength evaluated.

Results: For the full subset, teriparatide therapy increased vertebral stiffness in 88% and strength in 85% of the patients after 12 months. The increase in stiffness was significantly greater in the RIS (24.6±3.2%, mean±se) than in the ALN group (14.4±2.8%) with p=0.0079. The increase in strength was also significantly greater in the RIS (27.2±3.5%) than in the ALN group (15.3±3.1%) with p=0.0042. The increase in vertebral strength was dominated by the increase in strength of the trabecular core in both ALN (29.9±5.1) and RIS (39.9±4.8%) groups.



Conclusions: This work confirms the favorable biomechanical effect of teriparatide on the vertebral body in postmenopausal women with prior antiresorptive therapy and suggests that the increase in vertebral strength after 12 months is greater in patients treated previously with RIS than with ALN.

References: (1) Miller et al, J Clin Endocrinol Metab 2008;93:3785; (2) Chevalier et al, Comput Methods Biomech Biomed Engin 2008;11:477.

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Disclosure of Interest: P. Zysset Grant / Research Support from: P&G and Sanofi-Aventis, E. Quek: None Declared, B. Borah Employee of: Warner Chilcott, G. Gross Employee of: Procter & Gamble Co., J. Stewart Employee of: Sanofi-Aventis, T. Lang Grant / Research Support from: P&G and Sanofi-Aventis, Y. Chevalier: None Declared

P390 - VASCULAR EVENT IN OSTOEOPOROSIS POSTMENOPAUSAL WOMAN

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Aims: Calcium is an essential mineral, vital for bone health and nerve and muscle function. Current evidence suggests that high intake of calcium may play a protective role against vascular disease. Calcium supplementation has been demonstrated that calcium substantially slows bone loss, increase the ratio of high-density lipoprotein cholesterol to low-density lipoprotein by almost 20% in healthy postmenopausal women. High calcium uptake might accelerate calcification of arteries. The higher calcium intake — and particularly the bolus of calcium that supplementation provides — is somehow accelerating the laying down of calcium in the artery walls.

Methods: We present the case of a woman of 69 years old, with no previous vascular pathology that develop arterial calcification. The subject has osteoporosis treated with biphosphonates and supplements of calcium and vitamin D in the past two years. In the last six months there were symptoms of claudication, leg fatigue. Angiography revealed arterial calcification of both iliac vessels. The calcium supplements was 8oo-1ooomg/day for two or three weeks per month. We evaluate clinically the subject, pain with visual analogic scale, and quality of life using SF 36, at admission, at 3 and at 6 months. Rehabilitation treatment consist of balneokinetotherapy, paraffin, electrotherapy, kinetotherapy, massage in order to improve pain, disability.

Results: rehabilitation treatment improved pain from 8 to 5 and 3 at six months. The value of SF36 test increase from 45 to 56 and 71 at 6 months.

Conclusions: Calcium supplementation might increase vascular events in elderly women. Reducing intake daily dose of calcium at 500mg/day is not going to achieve the same bone benefit, but although it is probably a safer balance. Rehabilitation treatment improve quality of life and pain

Disclosure of Interest: None Declared

P391 - DAILY AND INTERMITTENT ORAL IBANDRONATE IMPROVE BONE TISSUE HARDNESS AND MAINTAINED ITS MINERALIZATION

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Aims: To evaluate the effect of ibandronate (IBN) on bone tissue quality. IBN has been associated with significant increases in bone mineral density, decreases of the incidence of new vertebral fractures (1) and at bone tissue level, with reductions of activation frequency and a trend toward improvement of microarchitecture (2) in postmenopausal osteoporosis.
Methods: 110 iliac bone biopsies (2) were taken from patients treated for 22 or 34 months with: an oral placebo (n=36), 2.5 mg daily (n=40) or 20 mg intermittent (n=34, 20 mg every other day for 12 doses every 3 months). These regimens provide annual cumulative exposures (ACE) about half the therapeutic doses currently licensed for PMO (3). Quantitative microradiography measured degree of mineralization of bone (DMB, g/cm^3) and the index of heterogeneity of mineralization (HI, g/cm^3), Vickers microhardness (Hv, kg/mm^2) was also assessed using microindentation (4). These variables were measured both at global level, i.e., cortical, cancellous or total bone (cortical + cancellous), and at focal level, i.e., at Bone Structural Unit (BSU) level.
Results: At global level, DMB and HI were not significantly different from placebo after 22 or 34 months of treatment. Hv was significantly higher in cortical, cancellous and total bone after 22 months of IBN versus placebo. These results persisted after 34 months except for Hv of cortical bone in daily group. DMB, HI and Hv were not different between the two IBN regimens. At focal level (3500 BSUs), DMB and Hv measured simultaneously were significantly and positively correlated ($p<0.0001$); the slopes between placebo and IBN groups were significantly different ($p<0.05$).
Conclusions: In contrast to results obtained with other bisphosphonates (5), DMB was maintained after IBN, and Hv was improved. Thus, IBN even at lower than licensed doses may modify intrinsic properties of bone, such as the quality of mineral crystals or of organic matrix, not measured by microradiography but leading to an improvement of microhardness.
References: 1. Chestnut C et al, J Bone Miner Res 2004;19:1241; 2. Recker R et al, Osteoporos Int 2004;15:231; 3. Harris ST et al, Curr Med Res Opin 2008;24:237; 4. Boivin G et al, Bone 2008;43:532; 5. Boivin G et al, Bone 2000;27:687

Disclosure of Interest: Y. Bala Grant / Research Support from: Hoffmann-LaRoche, C. Barr: None Declared, G. Boivin Grant / Research Support from: Hoffmann-LaRoche

P392 - NEW APPROACHES IN THE CHONDROPROTECTIVE TREATMENT OF OSTEOARTHRITIS

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Aims: The incidence of osteoarthritis increases with age and lifespan, becoming the most common cause of invalidity after a certain age. To assess the effectiveness of chondroprotective treatment in osteoarthritis
Methods: The study was carried out on 450 patients hospitalized between 2007-2009 for coxarthritis (61.53%), knee osteoarthritis (19.24%), hip and knee osteoarthritis (19.23%). The group was divided into three subgroups as follows:

1. Group I (277 patients) treated with *Alflutop*, a bioactive concentrate containing marine organisms rich in mucopolysaccharides (chondroitin sulfate, amino acids, peptides, ions of K, Ca, Mg, Fe, Cu, Zn). The medicine was administered intraarticularly, every other day, in ten consecutive doses, followed by intramuscular injections for three weeks. The treatment was repeated three times a year.

2. Group II (87 patients) treated with intramuscular injections with *Zeel P* (Hell GmbH Baden-Baden), containing extracts of cartilage, placenta, umbilical cord and symphytum coenzyme A, in the same dosage as above.

3. Group III (86 patients), treated with hyaluronic acid salt products (hyalgan, ostenyl, synvisc, synovial), intraarticular injections once a week for five consecutive weeks. Hyalgan yielded very good results, especially in the medial stages of the disease.

The age of patients ranged between 39 and 78 years, with a mean age of 52 years; most of the patients (78%) were women.
Results: Clinically the treatment resulted in the disappearance of pain, improved functionality (Lequesne index questionnaire), improved radiological index of the articular space, stable biological and immunological tests, both before and treatment. The best results were obtained in the early stages of the disease, in forms with severe pain (mainly in the age group 39-49 and 49-60), in the cases without severe cartilage destruction or articular deformation (especially in Group III).The regenerating and trophic effects of *Alflutop* was experimentally demonstrated scintigraphically and histochemically by inducing osteoarthritis in rats.
Conclusions: The primary role of this medication is prophylactic and curative, used as basic long-term treatment between the ages of 39-55, and in degenerative rheumatism, administered locally or associated with intramuscular injections. Physical therapy and exercise play an important role in preserving range of motion and muscle strength.

Disclosure of Interest: None Declared

P393 - THE EFFECT OF FUNDING POLICY TO THE PROFILE OF THE PATIENTS RECEIVING TREATMENT FOR OSTEOPOROSIS

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Aims: The aim of this study was to evaluate the effect of the reimbursement policy on osteoporosis treatment in Romania.

Methods: 1100 medical records of the patients admitted in the National Osteoporosis Program in two endocrine departments from Bucharest between 2003-2009 were retrospectively analysed in relation to the funding policy from the admission moment. Patients were divided in three subgroups based on the moment of the admission in the National Program which is providing free of charge treatment for patients diagnosed with osteoporosis. The three periods of time were selected based on the funding policy and were defined as period I: 2003-2006, period II: 2007-2008 and period III: 2009. The profile of the patients was defined by the age, gender, associated clinical risk factors, T-score value (assessed by DXA), prevalent osteoporotic fractures and the period of time with free of charge treatment. We analysed also the number of patients treated by year in the defined periods of time and the ratio between postmenopausal osteoporosis and other causes of osteoporosis.

Results: We found 220 patients in the 1st group with the following parameters: mean age of 67.5 yrs, 5.4% males, mean period of treatment 7.8 months, 76% with at least an additional clinical risk factor, mean value of lumbar T-score –3.6 SD, 67% with prevalent fractures and a 85% of postmenopausal osteoporosis. In group II were found 680 patients with a significantly lower mean age of 61.2 yrs, with 5.8± males and a mean period for treatment of 14.5 months. Only 38% had an additional clinical risk factor and 34% had prevalent fractures; lumbar T-score was significantly lower with a mean of –2.8 SD and postmenopausal osteoporosis accounts for 80% of cases. In group III, we had 200 patients with 5.9% males, mean age of 66.8 yrs, mean period of treatment 11.8 months and mean value of lumbar T-score of –3.1 SD. In this group, 50% had additional risk factors and 49% had prevalent fractures. Group I and III were patients treated in periods of time with low financial resources (9.1 patients/month and 16 patients/month respective) comparing to group II when admission rate was 27.5 patients/month due to increased funds.

Conclusions: These data has shown that increased financial resources could affect the profile of the patients receiving treatment in terms that more patients with lower age and lower fracture risk are receiving treatment in the absence of a fracture risk evaluation specific treatment recommendation strategy.

Disclosure of Interest: None Declared

P394 - CHANGES IN QUALITY OF LIFE AND BACK PAIN IN WOMEN WITH OSTEOPOROSIS TREATED WITH RHPTH(1-34) (TERIPARATIDE): 36 MONTH RESULTS FROM THE EUROPEAN FORSTEO OBSERVATIONAL STUDY (EFOS)

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Aims: To describe back pain and health-related quality of life (HRQoL) in postmenopausal women with osteoporosis treated with teriparatide for up to 18mths and followed-up for a further 18mths.

Methods: A 36-month observational study in 8 European countries. Data on incident clinical vertebral and non-vertebral fractures were collected, back pain (BP) was measured using a 100 mm Visual Analogue Scale (VAS) and a questionnaire, and HRQoL measured using EQ-5D. Changes from baseline in back pain VAS and in EQ-VAS were analysed using a repeated measures model.

Results: There were 1581 patients with follow-up data, including 909 patients with post-teriparatide follow-up data. At baseline, mean (SD) age was 71.0(8.4)yrs, 73.8% of patients had sustained ≥2 fractures after age 40yrs, 7.7% were OP-treatment naïve. Most patients (n=855, 94.3%) received anti-OP medication, mainly bisphosphonates (63.3%) at some point after stopping teriparatide. At all time points relative to baseline there was a significant reduction in adjusted mean back pain VAS ($p<0.001$). From a mean (SD) baseline of 52.0(21.98) the adjusted mean EQ-VAS increased by 12.5 at 18mths and this improvement was sustained after stopping teriparatide. Back pain frequency and severity was significantly reduced compared to baseline (Table).

	Baseline	18 mths	**36 mths**
EQ-5D Health State Value (median, IQR)	0.59 (0.08, 0.73)	0.73 (0.59, 0.85)	0.73 (0.59, 0.88)
EQ-VAS (mean, SD)	52.0 (21.98)	67.4 (21.38)	68.7 (22.45)
Back pain			
Every day / almost every day*	N=1569 63.2%	N=1271 25.6%	N=990 21.0%
Moderate / severe*	N=1481 91.0%	N=1028 61.3%	N=748 59.8%
VAS (mm)* (mean, SD)	57.8 (26.61)	31.9 (25.49)	29.3 (26.31)

* in the last month

Conclusions: Postmenopausal women with severe OP who were prescribed teriparatide for up to 18 months in a routine setting had a significant reduction in back pain and improvement in HRQoL during 18 mths of treatment with teriparatide. These outcomes lasted for at least 18 mths after teriparatide discontinuation. All findings should be interpreted in the context of a non-controlled observational study.

Disclosure of Interest: A. Fahrleitner-Pammer: None Declared, Ö. Ljunggren: None Declared, B. Langdahl: None Declared, B. Walsh: None Declared, C. Barker Employee of: Lilly, W. Lems: None Declared, D. Karras: None Declared, G. Rajzbaum: None Declared, F. Jakob: None Declared, A. Barrett Employee of: Lilly, F. Marin Employee of: Lilly

P395 - PROMOTION OF OSTEOBLAST DIFFERENTIATION AND INCREASE OF OPG/RANKL RATIO BY STRONTIUM RANELATE IN OSTEOBLAST-OSTEOCLAST CO-CULTURES

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Aims: In the treatment of osteoporosis Strontium Ranelate (SrRan) is unique in its dual effect on bone remodeling, on the one hand stimulating osteoblasts (OB) and on the other hand inhibiting osteoclasts (OC). The calcium sensing receptor has been reported to be involved in the action of SrRan.
Methods: In vitro evidence of the dual effect of SrRan has been obtained in cultures of OB and OC separately. Here we present the first study in which the effects of SrRan are shown in a co-culture of OB and OC, an experimental condition closer to the in vivo situation. OC precursors (RAW 264.7) were co-cultured for 7 days with human pre-osteoblasts (SV-HFO) during early and late (mineralization) stage of OB differentiation (9-16 days or 23-30 days of OB culture, respectively). Cells were treated with different concentrations of SrRan (0.1-10 mM). Continuous SrRan treatment occurred from start of OB culture.
Results: The effects of SrRan on OB and OC cultured separately were first assessed. When OB were cultured alone, SrRan dose-dependently increased in early as well as late stage of differentiation the expression of collagen type I (Col1A1) and alkaline phosphatase (ALP) by 1.5 fold. In the late stage of osteoblast differentiation SrRan increased the OPG/RANKL ratio by about 2-fold. When OC were cultured alone, OC differentiation was inhibited by 10 mM SrRan, as shown by an inhibition of fusion of mononuclear cells and a decrease in gene expression of TRAP by 1.5-fold. Importantly, in OB-OC co-culture, SrRan increased both ColA1 and ALP gene expression 1.5-fold. OPG/RANKL ratio was increased 3-fold. TRAP expression in osteoclasts tended to be further reduced by SrRan treatment.
Conclusions: In conclusion, these results show for the first time the beneficial effect of SrRan on the osteoblastic (Col1A1 and ALP) and osteoclastic-related differentiation markers (OPG/RANKL ratio) in OB-OC co-culture, which is closer to the in vivo situation where OB and OC are found in the same environment.

Disclosure of Interest: None Declared

P396 - STRONTIUM RANELATE-INDUCED OSTEOGENIC EFFECTS IN HUMAN OSTEOBLASTS VIA A SCLEROSTIN DECREASE AND A CANONICAL WNT SIGNALING INCREASE

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Aims: Strontium ranelate (SrRan) is a treatment for osteoporosis that has been shown to reduce fracture risk by increasing bone mass through increase in bone formation and decrease in bone resorption via the calcium sensing receptor. We have previously shown that SrRan treatment of primary human osteoblasts (HOBs) increases the expression of osteoblastic differentiation markers (alkaline phosphatase, RUNX2 and osteocalcin) (Brennan TC et al, Br J Pharmacol 2009;157:1291-1300). The canonical Wnt pathway, a key regulator of osteogenesis, is known to be activated via AKT and also by Wnt-induced Frizzled/LRP complex formation in the plasma membrane, the formation of which is inhibited by sclerostin, an osteocyte-specific secreted protein. Recently, it has been shown that SrRan treatment of MC3T3-E1 cells promoted osteoblast differentiation, at least in part, by increasing expression of Wnt 3a and β-catenin transcriptional activity (Fromigue O et al, J Bone Miner Res 2009;24 suppl 1). In the current study, we investigated whether sclerostin, an inhibitor of bone formation, and the canonical Wnt signaling are implicated in strontium ranelate-induced osteogenic effects in HOBs.
Methods: HOBs were differentiated to a multilayer "osteocyte-like" phenotype (dHOBs).
Results: At 7 and 14 days post-treatment, SrRan was shown to significantly increase the mineralization rate of dHOBs as measured by alizarin red staining (0.1 mM $p<0.05$ at 14 days, 2 mM $p<0.01$ at 7 days and $p<0.001$ at 14 days vs. vehicle). The presence of SrRan during mineralization was also shown to significantly decrease the level of sclerostin expression in dHOBs as measured by Western blot analysis at 7 and 14 days post-treatment (0.1 mM $p<0.001$ at 14 days, 2 mM $p<0.05$ at 7 days and $p<0.001$ at 14 days vs. vehicle). Using Western blot analysis, we demonstrate that SrRan treatment of monolayer HOBs resulted in phosphorylation of AKT, GSK-3β, β-catenin, stabilization of β-catenin in the cytosol and subsequent β-catenin translocation to the nucleus.
Conclusions: With this experiment we can conclude that the decrease of sclerostin, resulting in the increase in culture mineralization, and the increase of canonical Wnt signaling are involved in strontium ranelate-induced osteogenic effects in HOBs.

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P397 - HORMONE REPLACEMENT THERAPY AND CALCITONIN IN POSTMENOPAUSAL WOMEN

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Aims: Determining if the combined use of hormone replacement therapy and calcitonin influences on bone mass loss in postmenopausal women
Methods: We studied for 18 months 12 women who were 43 to 77 years old at base line, were within 1 and 21 years of menopause, and had a bone mineral density at the lumbar spine between 150 mg/cc and 80 mg/cc measured by the QBMAP system with a spiral CT Picker PQ-S densitometer at L2, L3, L4 and L5. 22 women were assigned to transdermal therapy with 50 mg/day of 17β -oestradiol on a uninterrupted cyclic regimen combined with 100 mg/day of micronized progesterone, and 13 were treated with the same hormone replacement therapy plus 200 UI of intranasal. The SPSS programme was used for statistical analysis.
Results: The characteristics of the women recruited for both groups were similar. Mean mineral bone density at the lumbar spine was between 1 and 3 DS below the mean value for 30 years old normal premenopausal women. After treatment no difference statistically significant was found among the groups with and without calcitonin as for the bone mineral density at the lumbar spine. The calcitonin group felt less pain.
Conclusions: It is necessary to carry out a wider study but it seems that the 200 UI calcitonin contribute advantages when it is combined with hormone replacement therapy to decrease the bone mass loss in postmenopausal women at least at lumbar spine. Micronized progesterone is different from medroxiprogesterone acetate and conjugated equine oestrogens are not 17β -oestradiol. Women does not have in their fertile period conjugated equine oestrogens and medroxiprogesterone acetate but progesterone and 17β -oestradiol. These avoid osteoporosis in the young woman.

Disclosure of Interest: None Declared

P398 - A PULSED ELECTROMAGNETIC FIELD STIMULATION IN FRACTURE HEALING AND IN INDUCED OSTEOPOROSIS IN WISTAR RATS

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Aims: Pulsed Electromagnetic field stimulation has been a well documented technique for fracture healing and osteoporosis has been successfully used on animals and humans. No side effects of these have been reported so far, though these have not have been much in use because of its limited understanding among clinicians.
Methods: The method on fracture healing has been successfully demonstrated in our laboratory in induced fractures and on induced osteoporosis in animals. The stimulation has been found effective in induced osteoporosis in animals by all the three methods, e.g. Sciatic denervation, ovariectomy and microgravity induced osteoporosis. An essential difference between induced fracture and osteoporosis is one of calcium loss in the later. Of the three methods the calcium loss in microgravity induced osteoporosis is much higher (about ten times) than the other two, and is important because of possibility of long duration space travel becoming a distinct possibility. In view of this a program was initiated in this laboratory to attempt a synergistic effect of pulsed field along with calcium salt to restore the structural integrity of the microgravity induced bone loss.
Results: An intake of hydroxyapatite nanoparticles along with .Pulsed field is instrumental in deposition of calcium particles in the gap due to calcium loss. It is suggested that their synergistic influence is effective in restoring the bone loss with utmost fidelity by way of biochemical indicators and XRD analysis. The osteoporosis set in by other two methods is restored by the electrostimulation alone. This capacitively coupled field leads to proliferation of osteoblastic activity at fractured site. The activity of the damaged site reaches to pre activated site as evidenced by various physical and bio chemical parameters.
Conclusions: The pulsed field is of low level and unlikely to cause heating or any other side effects, is non invasive and demands no patient compliance or assistance of medical or paramedical person, demanding no hospitalization. It is suggested that the method be given a trial in subjects during log term space travel and In subjects prior or post to the onset of menopausal stage in addition to meet the situations caused due to incidental onset of fractures.

Disclosure of Interest: J. Behari Other: JNU, J. Manjhi: None Declared, D. Prakash: None Declared

P399 - THE COMPARATIVE RESPONSE OF BIOCHEMICAL PARAMETERS CONCERNING TREATMENT WITH ZOLENDRONIC ACID 5MG A YEAR IN PATIENTS WITH PRIMARY HYPERPARATHYROIDISM AND POSTMENOPAUSAL OSTEOPOROSIS

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Aims: to investigate the antiresorptive and hypocalcemic efficacy of zolendronic acid 5mg once a year for treatment of primary hyperparathyroidism versus postmenopausal osteoporosis
Methods: 28 women with postmenopausal osteoporosis Me 68 (Q25-Q75 59-75) y.o. and 9 with a mild form of primary hyperparathyroidism (67 (61-73)) were included. Osteocalcin (OC), C-terminal telopeptide of collagen type I (CTx), PTH, calcium, phosphorus, creatinine were measured in fasting serum before and 7-10 days, 3,6,12 months after the injection of zolendronic acid 5mg.
Results: Subjects did not significantly differ in age, menopause duration, body mass index or BMD loss. The calcium level significantly decreased in patients with primary hyperparathyroidism from Me 2,71 (Q25 2,58- Q75 2,82) to 2,50 (2,39-2,73) at 7-10th day (p=0,02), 2,61 (2,42-2,75) at the 3rd month and 2,54 (2,51-2,72) at the 6th month with relapse 2,75 (2,57-2,84) at the month 12. The correlation between PTH and calcium which had been positive before infusion (R=0,52 p=0,006), had become not significant at the 7-10th day R=0,28 (p=0,18). The decrease of the

calcium level was significantly lower in patients with postmenopausal osteoporosis at the 7-10th day (p=0,01), but than remained normal. The phosphorus levels decreased in all patients, but not significant statistically. The creatinine level did not change. The PTH increase did not reach a statistically significant level either. There was found a profound decrease in CTx levels in both groups of patients (-90%) at the 7-10th (p= 0,01) day but at the 3rd month it was higher in patients with primary hyperparathyroidism 0,20 (0,1-0,39) vs. postmenopausal osteoporosis (0,05 (0,03-0,2) (p=0,04), though lower than before the injection (0,68 (0,35-1,0) that persists at the 6th month (0,29 (0,1-0,31). The OC level decreased significantly -40% (p=0,002) only at month 3 and the level was significantly higher in patients with primary hyperparathyroidism.

Conclusions: Zolendronic acid has a hypocalcemic and antiresorptive effects in patients with primary hyperparathyroidism, especially in the first 6 months. However further study is needed to investigate weather an additional dose of drug is required after 6 months of treatment in patients with primary hyperparathyroidism.

Disclosure of Interest: None Declared

P400 - EFFECT OF EXERCISE IN OSTEOPOROTIC WOMEN WITH A HISTORY OF VERTEBRAL FRACTURE: A RANDOMIZED, DOUBLE-BLIND CONTROLLED STUDY

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Aims: The aim was to evaluate the effectiveness for health-related quality of life (HRQOL) of a 3-month course of circuit exercises for a group of postmenopausal elderly women (60-84 years) with osteoporosis. Our hypothesis was that the course of exercises and a three-hour lesson on how to cope with osteoporosis would have a significantly positive effect on the women's' generic and disease-specific quality of life, as well as their balance and mobility, both 3 months and one year after the intervention.

Methods: The participants (89) were randomized to an intervention group or a control group, and assessed at baseline, at 3 months, and at 12 months with two HRQOL instruments (the Quality of Life Questionnaire issued by the European Foundation for Osteoporosis, i.e. QUALEFFO-41', and the General Health Questionnaire (GHQ-20), Functional reach (FR) and maximum walking speed and Time Up and GO(TUG). The sample size was calculated and statistical approaches used were Student's T test or the chi-square test.

Results: At 3 months maximum walking speed and TUG and FR improved. Better results was registered on the sum score of GHQ-20 and 'QUALEFFO-41: mental function' at 3 months. At 12 months those in the intervention group had better result on 'QUALEFFO-41: total score' 'QUALEFFO-41: mental function', 'QUALEFFO-41:Physical function' 'QUALEFFO-41:pain', Maximal walking speed and TUG.

Conclusions: Circuit exercises will improve the health-related quality of life and mobility of elderly women with osteoporosis and a history of vertebral fractures.

Disclosure of Interest: None Declared

P401 - TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS WITH STRONTIUM RANELATE: RESULTS AT THREE YEARS

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Aims: Previous studies have shown that Strontium ranelate (SrR) is an orally active treatment able to modulate bone loss in osteoporosis with anti-fracture efficacy at vertebral (SOTI)[1] as well as peripheral sites (TROPOS)[2]. To assess the effect of SrR treatment on bone mineral density (BMD) in osteoporotic postmenopausal women (OPW), during three years.

Methods: A prospective study was carried out in 143 OPW of 65.7±7.7 years old and 17±8.2 years of menopause with or without prevalent fractures. SrR was prescribed at an oral dose of 2g daily for 3 years, and supplemental calcium and vitamin D were given at adapted doses according to the individual basal levels. 35.7% have had at least one osteoporotic fracture, of which 64.7% were vertebral fractures, 13.7% Colles fracture, 4% femoral fracture and 17.6% in other locations. 9.4% of the women have had one second fracture. BMD(DXA) was determined at baseline and at 12, 24 and 36 months. Vertebral X-rays were performed.

Results: At 12 months of treatment, a significant BMD increase was seen in comparison with basal value, as much in lumbar spine (LS):3.5%(p=.049) as in femoral neck (FN):1.6%(p=.04) and in total hip (TH):2.5%(p=.025). At 24 months, BMD increase was at LS:6%(p=.009), FN:2.4%(p=.033) and TH:3%(p=.007). After 36 months of treatment BMD increase was at LS:9.9%(p<.001);(5.9% adjusted BMD[3]), FN:4.9%(p=.04) and TH:5%(p=.003). During three years of treatment 7 new fractures have taken place:5 vertebral fractures, one of the hip and one of Colles fracture. At basal condition, 25.2% of the patients had <20ng/mL serum calcidiol level, (mean:15±3.5ng/mL;IC 95%, 13.7-16.2). At cut-off point of 20ng/mL, it was observed a significant BMD difference at FN between patients with <20ng/mL and ≥20 ng/mL calcidiol levels (p=.015). Serum 25-hydroxyvitamin D, parathormone (PTH) and urinary D-pyridinoline were determined at baseline and at 6, 12, 24 and 36 months of treatment. Only PTH showed a significant decreasing respect to the basal value at 12 months (p=.016). SrR was well tolerated, however 17.5% of patients suspended the treatment because, mild gastrointestinal disorders, headache, or circulatory problems.

Conclusions: The treatment with 2g/day of strontium ranelate in OPW with or without prevalent fractures, increases BMD at lumbar spine, femoral neck and total hip.

References: [1]Meunier PJ et al, N Engl J Med 2004;350:459; [2]Reginster JY et al, J Clin Endocrinol Metab 2005;90:2816; [3]Meunier PJ et al, J Clin Endocrinol Metab 2002;87:2060.

Disclosure of Interest: None Declared

P402 - THE ROLE OF COMPLEX PHYSICAL-KINETHIC TREATMENT IN PATIENTS WITH OSTEOPOROSIS

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Aims: To evaluate the role of the rehabilitation treatment in patients with osteoporosis.
Methods: The studied lot included 42 patients with osteoporosis, 37 women and 5 men, mean age 62.82 years, hospitalized in Physical Medicine and Rehabilitation Clinic of the Emergency Hospital Craiova during May-September 2009. The patients were included in a complex rehabilitation program for 14 days. The evaluation was made using four parameters: lumbar spine mobility (Schőber test), dorsal mobility (Ott index), pain assessment on a visual analogue scale (VAS) and quality of life evaluation (SF-36 questionnaire).
Results: The benefit on spinal mobility is proved by an increase of Schőber test with 2.5 cm (55.55%) and of Ott index with 1.5 cm (50%). Pain, evaluated on a visual analogue scale, had a 75% decrease. For SF-36 Questionnaire, the best results were obtained for vitality, mental health and body pain domains.
Conclusions: The complex rehabilitation program has proven its efficiency in improving spinal mobility, pain and quality of life in patients with osteoporosis.

Disclosure of Interest: None Declared

P403 - A HOME BASED EXERCISE AND BALANCE TRAINING PROGRAMME INCREASE PHYSICAL ACTIVITY AND IMPROVES HEALTH IN WOMEN WITH OSTEOPOROSIS

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Aims: Some studies have shown that decreased activity in osteoporotic patients can mean more falls and injuries and both, BMD and physical performance are independent predictors of fracture risk**.** The aim of this study was to demonstrate that the 6 months home based exercise and balance training programme which we developed could be used for increase physical activity and improves health in women with osteoporosis.
Methods: Fifty women subjects who want to participate in our trial were randomized, 25 to an exercise-intervention group and 25 to a control group.

Exercises included moderate intensity strengthening exercises with ankle cuff weights for: hip extensor and abductor muscles, knee flexor and extensor muscles and ankle plantar and dorsiflexor muscles. Other exercises were: standing or walking with one foot directly in front of the other, walking on the toes and on the heels, walking backwards, sideways, and turning around, stepping over an object, bending and picking up an object, stair climbing, rising from a sitting position, neck rotations, hip and knee extensions. Every exercise session took about 30 minutes to complete, five times a week and the patients were encouraged to walk outside the home. Two parameters were used to assess physical performance: timed get up and go test (TGUGT) and five-times-sit-to-stand test (5 TSTS), at baseline and after 6 months.
Results: At the end of the study physical performance had improved in the exercise group compared with the control group (mean changes in the TGUGT-score were -2.9 sec. and 1.9 sec. respectively). Those in the exercise group had improved their performance in the five-times-sit-to-stand test (-2.3 sec. vs. 1.2 sec. in the control group).
Conclusions: After the intervention program participants showed significant improvements in physical function that not only may reduce the risk of falls but, it may improve health in other ways.

Disclosure of Interest: None Declared

P404 - EFFECTS OF ALENDRONATE ON BONE MINERAL DENSITY IN HYPOGONADOTROPH HYPOGONADISM

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Aims: More frequent diagnosis of hypogonadotroph hypogonadism cases (male or female), sustains therapeutical approach of early onset osteoporosis. The hypogonadotroph hypogonadism, though secondary to hypothalamic-pituitary failure, reveals only by signs of ovarian or testicular failure as they result from a selective impairment of gonadotropic hormones. Clinical semiology of hypogonadotroph hypogonadism fits that of premature gonadic failure.
Methods: We studied 21 cases (pituitary dwarfism with sexual infantilism - 7 cases; adiposo-genital syndrome -10 and impaired pituitary tumor cases - 4 cases) aged 12-25 years. In all cases, bone mineral density (BMD) was assessed by dual X-ray absorptiometry (DXA).
Results: Osteoporosis was confirmed in 9 cases with hypogonadotroph hypogonadism and 7 subjects had T-score suggestive for osteopenia. Patients with hypogonadic osteoporosis or osteopenia received antiresorptive medication, represented by alendronic acid (70 mg Fosavance) 1 pill / week for 12 months. The effectiveness of treatment was noted in 73% of cases, both at the lumbar spine and femoral neck.
Conclusions: The study shows:

a) the effectiveness of alendronate on BMD in the spine and the femoral neck,

b) therapeutical solution of hypogonadotroph hypogonadism associates hypogonadotrop, oestro-progestative / androgenic hormones substitution with antiresorptive drugs and deficient hormones of pituitary-dependent endocrine glands (thyroid, glucocorticoids, mineralocorticoids).

Disclosure of Interest: None Declared

P405 - EARLY AGE OSTEOPOROSIS

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Aims: Gonadal disgenesia is defined as all edification(formation) defects of gonad during intrauterine development period. It also means perturbations of entire body function, mainly damaged being the process of sexualization. estrogens, progesterone or androgens lack or deficit lead to hypogonadal sexoidoprive osteoporosis. The assessment of bone mass and its turnover offers the premises of early osteoporosis diagnosis that lead to finding the best therapeutical solution
Methods: We studied 9 cases of Turner syndrome, feminine phenotype, aged 12-25 and 4 cases of Klinefelter syndrome, aged 18-27. We performed hormonal (LH, FSH, PRL, estradiol, progesterone, testosterone, TSH, FT4) and cytogenetic (Barr chromatin and kariotype)evaluations in order to asses gonadal disgenesia. Serum osteocalcin and CrossLap (markers of bone formation) were evaluated by ELISA method. Dual X-ray absorptiometer (BMD) was used to evaluate bone mineral density.
Results: All studied cases showed osteocalcin and CrossLap values similar to those of women in premenopausal and postmenopausal period (29,4-112,96 ng/ml for osteocalcin and o,197-1,768 ng/ml for CrossLap). BMD confirmed osteoporosis for 6 cases of Turner syndrome and 3 cases Klinefelter syndrome. To other cases, the T-score suggested osteopenia (-1,70 to – 2,10 DS).
Conclusions: In order to obtain osteoporosis stabilization (increase of bone mass and decrease of fractures incidences), early diagnosis of gonadal disgenesia is a demand. The association of estro-progestive/androgenic substitution and bone remineralization specific drugs (bisphosphonates, calcium products and vitamin D derivates) represents a therapeutical solution.

Disclosure of Interest: None Declared

P406 - GENISTEIN AGLYCONE: A METABOLIC APPROACH TO REBALANCE BONE TURNOVER TOWARDS BONE FORMATION

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Aims: The first study aimed to assess how genistein agylcone compared in effectiveness with a gold standard treatment for glucocorticoid-induced osteoporosis (GIO), alendronate. A second study was also carried out to assess the effectiveness of genistein agylcone in the preventive management of GIO-induced bone loss and osteonecrosis of the femoral head.
Methods: In the first study GIO was induced by daily injections of methylprednisolone on 28 Sprague-Dawley rats for 60 days followed by treatment with genistein agylcone (5mg/kg), alendronate (0.03 mg/kg) or vehicle for an additional 60 days. In the second study 28 female Sprague-Dawley rats received treatment with either methylprednisolone (MP) + genistein, MP alone, genistein alone or vehicle for 60 days.
Results: In the first experiment the genistein group demonstrated a greater increase in BMD, bone mineral content (BMC) and in breaking strength compared to animals treated with alendronate. The genistein treated animals also had significantly increased serum levels of the bone formation marker, bone-alkaline phosphatase (b-ALP) and reduced carboxy-terminal collagen cross links (CTX), a bone resorption maker, compared with alendronate. Genistein agylcone showed positive histological evidence of reducing bone and cartilage erosion and was able to reverse GIO more effectively than alendronate. At the end of treatment of the second experiment, genistein was found to not only maintain but also increase BMD and BMC in treated animals. Serum levels of b-ALP were increased in the genistein treated group, while CTX levels were reduced. Administration of genistein succeeded in preserving femoral breaking strength and prevented osteonecrosis, bone erosion and maintained a normal bone architecture equivalent to the vehicle group.
Conclusions: Collectively, these results suggest that the naturally derived isoflavone genistein aglycone might be a potential new therapy for the prevention of GIO, the most important secondary cause of osteoporosis in humans. Genistein agylcone may also prevent necrotic deterioration of the femoral head caused by glucocorticoid use and could represent a unique therapy that combines powerful bone-forming as well as anti-resorptive activity.
References: Bitto A et al, J Endocrinol. 2009;201:321; Bitto A et al, Br J Pharmacol. 2009;156:1287.

Disclosure of Interest: None Declared

P407 - DOES ZOLEDRONIC ACID INCREASE RISK OF ATYPICAL FEMORAL SHAFT FRACTURES? RESULTS FROM THE HORIZON-PFT

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Aims: Recent case reports have suggested the possibility that long-term bisphosphonate use might increase the risk of low-trauma, subtrochanteric femoral shaft fractures with specific characteristics (transverse fracture pattern and cortical thickening and/or beaking at the fracture location). However, a recent Danish population-based data review did not support an increased risk of subtrochanteric hip fractures among long term bisphosphonate users. We examined the occurrence of femoral shaft fractures in the HORIZON-Pivotal Fracture Trial, a randomized trial comparing 3 years of zoledronic acid (ZOL) 5 mg treatment with placebo in 7736 postmenopausal women with osteoporosis[1]
Methods: During the trial, all reported fractures were blindly reviewed and confirmed from x-ray and/or surgical reports and in some cases radiographs. However, these procedures were not specifically designed to identify and classify subtrochanteric femoral

shaft fractures. To examine the occurrence of subtrochanteric fractures, we developed a system to classify whether any of the fractures in our trial met the criteria for subtrochanteric femoral shaft fractures as described in recent reports. All hip and femur fractures (other than femoral neck and subcapital fractures) were re-reviewed from x-ray or surgical reports and from radiographs, when available, by a blinded radiologist specifically evaluating the location of the fracture. A subtrochanteric femoral shaft fracture was defined as a diaphyseal fracture below the lesser trochanter and above the distal metaphysis.

Results: Excluding periprosthetic and severe trauma fractures, 84 hip and femur fractures were reviewed. Five women had fractures (6 fractures) which met criteria for subtrochanteric femoral shaft fracture, 3 in ZOL and 2 in placebo (RH=1.5, 95% CI:0.25, 9.0). Radiograph was available in only 1 of these patients (ZOL), which showed a transverse fracture with some cortical thickening but no beaking. Important limitations include that the classification relied mostly on x-ray and/or surgical reports (not radiographs), a small number of fractures and a study duration of only 3 years.

Conclusions: Our results showed a very low risk of femoral shaft fractures which was not significantly increased with 3 yrs of ZOL therapy; however, it demonstrates the difficulty of studying rare outcomes in RCTs, even very large trials.

References: 1. Black DM et al, N Engl J Med. 2007;356:1809.

Disclosure of Interest: H. Genant Grant / Research Support from: Novartis, Merck, Lilly, Amgen, Roche, GSK, Servier, BMS, Genentech, BMS, Synarc, C. Bucci-Rechtweg Employee of: Novartis, D. Bauer Grant / Research Support from: Merck, Amgen, Procter & Gamble, Novartis, P. Mesenbrink Employee of: Novartis, L. Palermo Grant / Research Support from: NPS, L. Nusgarten: None Declared, R. Eastell Grant / Research Support from: Novartis, Amgen, Sanofi-Aventis, Lilly, Organon, Pfizer, Procter & Gamble, D. Black Grant / Research Support from: Novartis, Roche, Merck

P408 - BONE MINERAL DENSITY IN PATIENTS AFTER DISCONTINUATION OF ZOLEDRONIC ACID TREATMENT: POST HOC ANALYSIS OF HORIZON PIVOTAL FRACTURE TRIAL

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Aims: In postmenopausal osteoporotic women studied in the HORIZON Pivotal Fracture Trial (H-PFT), once-yearly iv infusions of zoledronic acid 5 mg (ZOL) for three years significantly increased bone mineral density (BMD) and reduced fracture risk vs. placebo[1]. This post hoc analysis was conducted to study the effect of ZOL on total hip and femoral neck BMD in patients who discontinued treatment prior to receiving all three pre-specified infusions.

Methods: In H-PFT, 7736 women (65-89 yrs) were randomized to ZOL (annually) vs. PBO and followed for three years. BMD at the hip was obtained annually regardless of how many infusions were received. This analysis included 1417 women who discontinued treatment after receiving the first (ZOL=432; placebo=319) or second (ZOL=323; placebo=343) of three annual infusions. The percentage change from baseline in BMD at the total hip and femoral neck were compared in the two study groups adjusted for treatment, stratum and region.

Results: At Month 36 there was a significant increase in total hip and femoral neck BMD for ZOL vs. placebo in patients who discontinued treatment after the first or second study drug infusion (P<0.0001, for all). This significant increase was observed from Month 6 and sustained up to Month 36 (Table). At Month 36 the difference of ZOL vs. placebo was 3.9% and 3.7% for the total hip and femoral neck BMD respectively in patients who discontinued treatment after first infusion and 5.1% and 4.5% respectively in patients who discontinued treatment after first two study drug infusions. In the group of patients, who received three infusions, the differences were 6.1% and 5.1% at the total hip and femoral neck, respectively.

Table. Between treatment comparisons of the percentage change from baseline in total hip and femoral neck BMD in patients with only first infusion, first two infusions or all three infusions

Site of BMD & Visit	ZOL vs Placebo Treatment Difference (95% CI)		
	Patients with first infusion only	Patients with first two infusions	Patients with all three infusions
Total Hip BMD			
Month 6	2.16 (1.43, 2.88)	2.19 (1.56, 2.82)	1.91 (1.73, 2.08)
Month 12	4.02 (2.96, 5.08)	3.63 (2.93, 4.33)	2.73 (2.54, 2.92)
Month 24	3.32 (1.95, 4.68)	5.13 (3.90, 6.36)	4.74 (4.51, 4.96)
Month 36	3.86 (2.10, 5.63)	5.07 (3.74, 6.40)	6.14 (5.87, 6.40)
Femoral neck BMD			
Month 6	1.29 (0.43, 2.14)	1.57 (0.76, 2.38)	1.63 (1.39, 1.86)
Month 12	2.47 (1.27, 3.67)	2.20 (1.34, 3.07)	2.16 (1.91, 2.41)
Month 24	3.36 (1.86, 4.85)	4.34 (2.80, 5.88)	3.91 (3.63, 4.19)
Month 36	3.66 (1.99, 5.32)	4.52 (2.92, 6.12)	5.14 (4.83, 5.46)

Conclusions: In women with post menopausal osteoporosis, who discontinued treatment after receiving the first or second of three annual infusions, ZOL 5mg significantly increased total hip and femoral neck BMD vs. placebo through Month 36. Increasing total number of infusions was associated with somewhat larger increases in BMD.

References: 1. Black DM et al. 2007;356:1809.

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P409 - HYDROLYZED COLLAGEN IMPROVES BONE METABOLISM AND BIOMECHANICAL PARAMETERS IN OVARIECTOMIZED MICE

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Aims: Collagen has an important structural function in several organs of the body, especially in bone and cartilage. In addition, peptides derived from collagen are suspected to exert beneficial effect on bone metabolism in a context of osteoporosis. The aim of this study was to investigate the effect of hydrolyzed collagen (HC) on bone metabolism and to decipher its mechanism of action.
Methods: Two *in vivo* experiments were performed in mice: 1) female C3H/HeN mice were ovariectomized (OVX) or sham-operated (Sham) at three or six months and fed for 24 weeks with diets including 0, 10 or 25 g/kg of HC; 2) 3 months-old female mice either ovariectomized (OVX) or sham-operated (Sham) and fed for 8 or 12 weeks with diets containing 0 or 25 g/kg of hydrolyzed collagen, given *ad libitum* or per gavage. Bone mineral density (BMD) was determined by dual-energy x-ray absorptiometry (DXA) and the C-terminal telopeptide of type I collagen (CTX), a marker of bone resorption, was assayed after 8 or 24 weeks. Femur biomechanical properties were studied using a three-point bending test and by micro tomography.
Results: BMD of OVX mice fed with the diet including 25g/kg of HC was significantly higher as compared to control OVX mice. The blood CTX level significantly decreased when mice were fed with diet including 10 or 25g/kg of HC for 12 weeks. We also observed a significant increase in bone strength for the OVX mice fed the 25 g/kg HC, and this was correlated with geometrical changes. No difference of effect was observed when HC was given *ad libitum* or per gavage. interestingly, HC intakes 4 weeks before the OVX procedure reduced bone loss suggesting a preventive role on bone metabolism.
Conclusions: In conclusion this study shows that ingestion of 25g/kg HC is able to improve bone strength in OVX mice. In addition BMD and bone strength increased after 12 weeks of HC supplementation and this was correlated with an enhanced osteoblast activity.

Disclosure of Interest: None Declared

P410 - IN BALLOON KYPHOPLASTY FOR OSTEOPOROTIC VERTEBRAL BODY FRACTURES, THE POTENTIAL OF REDUCTION IS DEPENDING ON THE TIME TO SURGERY

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Aims: For the treatment of osteoporotic vertebral body fractures, both kyphoplasty and vertebroplasty have been shown to be highly efficient in pain reduction. Both techniques can restore patient mobility and enhance quality of life. For kyphoplasty, this study tries to investigate whether the potential of reduction is depending on the time to surgery.
Methods: Prospective clinical study. Inclusion criteria: t-score<1.0, thoracolumbar fracture. Exclusion criteria: > 2 fractures, previous fractures, additional posterior instrumentation. 71 patients (47 female, 24 male; average age 74 years) with 101 fractures included. Recruitment period: 18 months. 62 patients concluded follow-up (FU) at 2 years post op. Fractures were defined acute, if fracture age was<2 weeks. Fractures were defined chronic, if fracture age was 2 weeks or more. Conventional X-rays were provided during all FU visits. Clinical and radiological data collected pre and post op, after 6 weeks, and after 3, 6, 12 and 24 months: Bisegmental endplate angle, anterior vertebral body height, Visual-Analog-Score (VAS; 0 no pain; 100 worst possible pain), Oswestry-Disability-Questionnaire (ODQ).
Results: 61 patients suffered from osteoporosis, 10 from osteopenia. Fractures were located at Th6-L5. For the acute fracture group (n=54), bisegmental endplate angle was improved by 8,6° on average. For the chronic fracture group (n=47), however, bisegmental endplate angle was improved by 3,7° only. This difference is statistically significant ($p<0.05$). For the total of patients, VAS dropped from 77 pre op to 19 post op ($p<0.01$). VAS at 24 months FU was 20 *vs.* 77 pre op ($p<0.05$). ODQ was 75 pre op, and 19 post op ($p<0.01$). ODQ at 24 months FU was 24 *vs.* 75 ($p<0.05$). Upon stratification, there was no statistically significant difference between acute and chronic fracture groups in terms of VAS and ODQ.
Conclusions: If osteoporotic vertebral body fractures are being surgically treated within the first 2 weeks of injury, restoration of the sagittal spinal profile is significantly improved as compared to older fracture age. The pain reducing effect of the procedure, however, occurs independent of fracture age. As the leading clinical sign for osteoporotic fracture augmentation is persistent pain, cement injection remains an option even in older fractures with reduced potential for sagittal correction.

Disclosure of Interest: None Declared

P411 - RATIONALE FOR LIMITED SURGICAL INTERVENTION IN VERTEBRAL BODY FRACTURES

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Aims: Stabilization of osteoporotic vertebral fractures comprises a major challenge. Balloon-kyphoplasty as a single procedure does not address the posterior wall fragment and thus cannot restore axial stability. Classic-type posterior instrumentation tends to fail due to implant loosening. We therefore prefer combined vertebral stabilization by means of cement-augmented bi-level posterior instrumentation and single-level kyphoplasty.
Methods: Prospective trial. Inclusion criteria: A3-fractures of Th11-L5; integrity of adjacent discs (MRI); t-score ≤ -2.5 (DXA). Initial reduction and cement-augmentation was performed by percutaneous Balloon-kyphoplasty (Medtronic) using PMMA-cement. Final reduction was achieved by short-segment instrumentation of the

adjacent vertebrae with PMMA screw-augmentation. A percutaneous technique (Sextant; Medtronic) was applied for instrumentation. The following data were acquired: subjective pain rating (Visual Analogue Scale-VAS); bisegmental endplate-angle (plain X-rays). Patients were subject to full weight-bearing on day 1. Follow-up was performed on day 1; week 6; and months 3, 6, and 12.
Results: 52 patients with 208 augmented pedicle screws were included. Average patient age was 74 (60 to 92). Average t-score was -2.7. (-3.1 to -2.5). In 41/208 pedicle screws, leakage of cement was noted. Direction of leakage was anterior or lateral for 40, and epidural for 1 case. There were 3/52 cases with extrusion of cement during the kyphoplasty procedures. All 52 patients experienced marked pain-relief as expressed on the VAS. Average correction of bisegmental endplate-angle was 8.7°. During follow-up, no significant loss of correction was noted with the exception of 2/52 patients in which there was cut-out of the cement-augmented cranial pairs of screws. Except those 2/52 cases, there was no case of implant loosening or cut-out of pedicle screws.
Conclusions: Combined cement-augmented instrumentation and kyphoplasty is efficient for stabilization of osteoporotic burst fractures. The typical shortcomings of conventional instrumentation (implant loosening; cut-out of screws) can be avoided. With the fixator providing sufficient axial stability for the posterior spinal wall, this technique allows for far anterior placement of the cement during kyphoplasty, thus adding to its safetyness. It can be performed percutaneously, additionally fitting elderly patients needs. However, verification of disc-integrity is necessary, as this technique does not address the disc space.

Disclosure of Interest: None Declared

P412 - CONTACT CHARACTERISTICS OF UNICONDYLAR KNEE ARTHROPLASTY

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Aims: Malresection of bone and subsequent malposion of prosthesis poses a major contribution to early failure of unicondylar knee arthroplasty (UKA). We use finite element analysis to demonstrate the stress change of different implant in different bone preparation angles.
Methods: Three different designs of implants were use in this study(Zimmer, Depuy and Howmedica). The posterior slope angle was set at 5 and 10 degrees. The femoral component was set in neutral, 5,10 and 15 degrees varus position. The loading force was fixed, which was equal to body weight 65kg in knee fully extension position.
Results: The maximal forces of PE components shift laterally with the increasing varus tilt. The Von Mises stress exceeds the yield strength of the PE components in all three designs.
Conclusions: Our study reveals that using UKA for correcting varus deformity is susceptible to PE failure and also the angle of tibial implant should not exceed 10 degrees to prevent edge contact.

Disclosure of Interest: None Declared

P413 - EFFECTS OF MONTHLY ORAL IBANDRONATE 150 MG ON BV/TV AND TRABECULAR SEPARATION MEASURED IN VIVO BY MICRO-CT AT THE DISTAL TIBIA IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS OR OSTEOPENIA

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Aims: To examine in vivo the effect of oral ibandronate (IBN) 150 mg once monthly on bone density and structure in postmenopausal women with osteopenia osteoporosis.
Methods: 68 postmenopausal women (mean age 68.9±2.9 years) with low bone mass (mean T-score of DXA-BMD at lumbar spine -2.55±0.43 SD, no vertebral fractures) were equally randomized into a mono-centric, placebo-controlled, double-blind study of one year (SPIMOS-3D) with two treatment arms: IBN 150 mg or placebo once monthly. All patients received calcium 500 mg and vitamin D3 400 IU daily (CaD). Bone density and structure were measured in vivo by hr-pQCT (Xtreme-CT, Scanco) at the distal tibia (DT) and at the distal radius (DR). These are the results of a post-hoc analysis comparing the effects of IBN on BV/TV and trabecular separation (Tb.Sp) at the DT in two subgroups of patients with osteoporosis (DXA-BMD LS<-2.5 SD T-score, n=36) or osteopenia (n=32).
Results: In the entire IBN group, there was a significant increase of BV/TV and decrease of Tb.Sp at the DT as compared to baseline ($p<0.001$). These effects did not differ between osteoporotic and osteopenic patients. Over one year treatment period, there was a significant increase of BV/TV in the IBN group by 1.94% and 1.64% in osteoporotic ($p<0.001$) and osteopenic ($p=0.002$) patients, respectively. Tb.Sp was reduced in the IBN group by -10,93% and -5.58% in osteoporotic ($p<0.001$) and osteopenic ($p=0.001$) patients. However, there was no significant difference in IBN treatment effects on BV/TV and Tb.Sp when comparing osteoporotic and osteopenic patients. Other structural parameters, such as trabecular number (Tb.N), trabecular density (Tb.D) and cortical thickness (Ct.Th), also showed significant beneficial changes in the IBN treated patients in both subgroups after one year as compared to baseline (for all $p<0.01$). Although some positive effects were also found in the CaD only group, a multivariate analysis, but not the primary univariate analysis, of the changes in BV/TV after one year in the total ITT population showed significant effects ($p=0.045$) in favour of IBN as compared to CaD only.
Conclusions: One year of monthly oral IBN 150 mg in combination with CaD improves BV/TV and Tb.Sp at the DT measured by micro-CT in postmenopausal women with osteoporosis as well as in those with osteopenia. This and other effects on bone density and structure observed by micro-CT in IBN treated, and to some extent in CaD only patients as well, need further analysis to explain the outcome.

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Kalbow: None Declared, G. Armbrecht: None Declared, P. Martus: None Declared, J. Glaab Employee of: Roche Pharma AG, D. Felsenberg Grant / Research Support from: Roche Pharma AG, Consultant / Speaker's bureau / Advisory activities with: Roche Pharma AG, Board member of: Roche Pharma AG

P414 - REHABILITATION AND EXERCISE TOLERANCE

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Aims: Chronic obstructive pulmonary disease (COPD) appears to be associated with low bone mineral density (BMD); BMD decreases with increasing severity of the COPD (1). Multi-modal aerobic exercise for older adults appears to be effective for falls prevention (2). We assessed the effects of a 6 week complex rehabilitation program - RP (pharmacotherapy, educational sessions, exercise and respiratory muscle training, multi-modal exercise and psychological support) on exercise tolerance and quality of life, in postmenopausal COPD females with spinal osteoporosis.
Methods: 46 females with COPD and spinal osteoporosis were randomly assigned to a rehabilitation group – RG (n=26; 57years mean age) and a pharmacotherapy group – PG (n=20; 59years mean age). Clinical evaluation, spirometric tests, exercise tolerance tests (six minute walking distance - 6MWD) and generic QoL scale SF-MOS (Short Form Medical Outcomes Study) were performed. BMD was measured by dual X-ray absorptiometry in lumbar spine (L2–4). Statistical analysis and correlation between data were done with the Kruskal – Wallis, ANOVA and chi-square tests.
Results: We found a significant correlation between the mean of T–score and COPD stages for all females. In RG, we have correlations between the mean value of 6 MWD and BMI (body mass index), the T-score mean and generic QoL scale SF-MOS score (the Chi-square significant) at the beginning and after the RP. Both groups showed clinically and statistically significant improvements in 6-MWD and SF-MOS scores at 6 weeks; SF-MOS scores had improved by 48% in the RG and by 23% in the PG. The RG females were more satisfied with the overall outcome of their rehabilitative treatment compared with PG subjects.
Conclusions: The benefits on exercise tolerance are characterised by a short term effect, but the change in quality of life is almost constant. Multi-modal exercise, based on the aerobic exercise, represents the adequate mode of physical training in COPD females with spinal osteoporosis.
References: 1. A. Kjensli et al, Bone 2007:40:493; 2. MK Baker, Age and Ageing 2007;36:375

Disclosure of Interest: None Declared

P415 - THE IMPORTANCE OF REHABILITATION PROGRAM IN OSTEOARTHRITIS PATIENTS WITH KNEE-SPINE SYNDROME

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Aims: Low back pain (LBP) and knee pain are among the most common complaints of people over 55 years old (1). In our study (single blind, randomized controlled trial) we evaluated the clinical and functional parameters and assessed the short-term effects of rehabilitation program on quality of life of patients with knee osteoarthritis and painful – dysfunctional complaints in dorsal and lumbar vertebral segments.
Methods: 80 patients aged 54 years and over with clinical knee osteoarthritis were randomized into two groups: Group 1 – 41 patients (G1) was treated by complex rehabilitation therapy (pharmacotherapy, massage, physical training – exercises for lower limbs and spine), and group 2 – 39 patients (G2) control receiving no kinetotherapy. All patients were evaluated initial and finally. The outcome assessments at the beginning and at the end of the rehabilitation program were Lequesne knee severity index, pain intensity (visual analogue scale), Arthritis Self-Efficacy Scale. At four weeks an independent physiotherapist unaware of the treatment allocation performed all outcome assessments.
Results: In both groups, Allis test was negative and sustained the functional aspect of lower limb inequality. The improvements were found in Lequesne Knee Index (42.6± in G1 and 28.3± in G 2, respectively) ($p<0.05$) and improvement in group 1 was significantly higher than G2 ($p<0.01$). VAS scores for pain reduced in all patients (48.3± and 31±) and this reduction was significantly higher in G1. The Arthritis Self-Efficacy Scale also showed significant improvements in G1 group.
Conclusions: Our study confirms the presence of knee-spine syndrome in osteoarthritis patient with knee flexion contracture and functional lower limb inequality. The ability to maintain a neutral spine posture while moving the extremities is imperative for proper movement and function in all daily activity and quality of life. The functional lower limb inequality and functional disturbance of vertebral curvatures have reciprocal conditions and direct consequence through somatic dimension of kinematics chains and joint component of lower limb.
References: 1. Murata Yet al, J Bone Joint Surg Br. 2003;85:95

Disclosure of Interest: None Declared

P416 - NEW INTERIM ANALYSIS OF A PROSPECTIVE OBSERVATIONAL COHORT STUDY OF PATIENTS TREATED WITH STRONTIUM RANELATE

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Aims: The objective of this prospective observational cohort study is to describe the baseline characteristics of an unselected osteoporotic population treated with strontium ranelate and to assess safety data and persistence of treatment over three years of follow-up.
Methods: The cohort consisted of 13.069 patients in 7 European countries (Germany: 4.671; Spain: 3.355; France: 2.199; Italy: 2.113; The Netherlands: 374; Austria: 279; United Kingdom: 78). 11.699 patients have had a follow-up visit, adding up to a total of over 15.400 patient-years under treatment with strontium ranelate. The crude incidence of venous thromboembolic events (VTE) was calculated for events during treatment or within 30 days of stopping in the study period, with 95% Poisson exact confidence intervals .The persistence of the treatment was analysed with the Kaplan-Meier method.
Results: At baseline, the average age of included patients was 68.9 years [±10.3] with 16.2± of the patients older than 80 years, 42% of the patients had at least one prevalent osteoporotic fracture, 22± a non vertebral fracture and 27± a vertebral fracture. The median of the lumbar and femoral T-score values were –2.7 and –2.2, respectively. At the time of this interim analysis, 3 years after the start of the study, the number of patients with a VTE was 43, which corresponds to an incidence of 2.8 /1000 patient-years. This incidence is lower than those observed under strontium ranelate in the pooled phase III studies (7.9 /1000 patient-years; 95%CI=[6,3; 9,7]) and in the GPRD database (7.0 /1000 patient-years 95%CI=[3,7; 12,0])[1]. No severe hypersensitivity reaction was reported. The persistence of strontium ranelate treatment, estimated through Kaplan -Meyer method was 80% and 70%, respectively 12 and 24 months after the inclusion.
Conclusions: This study, the largest ever database of patients under treatment, confirms the good persistence and safety of strontium ranelate in real-life current medical practice.
References: 1. Breart G et al, Osteoporosis and venous thromboembolism: a retrospective cohort study in the UK General Practice Research Database. Osteoporos Int. 2009 Oct 6.

Disclosure of Interest: None Declared

P417 - EXPERIENCE OF RECOMBINANT PARATHYROID HORMONE THERAPY IN A TERTIARY REFERRAL HOSPITAL IN THE REPUBLIC OF IRELAND

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Aims: To describe the use and outcomes of recombinant parathyroid hormone (PTH) therapy in a tertiary referral hospital in the Republic of Ireland over a 5 year period (2003-2008).
Methods: Daily subcutaneous injections of 20 mcg Teriparatide [rhPTH(1-34)] or 100 mcg PTH 1-84 (in use from January 2008) were administered for 18 and 24 months respectively.189 postmenopausal women and men with established osteoporosis with at least one vertebral fracture, or low lumbar spine BMD T-score ≤ -3.5 or who failed to respond/did not tolerate other disease modifying treatment were included. All patients received daily calcium (1000 mg) and Vitamin D (800 IU) supplementation. The following variables were collected: demographic data, previous bisphosphonate therapy, prevalence of non-vertebral fractures, eGFR, biochemical determinants of bone turnover, calcium-phosphorus metabolism (measured at baseline, 3, 12, 18 and 30 months), Lumbar Spine (LS) and Total Hip (TH) BMD with vertebral fracture assessment analysis (measured at baseline and 18 months). The primary endpoint was a change in LS BMD. Secondary outcomes were changes in bone turnover markers, TH BMD and adverse events.
Results: Of 189 patients, 177 received daily teriparatide and 12 received PTH 1-84. Sufficient data with paired BMDs were available for 107 patients, 101 women and 6 men. Mean age was 74±11 years. LS BMD increased by a mean 12%±11 at 18 months and 19% (20 patients) were classified as non-responders based on a non-significant change of a paired LS BMD. Effect on BMD was independent of demographic factors. TH BMD increased by 2%. Biochemical markers of bone formation and bone resorption increased at 3 months and peaked at 12 months during the treatment. The greatest changes were seen in P1NP and CTx (375% and 302% respectively at 12 months). Among total 189 patients, PTH had to be discontinued in 10.5% (20 patients). The main adverse events were nausea, tiredness, muscle aches and pains, mild transient hypercalcaemia (8 patients, 4.2%) and asymptomatic hypercalciuria (18 patients, 9.5%) usually seen in the first 3 months.
Conclusions: Our analysis of the data collected at St James' Hospital, one of the first institutions to use PTH treatment for osteoporosis in Ireland, shows that PTH treatment is associated with a large increase in LS BMD, mild increase in TH BMD and marked stimulation of bone turnover. PTH was very well tolerated with few adverse events.

Disclosure of Interest: I. Borovickova: None Declared, M. Casey Consultant / Speaker's bureau / Advisory activities with: Nycomed, Amgen, M. Healy: None Declared, C. Chuan: None Declared, J. Ward: None Declared, V. Crowley: None Declared, J. Walsh Consultant / Speaker's bureau / Advisory activities with: Eli Lilly, MSD, Merck, Servier, Amgen,

P418 - RENAL FUNCTION IN PATIENTS OF BONE METABOLISM UNIT

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Aims: Treatment of osteoporosis by oral (and some i.v.) bisphosphonates (BP) is limited by renal functions. For ibandronate, risedronate and other BP the limit is GFR 30 ml/min, while 35 ml/min is considered for alendronate. Elderly women are at the high risk of severe renal insufficiency. The aim of our study was to demonstrate frequency of chronic kidney disease (CKD) in patients of our Bone Metabolism Unit (BMU).
Methods: Renal function of 185 new consecutives patients (19M, 166F) going for laboratory tests in our BMU during 3 months period has been evaluated. A mean age of patients was 65.1±10.8 years (96-31, median 64 year). Renal function has been calculated as estimated glomerular filtration (eGFR) using MDRD formula and CKD classification.
Results: 119 patients (64%) had eGFR ≥ 60 ml/min, i.e. normal glomerular filtration or mild renal insufficiency (CKD I-II). No patients had eGFR<30 ml/min, i.e. severe renal insufficiency (CKD IV-V). 66 patients (36%) had moderate renal insufficiency – chronic kidney disease III. Only 2 patients (1.1%) had eGFR 30-35 ml/min, in which alendronate, but no other bisphosphonates were contraindicated, 3 patients had eGFR 35-40 ml/min, 61 patients had eGFR 40-60 ml/min. A mean of blood levels of creatinine were 0.982±0.174 mg/dL, calcium 9.57±0.03 mg/dL, PTH 55.8±22.2 pg/mL and 25(OH)D_3 20.6±7.96 ng/mL. 108 patients (58.4%) were treated by bisphosphonates, 155 patients (83.7%) were treated by combination of calcium and vitamin D, 27 patients (14.6%) by other therapy.
Conclusions: We find no patient with severe renal insufficiency in our BMU during 3 months period. Only 2 patients (1.1%) have borderline eGFR for treatment by BP. Contraindication of therapy by oral or i.v. bisphosphonates due to impaired renal function is rare.

Disclosure of Interest: None Declared

P419 - COST-EFFECTIVENESS OF GLUCOSAMINE SULFATE COMPARED TO ACETAMINOPHEN IN THE TREATMENT OF KNEE OSTEOARTHRITIS: A FRENCH HEALTH CARE PERSEPCTIVE

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Aims: The aim of the present study was to explore the cost-effectiveness of glucosamine sulphate (GS) compared to acetaminophen (AC) and placebo (PBO) in the treatment of knee osteoarthritis. For this purpose a 6-month time horizon and a health care perspective were used.
Methods: The cost and effectiveness data were derived from WOMAC data of the GUIDE study by Herrero-Beaumont et al. Clinical effectiveness was converted into utility scores to allow for the computation of cost per quality adjusted life year (QALY). For the three treatment arms incremental cost-effectiveness ratio (ICER) were calculated and statistical uncertainty was explored using a bootstrap simulation. In France, drugs in the same class as GS are usually reimbursed at a level of 35%; therefore, in the primary analysis in the perspective of the health care system, a reimbursed cost of 0.27 €/day was considered. Since AC is reimbursed at a 65% level in France, the mean price considered in the primary analysis was 0.41 €/day for 3g/day, the dose used in the GUIDE study. However, all medication costs, including placebo, were corrected by the use of the rescue medication, i.e. ibuprphene (IB) 400 mg tablets. Since it is reimbursed at a 65% level, the mean unit cost used in the analysis was of 0.10 €. Costs were also adjusted for the compliance of each individual patient.
Results: In terms of absolute mean utility score at baseline, no statistically significant difference was observed between the three groups. When considering the mean utility score changes from baseline to 3 and 6 months, no difference was observed at the first time point but there was a statistically significant difference from baseline to 6 months with a p-value of 0.047. When comparing GS to AC, the mean baseline ICER was dominant and the mean ICER after bootstrapping was -766 €/QALY indicating dominance (with 78% probability). When comparing GS to PBO, the mean baseline and after bootstrapping ICER were 4145 and 6436 €/QALY, respectively.
Conclusions: The results of the present cost-effectiveness analysis suggest that GS is a cost-effective therapy alternative compared to acetaminophen and placebo to treat patients diagnosed with primary knee OA.

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P420 - FALL FRACTURE AND OSTEOPOROSIS RISK IN COMMUNITY DWELLING SENIORS BY PHYSICAL THERAPISTS

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Aims: Osteoporosis is a complex, multifactorial, chronic bone disease. It is a principal etiological contributor to fractures in the elderly. As the population increases in age, the incidence of osteoporosis is projected to increase, as is the risk of osteoporosis related falls and fractures. Falls and fractures often share risk factors such as weakness, poor endurance, gait dysfunction, balance deficits and vestibular hypofunction. The purpose of this study was to determine the usefulness of physical therapy functional and predictive outcome measures to screen for underlying impairments related to falls, fracture and osteoporosis in community dwelling seniors.
Methods: A convenience sample of 49 older adults were recruited from a community based senior center to participate in a screen-

ing day. Participants gave informed consent, followed by completing a questionnaire and functional and predictive outcome measures including the senior fitness test, dynamic gait index, head shake test, clinical test of sensory integration, fracture risk calculator by a team of physical therapists and physical therapy doctoral students. Following testing, participants were provided individualized consultation and a report card on findings and recommendations for follow up by a licensed physical therapist.
Results: Thirty eight females and 11 males with a mean age of 72.5 years participated in the study. 22% of the population reported a fall in the prior year with 12.2± resulting in a fracture. 42% were below the 50th percentile for age in upper extremity strength and flexibility while 57.1% and 69.6% were below the 50th percentile for lower extremity strength and flexibility respectively. 39.8% were at risk for falls and 14.9% demonstrated vestibular hypofunction. 44% had endurance below the 50th percentile for age. Fracture risk was 14.2% with a 5 year fracture risk of hip=8.2±, non vertebral= 26.1% and vertebral=9.9±.
Conclusions: Non-pharmacologic approaches to prevent falls and fractures in the elderly include a wide variety of interventional strategies. Determination of which interventions to pursue may be best based on an individuals identified impairments. Physical therapists have a unique expertise in the area of identification of movement dysfunction and may be best suited to screen in this area. These findings indicate that physical therapists can play an important role in screening for underlying impairments that can lead to increased falls, fractures and osteoporosis risk.

Disclosure of Interest: None Declared

P421 - NON-COMPLIANCE AND ASSOCIATED RISK OF FRACTURE IN OSTEOPOROSIS PATIENTS TREATED WITH ORAL BISPHOSPHONATES: GERMAN RETROSPECTIVE COHORT ANALYSIS ON NON-ADHERENCE (GRAND)

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Aims: To assess the influence of non-compliance on the risk of fractures in osteoporosis patients in Germany receiving oral bisphosphonate (oBP) treatment.
Methods: Analysis was based on the IMS® Disease Analyzer database containing representative data of 11 million patients from office-based physicians. Patients with malignant diseases, any anticancer or cytostatic hormone prescription, Paget's disease, AIDS or receiving intravenous BPs were excluded. Eligible patients had data available for 1 year before and after initiating oBP treatment (December 2004-November 2007). Compliance was measured as Medication Possession Ratio (MPR), prescribed to assumed number of therapy units, where a MPR >80% was considered compliant. MPR was calculated for patients on therapy up to 2 years. Fractures were identified by ICD-10 codes; only fractures occurring 3 months after initiating oBP were included. Kaplan-Meier and Cox regression analyses were used to determine the influence of compliance on time to fracture. The model was adjusted for gender, age, prevalence of fractures 1 year before index prescription, calcium/vitamin D co-prescription, continuation of the initial regimen after 6 months and after 1 year.
Results: Of the 4738 patients analyzed, 1365 (28.8%) had previous fractures. The total number of patients receiving oBP treatment was 177 (3.7%) daily, 4367 (92.2%) weekly and 194 (4.1%) monthly. After 2 years, the incidence of fractures was similar in patients receiving weekly and monthly oBPs (12.2% and 9.7%, respectively) and higher in those receiving daily oBPs (14.5%). The time to fracture was significantly longer for compliant versus non-compliant patients (log rank test; p=0.013). Compliance was associated with a 25.9% (95% confidence interval (CI): 9.9–39.1%) lower individual risk for fracture versus non-compliance. Only half the patients (50.7%) were found to be compliant according to the definition. Older age groups (>60 years) and number of previous fractures were associated with a significantly higher risk of fractures (43.7% increase, p=0.03; 28.6% increase, p=0.01, respectively).
Conclusions: Compliant patients receiving oBP therapy have a decreased risk of fractures compared with those who are non-compliant. A significantly higher risk of fracture is associated with older patients and those with fracture history. These findings highlight the need to improve compliance to reduce the risk of osteoporosis-associated fractures.
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Disclosure of Interest: V. Claus: None Declared, T. Steinle Employee of: Amgen GmbH, Stock ownership or royalties of: May own stock or stock options in Amgen, K. Kostev: None Declared, M. Intorcia Employee of: Amgen (Europe) GmbH, Stock ownership or royalties of: May own stock or stock options in Amgen

P422 - GRAND – THE GERMAN RETROSPECTIVE COHORT ANALYSIS ON NON-ADHERENCE IN OSTEOPOROSIS: ANALYSIS OF PERSISTENCE WITH INTRAVENOUS BISPHOSPHONATES IN WOMEN

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Aims: To estimate rates of persistence with intravenous bisphosphonates (ivBPs) in osteoporosis (OP) in Germany.
Methods: This was a retrospective analysis of the IMS® LRx database, which provides longitudinal prescription data for Germany. Women analyzed were naïve for treatment with ivBPs and received initial prescriptions of iv ibandronic acid 3mg/3ml or iv zoledronic acid 5mg/100ml between January 2007 and October 2009. No wash-out period for oral bisphosphonates (oBPs) was stipulated. Patients were followed up for a minimum of 0.5 years (ibandronic acid) or 1.5 years (zoledronic acid). Persistence was measured as continuation of the initial ivBP prescriptions filled.

Individuals were considered non-persistent if their prescription was not refilled within 1, or 3 months of the due date. Statistical analysis was by descriptive methods and Kaplan-Meier analysis for estimation of the1-year persistence rate. An earlier retrospective analysis of data from the IMS® LRx database estimated rates of persistence in women with OP who were treated with oBPs, and selected results are compared below with those for women treated with ivBPs in the current study.

Results: The analysis included 7,019 patients prescribed ibandronic acid and an additional 2,934 patients prescribed zoledronic acid. The mean age was 74.8 years (SD 7.54); 78.1% of the women were older than 60 years and 40.5% of patients had received oBPs in the year before starting ivBP treatment. At 1 year, persistence with ivBPs was 27.1% (30 days' gap). Allowing a refill gap of up to 3 months resulted in 1-year persistence with ivBPs of 45.2%. The corresponding results for women from a sub-group of the former GRAND analysis for oBPs showed 1-year persistence rates of 27.9% with 30 days' gap and 44.0% with 3 months' gap. Excluding subjects with only one prescription from analyses showed 1-year persistence of 31.9% and 53.3% for the ivBPs, respectively. Corresponding rates for women receiving oral BPs were 35.1% and 56.0%.

Conclusions: The overall persistence with ivBP treatment is low with respect to recommended schedules. The rate of patients receiving appropriately scheduled follow-up administration of ivBP is estimated to be similar to the 1-year persistence with oral BPs.

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Disclosure of Interest: P. Hadji: None Declared, V. Claus: None Declared, K. Kostev: None Declared, M. Intorcia Employee of: Amgen (Europe) GmbH, Stock ownership or royalties of: May own stock or stock options in Amgen, T. Steinle Employee of: Amgen GmbH, Stock ownership or royalties of: May own stock or stock options in Amgen

P423 - PERSISTENCE WITH ORAL ANTI-OSTEOPOROSIS MEDICATIONS BY DOSING FREQUENCY IN THE UK GENERAL PRACTICE RESEARCH DATABASE (GPRD)

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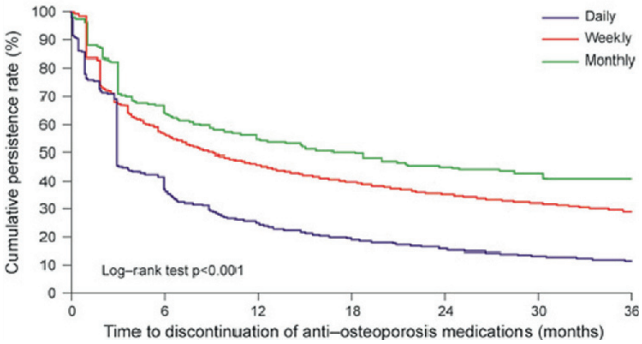
Aims: To evaluate the persistence of oral anti-osteoporosis medications by frequency of administration in women prescribed anti-osteoporosis medications in the UK.

Methods: Data were analyzed from a cohort of women ≥50 years and women diagnosed with menopause at an earlier age, who received a first prescription for an oral bisphosphonate, strontium, or raloxifene in the UK GPRD between 1/1/95 and 31/3/08. Eligible patients had to have data available for ≥12 months before initiating therapy. Women with a history of cancer or metabolic bone disease before or on the first prescription date were excluded. This analysis was restricted to women receiving only one category of therapy during follow-up (stable cohort). Patients lost to follow-up were censored. Persistence was estimated as the proportion of women who continued therapy (discontinuation in this cohort defined as a gap of ≥30 days from the end of a prescription to receipt of a refill prescription) over a 3-year period. Persistence was evaluated by frequency of administration and reported as percentage of persistent patients (including 95% associated confidence intervals [CI]) and presented using Kaplan Meier curves.

Results: Data from 44,994 patients initiated on daily (14,865, 33.0%), weekly (29,613, 65.8%), and monthly therapies (516, 1.2%) were evaluated. Mean age (SD) was 72.3±11.3 with approximately 61.3% initiating therapy at 70 years and older. By 3 years, 11.3% (95% CI: 10.9–11.7), 29.0% (95% CI: 28.5–29.5), and 40.7% (95% CI: 34.9–46.4) remained persistent on therapy for daily, weekly, and monthly dose frequencies, respectively (Figure 1). The respective ratio of non-persistence at 6 months, 1 year and 3 years for weekly vs. daily were 0.69, 0.72, and 0.80; for monthly vs. daily: 0.57, 0.60, and 0.67; and for monthly vs. weekly: 0.83, 0.83, and 0.84.

Figure 1: Kaplan–Meier persistence curves by frequency of administration



Conclusions: In the UK, persistence to oral therapies is low regardless of dose frequency. The relative improvements in persistence for monthly vs. weekly regimens remain stable over time. Consideration of the clinical efficacy of treatment, in addition to persistence, must be taken into account in order to maximize the potential for real-world effectiveness.

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P424 - PERSISTENCE TO OSTEOPOROSIS THERAPY IN AUSTRALIA: AN ANALYSIS OF THE MEDICARE AUSTRALIA DATABASE

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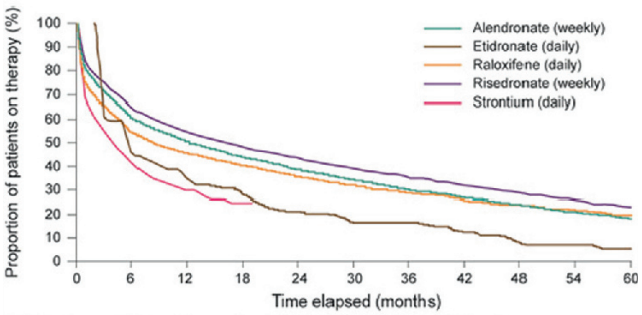
Aims: To describe persistence to therapy in Australian osteoporosis patients initiating an oral bisphosphonate, raloxifene or strontium ranelate.
Methods: The Medicare Australia database contains a longitudinal record, by patient, of all drugs dispensed through the Pharmaceutical Benefits Scheme (PBS), the National reimbursement formulary. It includes ~94% of all osteoporosis drug use. A random 10% sample of patients in the database were included in this retrospective analysis if they initiated alendronate (daily or weekly), risedronate (daily or weekly), etidronate, strontium or raloxifene for treatment of osteoporosis between 1 June 2003 and 30 September 2008. Initiation was defined as a 12-month preperiod without osteoporosis medication and follow-up was from initiation to 31 December 2008. Patients were deemed non-persistent only if there were 3 consecutive calendar months in the follow-up period without a filled prescription. Kaplan-Meier persistence curves were generated based on persistence to the first medication taken and also to "osteoporosis therapy" (i.e. allowing for medication changes during follow-up).
Results: Data from 35,143 patients (77% female, mean age=72) starting therapy with alendronate (57%), risedronate (34%), raloxifene (4%), strontium (4%) or etidronate (1%) were analysed. Cessation of all treatments was greatest in the first 12 months with a relatively steady decline thereafter (Figure 1). Persistence to risedronate and alendronate (both predominantly administered weekly) and raloxifene was similar: 45-55% at 1 year and 18-23% at 5 years. The lowest level of persistence was seen with etidronate (34% at 1 year, 5% at 5 years) and strontium (30% at 1 year). Persistence to "osteoporosis therapy" was 5-10% higher than persistence to the first medication indicating a small proportion of patients switch to an alternative medication. For the total study population, persistence to osteoporosis therapy was 53% at 1 year and 22% at 5 years.

Figure 1: Kaplan–Meier curves: persistence to initiation medication



Note: Strontium was listed for reimbursement on 1 April 2007 which limits follow-up to 18 months

Conclusions: Poor persistence was observed for all osteoporosis treatments included in the analysis. Over 50% of patients persist with their initial therapy for less than 12 months. The analysis also indicates that most patients stop treatment altogether rather than switching to a different medication. The lowest persistence was seen with strontium, the most recently introduced therapy. Persistence to osteoporosis therapy in Australia remains a significant problem despite the seriousness of the condition.

Disclosure of Interest: A. Maclean Employee of: Amgen Australia Pty Ltd, Stock ownership or royalties of: May own stock or stock options in Amgen, G. Calcino Grant / Research Support from: Project funding provided by Amgen Australia Pty Ltd

P425 - EFFECTS OF EXERCISE ON QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS

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Aims: The purpose of this study was to assess the effects of exercise therapy on quality of life (QoL) in patients with osteoporosis.
Methods: The study included 36 patients (mean age 59.6 years). Patients were randomly allocated into the exercise (EG) and control (CG) groups (18 in EG; 18 in CG). EG received an exercise program consisting of posture, breathing, back extension, stretching and strengthening exercises, relaxation techniques, and a walking program, three days a week for 3 months. CG received only an education program which consisted of information on nutrition, body mechanics and movements that should be avoided. Quality of Life Questionnaire of the European Foundation for Osteoporosis (QUALEFFO) was used to measure QoL in both groups at the baseline and at the end.
Results: There were no statistically significant differences in mean age (EG:58.5;CG:60.8 years), mean BMI (EG:27.6;CG:26.8 kg/m^2) and median QUALEFFO domains when the groups were compared at baseline ($p>0.05$). All QUALEFFO domains and total scores showed a statistically significant improvement at the end of three months in EG. Whereas, CG showed a statistically significant deterioration in physical function (PF) (jobs around the house and mobility) and general health perception (GHP) domains and in total scores.

QUALEFFO	Groups	Baseline Mean±SD Median(min-max)	3rd Month Mean±SD Median(min-max)	p
Pain	EG	33.1±24.9 35(0-80)	13.3±11.0 15(0-35)	0.001
	CG	30.8±28.6 22.5(0-85)	35.8±28.7 35(0-90)	0.066
PF (ADL)	EG	22.6±15.3 18.8(0-50)	6.6±6.6 6.3(0-19)	0.001
	CG	17.4±21.1 9.4(0-75)	19.1±21.1 12.5(0-81)	0.096
PF (Jobs Around the House)	EG	33.9±25.1 32.5(0-70)	19.2±16.7 17.5(0-50)	0.001
	CG	30.6±24.4 27.5(0-70)	38.9±27.6 35.0(0-100)	0.008
PF (Mobility)	EG	22.6±19.8 15.6(0-63)	9.4±10.8 4.7(0-31)	0.003
	CG	24.8±20.6 23.4(3-91)	28.8±19.8 28.1(3-91)	0.006
Leisure Social Activities	EG	44.4±12.5 44.4(17-61)	21.6±13.9 19.4(6-56)	0.000
	CG	40.1±19.0 44.4(11-83)	43.5±16.1 44.4(11-83)	0.235
GHP	EG	55.6±18.3 54.2(25-83)	36.1±11.1 33.3(17-58)	0.001
	CG	51.4±22.7 50(17-100)	67.1±18.8 62.5(33-100)	0.007
Mental Function	EG	50.6±16.9 50(25-83)	27.5 ± 11.7 23.6(14-50)	0.000
	CG	47.1±16.5 43.1(19-81)	51.7±18.4 52.8(28-81)	0.176
Total	EG	37.1±12.6 34.4(21-65)	18.6±7.8 18.1(6-35)	0.000
	CG	34.7±14.7 35.4(12-73)	40.2±13.5 42.5(16-71)	0.012

Conclusions: We can conclude that based on the results of this study, exercise has a favorable influence on QoL in patients with osteoporosis. We recommend exercise therapy additional to the treatment strategies designed for patients with osteoporosis as an important treatment strategy.

Disclosure of Interest: None Declared

P426 - SEVERE POSTMENOPAUSAL OSTEOPOROSIS: EFFYCACY OF PARATHYROID HORMONE THERAPY

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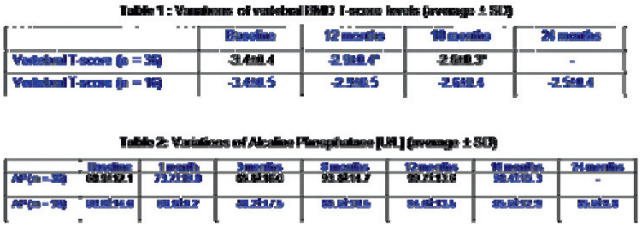
Aims: Osteoporosis is a systemic skeletal disease characterized by low bone mass and impaired bone quality. Bone mineral density (BMD) levels measurement is the most common quantitative parameter used for disease diagnosis and pharmacological therapy monitoring
Methods: We have reviewed our experience concerning vertebral BMD changes in severe postmenopausal osteoporosis outpatients treated for 18 months with parathyroid hormone (PTH 1-84). We observed 70 women who had started PTH 1-84 therapy (average age 72.8±8.5), 36 out of 70 had ended the planned 18 months of treatment as per reimbursement limitation of "Nota 79".
Results: Statistically significant vertebral BMD level changes have been registered after 12 month of treatment, this increase has been strengthened after 18 months. A subgroup of 16 patients has been monitored for an additional 6 months follow-up, during this period patients received an anti-resorptive treatment: results confirm a positive consolidation of BMD levels gained with PTH 1-84 (table 1). The osteoanabolic effect of PTH 1-84 has been demonstrated by alkaline phosphatase (AP) level variations as reflected in table 2. During the 18 months of therapy this parameter was persistently increased compared to baseline, whereas it was reduced in the follow-up period reflecting the end of the osteoanabolic treatment (table 2).



Conclusions: Our results confirm results previously obtained in randomized clinical trials in clinical practice: PTH 1-84 increases bone density in severe postmenopausal osteoporosis patients with an osteoanabolic effect.

Disclosure of Interest: None Declared

P427 - EVALUATION OF EFFECTIVENESS, TOLERABILITY, QUALITY OF LIFE AND ADHERENCE TO THERAPY IN ELDERLY PATIENTS SUFFERING FROM SEVERE OSTEOPOROSIS TREATED WITH TERIPARATIDE (TPTD)

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Aims: The study objective was to evaluate the effectiveness, tolerability and adherence to Forsteo therapy given for severe osteoporosis (OP);quality of life was also investigated.
Methods: 181 severely osteoporotic women were enrolled aged 72.4±4.74 yrs; they had 3±0.45 of vertebral fractures (VF), SDI of 5.72±1.22, lumbar T-score of -3.05±0.49 SD and femoral BMI of -2.8±0.22 SD. They had already been treated with anti-resorptives for at least 12 months (92 with alendronate 52 with risedronate; 37 with raloxifene). All of the enrolled patients were treated for 18 months with TPTD (20 µg daily sc), Calcium (1 g/daily) and Vitamin D3(800 IU/daily), the remaining 6 months the patients received only Calcim and Vitamin D3 at the same dosages. All patients underwent densitometric evaluation at the lumbar spine (L1-L4) and femoral neck at baseline, 6,12,18 and 24 months. At same time intervals we have also evaluated quality of life by Qualeffo questionnaire, VAS for back pain, and non-steroidal anti-inflammatory drug (NSAIDs) use. The incidence of new femoral clinical fractures and adherence to treatment were evaluated, too.
Results: BMD increased at the total hip by +4.2%; +7.4% and +11.1%, respectively at 12,18 and 24 months, the increase in lumbar spine BMD was +7.9%, +11.1% and +12.4% respectively. During the observation period of 24 months were found 7

new hip fractures (7/181). The NSAIDs consumption compared with baseline was reduced from 93% to 23% of patients. All the QUALEFFO items progressively improved during the treatment, showing a slight deterioration after teriparatide withdrawal. Adherence to therapy was superior to 87%, probably due to the low number of side effects and the easy way of administration.
Conclusions: Treatment with teriparatide in elderly patients was well tolerated, has a very high adherence, providing a significant effect in reducing the risk of femoral fractures, in reducing back pain and improving quality of life.

Disclosure of Interest: None Declared

P428 - ASSESSING ADHERENCE WITH USE OF HIP PROTECTORS: AUTOMATED MONITORING IS FEASIBLE

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Aims: Adherence with the use of hip protectors has been identified as the major factor limiting their clinical effectiveness. In the context of a study that aimed to improve adherence with hip protectors, we developed a monitoring device to automatically record adherence with hip protector use. The aim is to compare self reported adherence with that recorded by the monitoring device.
Methods: Community dwelling participants in the Hip Protector Adherence Study gave informed consent to wear instrumented hip protector underwear for four weeks. The underwear was modified to hold a temperature logging device which is commercially available and is used in the food transportation industry. Temperature was recorded each 30 minutes for at least 28 days. Prior to use the device had been shown to differentiate accurately between skin surface and environmental temperature.
Results: Data from 10 older people, 6 women, mean age 84.1 years were recorded and analysed. Each participant was cognitively unimpaired. The mean adherence that they self reported, and that recorded by the monitoring device was 81% (median 75%), and 60% (median 61%) respectively (z -2.4, p=0.015). No adverse effects from the use of the instrumented hip protectors were reported and all recorded temperature accurately for the duration of the study.
Conclusions: This study has shown that it is feasible to automatically monitor use of hip protectors by recording the periods of time that the hip protectors are maintained at skin temperature. It also suggests that the self report of study participants of their adherence overestimates the actual adherence. The device is unobtrusive and is well accepted by hip protector users. It demonstrates promise as a method of monitoring adherence in future trials of hip protectors.

Disclosure of Interest: None Declared

P429 - INTRAPERITONEAL INJECTION OF (-)-EPIGALLOCATECHIN-3-GALLATE (EGCG) INCREASE BONE MINERAL DENSITY IN OVARIECTOMIZED RATS

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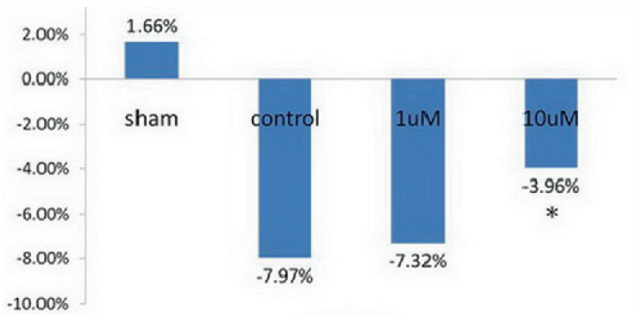
Aims: Green tea is one of the most popular beverages in the world. Among the catechins, (-)-epigalloncatechin -3-gallate (EGCG) has received by far the most attention. Surveys have reported to reduce the risk of having a hip fracture with higher bone mineral density (BMD) by habitual tea drinkers. Our previous showed EGCG can enhance osteogenesis in a murine bone marrow cell line (1). Beside, we also found EGCG can inhibit osteoclastogenesis via NF-κB (2). In this study, we evaluated the in vivo effect of EGCG.
Methods: Forty-one female Sprague-Dawley rats received ovariectomy at 6-month-old. There months later, all rats were randomly divided into 3 groups. Thirteen rats received intra-peritoneal injection of EGCG in DMSO solution (0.24 mg/kg/day) and fourteen rats received EGCG (2.4 mg/kg/day) for 3 months. The other fourteen rats received same concentration of DMSO as control group. After treatment, BMD over distal femur and proximal tibia were checked at the end of 3 months after treatment. Besides, the biochemical profiles including liver function, renal function and electrolyte were also examined after the rats killed.
Results: The change was significant in the proximal tibia (P=0.045) at the dose of 2.4 mg/kg/day (Fig.1) only but not in the distal femur at the end of 3 months. Besides, bone volume also increased in histology. At the end of treatment, there was no obvious liver and renal toxicity. In the autopsy study of liver and kidney section, there was no obvious necrosis.



Conclusions: Previous report indicated that one cup of green tea drinking could accumulate the circulating level of EGCG to 1 μmol/L. Our previous results indicated that EGCG enhanced

osteogenesis of murine marrow mesenchymal cells at the range of 1 to 10 μmol/L in murine bone marrow mesenchymal cells. The more effective concentration is 10 μmol/L (1). We also found EGCG (10–100 μmol/L) significantly suppressed the RANKL-induced differentiation of osteoclasts and the formation of pits in murine RAW 264.7 cells and bone marrow macrophages (2). In this study, we confirm the proximal tibia BMD can be increased with intra-peritoneal injection of EGCG at the dose of 2.4 mg/kg/day with the estimated peak serum concentration of 10 μmol/L. We infer that intra-peritoneal injection of EGCG for 3 months can increase BMD in ovariectomized rats without obvious toxicity.

References: 1. Chen CH et al. Osteoporos Int 2005;16:2039;2. Lin RW et al. Biochem Biophys Res Commun 2009;379:1033.

Disclosure of Interest: None Declared

P430 - HIGH AND LOW-INTENSITY RESISTANCE TRAINING FOR POSTMENOPAUSAL BONE: AN UPDATED META-ANALYSIS

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Aims: To update the evidence on the effects of resistance training on bone mineral density (BMD) at the lumbar spine (LS) and femoral neck (FN) in postmenopausal women. An updated systematic review and meta-analysis was undertaken to evaluate the effects of randomised controlled trials (RCTs) of both low and high-intensity (high > 60% of one repetition maximum) resistance training on bone mineral density (BMD) amongst postmenopausal women.

Methods: A systematic review and meta-analysis of RCTs was undertaken upto end 2008. Absolute BMD change outcomes were combined in the analysis. Weighted mean differences (WMD) were calculated using fixed and random-effects models. Heterogeneity among trials was examined using the I^2 method. Inspection of contour-enhanced funnel plot symmetry was undertaken. Trial quality assessment was also performed.

Results: Seventeen RCTs of high-intensity and 6 of low-intensity resistance training in postmenopausal women were located. Moderate heterogeneity was observed for changes in lumbar spine BMD among studies (I^2= 69.3%, 95% confidence interval (CI): 49.5% to 81.4%). The WMD for lumbar spine BMD change was statistically significant at 0.013 g/cm^2 [(random effects) 95% CI, 0.004 to 0.021; P=0.004]. By contrast, five RCT study group comparisons (I^2=40.6%, 95% CI: 0.0% to 78.1%) showed no significant effect of low-intensity resistance training on the spine (WMD 0.002 g/cm^2 [WMD (fixed effect) 95% CI, -0.018 to 0.032; P=0.840).

High heterogeneity was observed for femoral neck (FN) BMD changes within 15 RCT study group comparisons (I^2=77.8%, 95% CI: 64.5% to 86.2%). The WMD for FN was significant 0.010 g/cm^2 [(random effects) 95% confidence interval [CI], 0.001 to 0.019; P=0.031]. Heterogeneity was also evident in FN BMD changes among five RCT studies of low-intensity resistance training (I^2=73%). The BMD change was -0.011 g/cm^2 [WMD (random effects) 95% CI, -0.052 to 0.031; P=0.612].

Conclusions: Resistance training of high, but not lower-intensity, appears effective in augmenting BMD in postmenopausal women at the hip and spine. However, there is marked heterogeneity of response between studies and diverse methodological and reporting discrepancies evident in published RCTs.

Disclosure of Interest: None Declared

P431 - IS POLI-CARBONATE – URETHANE ON METAL A VIABLE SOLUTION FOR THE TREATMENT OF FEMORAL NECK FRACTURES IN SEVERE OSTEOPOROTIC ELDERLY PATIENTS?

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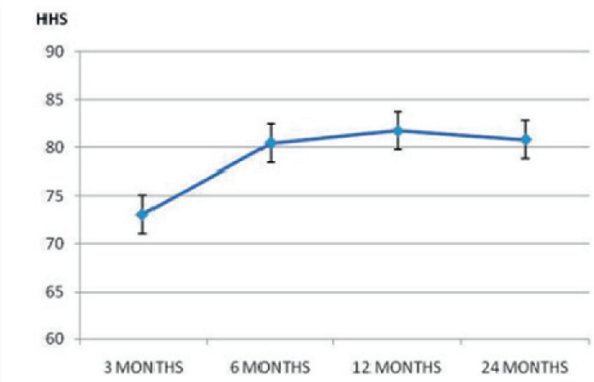
Aims: The purpose of this clinical study was to evaluate the efficacy of a new acetabular cup made in Poly-Carbonate-Urethane (PCU) coupled with large femoral metal head in elderly patients affected by Displaced Intracapsular Femoral Neck Fracture (DIFNF) and DXA diagnosis of osteoporosis.

Methods: Between September 2006 and January 2010, 30 patients were enrolled in the study; six patients that missed the Follow-Up (FU) were excluded from the analysis. Inclusion criteria were: age between 65 and 90, DIFNF type 3 and 4, according to Garden's classification requiring hip joint replacement, T-score ≤ -2.5 SD, prior ambulating status. Exclusion criteria were: patients unable to understand and sign the informed consent and patients with malignant tumor. An uncemented tapered stem was implanted in all patients. Outcomes included: Harris Hip Score (HHS), Range Of Motion (ROM) and radiological assessment.

Results: Six males, 18 females were evaluated, mean age was 80.5 (range 65 to 89). The main T-score, was -2.9 (range -2.5 to -3.8). Clinical assessment was performed at 1, 3, 6 and at 12 months following surgery, afterward once every year. Four patients completed 24 months follow-up (FU), 14 patients completed 12 months FU, 5 patients completed 6 months FU and one 3 months FU. The latest HHS was excellent in 8 patients; good in 8; fair in 4 and poor in 4; 19 patients had no hip pain. five patients at 6 months FU had some groin pain. (HHS pain sub-score: 30 out of 44, with the 44 being no pain). No radiolucent areas were found. The ROM in all operated hips was similar to the contralateral hip.



Conclusions: Standard implants are made of stiff materials, such as metals, ceramics or polymers. However, they failed to provide the significant function of shock-absorption, as provided naturally by cartilage. The direct contact between rigid implants and acetabular bone, is suspected to be the major cause of surgical failures of current devices. The PCU cup reduces the pressure between the metal head and acetabular bone. Moreover the large femoral head (sizes 44-50mm) reduces the risk of dislocation or subluxation. The potential advantages of PCU pliable cup are the minimal bone removal and the preservation of acetabular bone stock over time thus avoiding acetabular protrusion. Our preliminary results in elderly osteoporotic patients demonstrate safety of the device and good clinical results, nevertheless longer FU is necessary.

Disclosure of Interest: None Declared

P432 - CLINICAL STUDY REGARDING THE ROLE OF BALNEOKINETOTHERAPY IN SECONDARY COXARTHOSIS REHABILITATION

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Aims: The aim of this study was to evaluate the effects of kinetotherapy versus balneokinetotherapy in thermal oligomineral water, from Felix Spa, in patients with secondary coxarthrosis.
Methods: From 527 patients examined in rehabilitation units from SC Turism Felix SA, we selected two groups, similar regarding sex, age, comorbidities, physical training, coxarthrosis etiology and clinical stage. The study was conducted on a period of one year (may 2008 – may 2009). First group of patients consist of 46 patients who had two balneophysiokinetotherapy treatments during one year. The second group consist of 43 patients who had two physiokinetotherapy treatments without balneotherapy during one year. The patients from both groups follow up home recommendations for hip kinetotherapy. Patients evaluation took place at the beginning o treatment, at one month, 6 months and one year. Every patient was tested and we followed up the next items: muscular, articular testing, Lequesne functional index, Womac scale and Euroqol scale for life quality.
Results: Both groups had a significant improvement of all items in study. Patients in first group, with balneophysiokinetotherapy, had a highly statistical significant improvement in items like pain, range of motion, life quality ($p<0,001$), and statistical significant ($p<0,05$) for patients in second group, without balneotherapy.
Conclusions: Thermal oligomineral water as balneotherapy in external use, and other therapeutic means(physiokinetotherapy) improve patient's pain, range of motion, life quality.

Disclosure of Interest: None Declared

P433 - ANALGETIC EFFECT OF LOW LASER THERAPY IN ABARTICULAR DISEASES

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Aims: Lasers can be used for different purposes. Therapeutis lasers offer a variety of benefits that includes pain reduction, improved healing time, increased blood circulation and decreased inflammation. Laser therapy is a treatment methodology that is able to be used for numerous types of acute and chronic pain. The aim of this study was to evaluate the analgesic, anti-inflammatory effect of low laser Ga-As therapy in soft periarticular tissues and musculoskeletal diseases.
Methods: The study was conducted on 50 patients in Felix Spa, rehabilitation treatment unit in Muresul Hotel, between June-September 2009. The patients were selected by disease (supraspinosus tendinitis, epicondilitis, ischiatic bursitis) and divided in two groups by pain characteristics (acute, chronic pain). We used red laser radiation in the visible region for superficial tissues and IR laser for deep tissues (ligaments, muscles, tendons). Technically we used intense pulsed laser radiation, for acute pain, and low intensity continuous laser radiation for chronic pain. Laser energy dosage vary 4 from 6 joules/cm^2. In the same treatment session we used at the beginning of the treatment continuous emission laser radiation of painful region, then pulsed laser radiation with frequency between 9,12 Hz- 10 Hz. We administered one session per day, ten days. We evaluated the following items: analogic visual scale (VAS), range of motion, life quality (Euroqol)
Results: First group presented acute pain, after treatment was improved in 25% subjects and disappear in 75%. The second group with chronic pain, after treatment was improved in 66,6% subjects and disappear in 33,3%. Both groups improved range of motion an life quality.
Conclusions: Therapeutic lasers offer a safe, effective, non invasive, without side effects and cost effective treatment for acute and chronic pain in aparticular musculoskeletal diseases. The sessions are short, therapeutic analgesic effects are quick, intense and long lasting.

Disclosure of Interest: None Declared

P434 - TREATMENT OF OSTEOPOROSIS IN PRIMARY CARE: USE OF WEEKLY BISPHOSPHONATES AND CALCIUM AND VITAMIN D SUPPLEMENTS

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Aims: Osteoporosis is one of the most prevalent diseases of the muscular-skeletal system. Its prevalence among general population is more than 12% and 4%, in women and men, respectively. The anti-osteoporotic drugs more frequently used are weekly bisphosphonates. Its anti-fracture efficacy decreases whether they are not associated with calcium and vitamin D supplements. Dietary calcium intake in Spain is low (mean daily intake: Less than 1000 mg).

Data base "e-cap", is one computerized file of diagnosis and chronic therapies of patients of the Catalan Health Service (CHS). CHS that gives complete and free health care for all the population of Catalonia, more than 7.000.000 people. To asses the adequacy of weekly bisphosphonates and calcium and vitamin D supplements for osteoporosis treatment, in the population of several health care areas of Barcelona.

Methods: In this survey the population of 3 basic health care areas of Barcelona were included. We identified patients which were receiving chronic treatment with weekly bisphosphonates through search on the computerized data base "e-cap", during 2009. Within them we selected patients which were treated with calcium supplements, calcium plus vitamin D, or calcium and vitamin D separately.

Results: Within the 63.386 persons of the health care areas included in the study. 689 (1.1%) patients were treated with chronic weekly bisphosphonates during 2009. Patients treated with weekly bisphosphonates without calcium supplementation were 193 (28%) Data of each basic health care areas are shown in TABLE 1.

Health care area	Population	Chronic bisphosphonates treatments (Percentage over population)	Lack of calcium and vitamin D (% in patients treated with bisphosphonates)	Level of significance. « p »
La Pau	13.666	156 (1.14%)	31 (20%)	No significant
Besós	28.903	239 (0.82%)	85 (35.6%)	<0.05
Poble Nou	20.817	294 (1.41%)	77 (26.2%)	No significant
Total	63.386	689 (1.1%)	193 (28%)	

Conclusions: 1.- The number of anti-osteoporosis chronic treatments with weekly bisphosphonates is low in the population of the study according to the estimated prevalence of osteoporosis.

2.- Percentage of patients who received bisphosphonates treatment without calcium supplements is high, despite the low dietary daily calcium intake.

3.- The anti-fracture efficacy of bisphosphonates may be jeopardized due the lack of calcium and vitamin D supplementation

4.- There is a high variability in the results according to the health care area studied

Disclosure of Interest: None Declared

P435 - HIGH COMPLIANCE RATES WITH TERIPARATIDE IN FRAIL ELDERLY PATIENTS

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Aims: There is a perception that compliance with daily injections for Osteoporosis in frail elderly patients is problematic. We aimed to determine compliance rates and efficacy in those referred for Teriparatide treatment to a dedicated Elderly Osteoporosis Centre.

Methods: We analysed records in the Geriatric Day Hospital at St. Camillus Hospital from 2004-2009. Data were extracted and entered into an Excel database. Bone mineral density (BMD) was measured pre & post 18 months of Teriparatide on either Lunar Prodigy or iDXA machines (GE, USA). Sequential BMD's were measured on the same machine.

Results: 245 patients (16m:229f) were referred. Mean (±SD) age was 76 (±9). Mean Vitamin D (n=148) was 60.93 (±31) nmol/L. 9 were diagnosed with coeliac disease. BMI mean was 23 kg/m^2 (±4). Mean falls risk assessment T-score was 11 (±3) & barthel 17 (±3). Following initial assessment, 95% were referred to the Multidisciplinary Team (MDT). 76% to Physiotherapy (PT), 78% to Occupational Therapy (OT). Of those seen by MDT at St. Camillus Day Hospital there was a mean of 9 (±8) PT visits (n=95), and 7 (±6) OT visits (n=83), 64% had a home visit. Patients followed by Specialist Nursing (n=243) had a mean of 5 (±6) visits. 170 patients were pre-treated with another osteoporosis medication, 91% with Calcium/Vitamin D. 74% documented back pain, 87% of whom were taking at least one analgesic. Vertebral fracture was evident in 71%, 50% had multiple sites of fracture. Pre treatment the mean T-score was -2.8 (±1.4) in lumbar spine and -2.9 (±1.1) in the hip. Mean change in BMD, where available, in those that completed 18-months was +13.4% (±11.6) for the lumbar spine (n=87) and +3.4% (±7.2) for the hip (n=84). Table 1 describes compliance rates. 104 completed the course. Having initiated treatment, 25 patients discontinued due to patient choice or a reported adverse effect. This resulted in a compliance rate of 81% (104/129).

Table 1.

Currently On Treatment	77
Completed Course	104
Not Started: Contraindication	12
Not Started: Patient Choice	2
Stopped: Died	16
Stopped: Intercurrent Hospital Admission	9
Stopped ADR	18
Stopped: Patient Choice	7
Total Referrals	**245**

Conclusions: In this observational study BMD improvements were similar to previous published data with respect to the hip and slightly higher in the lumbar spine. Compliance rates were better than may be expected in a frail elderly group of patients. This was achieved in a focused Day Hospital setting, with ongoing MDT involvement.

Disclosure of Interest: None Declared

P436 - ECONOMIC EVALUATION OF BISPHOSPHONATES FOR THE TREATMENT OF OSTEOPOROSIS IN MEXICO: A MEXICAN HEALTH SYSTEM PERSPECTIVE

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[1]Clinical Epidemiology Unit, HIMFG & Faculty of Medicine UNAM, Mexico City, [2]RAC, Salud, Mexico, Mexico

Aims: Fragility fractures (FF) due to Osteoporosis affect mortality and quality of life increasing healthcare utilization and costs. Intermittent therapy has reported to be an efficient way to administrate treatment. This study determine the cost and effectiveness of three different bisphosphonates (BP) in Mexico
Methods: The analysis was conducted using a Markov microsimulation model, comparing 3 different interventions: Intravenously (IV) ibandronate 3mg injection every 3 months (IBD), oral weekly (OW) alendronate 70mg (ALD) and OW risedronate 35mg (RSD) under the perspective of the Mexican Public Healthcare System. Target population was postmenopausal (PM) women > 50 years with or without prior fracture. The model has six health states: healthy (without prior fracture), hip, vertebral, forearm and humerus fracture and death. One million simulations per intervention were generated in TreeAge® Pro Suit '09. Patients started in any health state, it was assumed that all of them received BP therapy for a maximum of 5 years. Only direct costs were accounted including drug acquisition and acute medical attention of FF. All costs are expressed in '09 dollars (USD). Unit cost and antifracture efficacy was derived from published literature. Outcome measures were: the type and frequency of FF avoided with each agent compared with non treatment, and quality-adjusted life years (QALY). Cost and efficacy were calculated taking into account persistence and compliance data. Deterministic sensitivity analysis was performed.
Results: IV IBD reduces 92% the number of annual doses, increasing persistence compared to OW BP was documented in 80% of cases. Avoided fracture rate was higher with IV IBD (644 per 10,000 patients Vs. 205 and 203 with ALD and RSD, respectively) Total fracture incidence was reduced about 10% with IV IBD compared with OW BP (number needed to treat to avoid a fracture: 16 for IV IBD, 47 for RSD and 49 for ALD). Compared with OW BP, the use of IV IBD result in a gain of about 37 QALY per 1,000 patients. The incremental cost per QALY gained with IV IBD ranged from 9,898 USD (Vs. ALD) to 15,047 USD (Vs. RSD)
Conclusions: IV IBD reduces the number of doses needed significantly, leading to a higher adherence and reduced expected frequency of FF compared to OW BP. These results suggest that IV IBD is a cost-effective intervention for PM OP in Mexico.
Acknowledgement: This study was supported by an unrestricted grant from ROCHE Mexico

Disclosure of Interest: P. Clark Grant / Research Support from: ROCHE, Consultant / Speaker's bureau / Advisory activities with: Consultant, F. Carlos Grant / Research Support from: ROCHE, Consultant / Speaker's bureau / Advisory activities with: Consultant, Y. Ramirez Gamez: None Declared

P437 - EFFECT OF TWO-YEAR ALENDRONATE WITHDRAWAL AFTER FIVE YEARS OF TREATMENT AND RETREATMENT BENEFITS OF BISPHOSPHONATES IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Aims: With prospective study we evaluate: (1) long term benefits of alendronate treatment after 24 months withdrawal and (2) re-treatment benefits using bisphosphonates for another 24 months.
Methods: Six women with postmenopausal osteoporosis (T-score below -2.5 SD) were followed for nine years. At the enrolment, patients were 63 to 74 years old (mean: 67,8 years) and 12 to 17 years (mean: 14 years) after the menopause. They were treated with alendronate (10 mg/d in Years 1-4 and 70 mg/w during Year 5) in combination with 500 mg/d elemental calcium; in Years 6-7 alendronate treatment was discontinued. In Years 8-9 five of them were treated with alendronate (70 mg/w with 5600 IU cholecalciferol) in combination with 1000-mg elemental calcium and one was treated with ibandronate 150 mg/month and 1000 mg/d elemental calcium and 1000 IU vitamin D. Every second year, the BMD in the lumbar spine (L1-L4) and left hip was measured in all patients using DXA densitometry (Hologic Explorer). The serum levels of Ca, alkaline phosphatase and creatinine were measured every 6 months.
Results: In Years 1-5, BMD increased on average by 11.4% (range±) in the lumbar spine (L1-L4) and by 9.3% in the left hip. In Years 6-7, BMD increased in the lumbar spine by additional 5.7%, but decreased on hip by 3.8%. In Years 8-9 BMD decreased in lumbar spine by 0.2%, but increased on hip by 2.8%. Levels of Ca, ALP and creatinine were within normal limits, during the entire period of 9 year follow-up; also, no clinical side effects were observed.
Conclusions: There were no residual effects of alendronate treatment in two years follow-up after drug withdrawal. BMD in the spine region markedly increased after cessation of treatment, probably due to degenerative changes of the lumbar vertebra. Two years after restarting treatment, BMD in the hip region increased again. Results of our study indicate, that patients suffering from osteoporosis may need continuous bisphosphonate treatment combined with calcium and vitamin D substitution.

Disclosure of Interest: None Declared

P438 - CLINICAL RISK FACTORS FOR RECURRENT FRACTURE AFTER HIP FRACTURE

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Aims: This retrospective analysis of the HORIZON-Recurrent Fracture Trial (RFT) aimed to identify clinical risk factors associated with subsequent fracture after a low-trauma hip fracture and to determine whether these risk factors are different in subjects treated with zoledronic acid (ZOL) compared with placebo (PBO).

Methods: In HORIZON-RFT, a randomized, placebo-controlled, double-blind trial, patients were randomly assigned to receive i.v. ZOL 5 mg or PBO within 90 days after surgical repair of low-trauma hip fracture (n=2127) and annually thereafter. Univariate testing of the association of 13 clinical risk factors with subsequent fracture in PBO patients was completed, and a stepwise Cox proportional hazards model constructed (variables significant at $p<0.05$). ZOL patients were added to the model, and treatment-by-risk factor interactions tested.

Results: Overall, 19% of PBO patients and 12% of ZOL patients experienced a clinical fracture by 36 months. In univariate analyses the following risk factors were significantly associated with subsequent fracture in PBO patients: female gender [Hazard Ratio (HR) 1.99, 95% Confidence Interval (CI) 1.24-3.19]; age (1.04 per year, 1.02-1.06); lower BMI (1.11 per kg/m^2 decrease, 1.06-1.15); lower creatinine clearance (1.015 mL/min decrease, 1.008-1.024); baseline femoral neck T-score ≤-2.5 (1.66, 1.18-2.31); prior osteoporosis therapy (1.94, 1.11-3.37); fall risk factors (1.82, 1.29-2.56); concomitant osteoporosis therapy (2.80, 1.94-4.05); and discharge to assisted or skilled living facility (1.80, 1.22-2.65). Patients in North America were significantly more likely (1.66, 1.18-2.33), while patients in Eastern Europe were significantly less likely to fracture (0.40, 0.23-0.68). Race, history of fracture prior to the incident hip fracture, and serum calcium were not associated with subsequent fracture. In multivariate analyses, age, sex, BMI, concomitant osteoporosis therapy, and fall risk factors remained significant predictors of subsequent fracture; Eastern Europe was associated with significantly lower risk of subsequent fracture. There were no significant treatment by risk factor interactions.

Conclusions: Risk factors for subsequent fracture may differ slightly from risk factors for incident fracture. ZOL does not appear to modify the risk associated with these factors.

Disclosure of Interest: C. Colon-Emeric Grant / Research Support from: Novartis and the Alliance for Better Bone Health, Consultant / Speaker's bureau / Advisory activities with: Novartis, K. Lyles Grant / Research Support from: Novartis, the Alliance for Better Bone Health (Sanofi-Aventis and Procter & Gamble), and Amgen, Consultant / Speaker's bureau / Advisory activities with: Novartis, Procter & Gamble, Merck, Amgen, GTx, GlaxoSmithKline, Eli Lilly, and Bone Medical, Patent licensing of: being listed as an inventor on a U.S. patent application (20050272707) covering methods for preventing or reducing secondary fractures after hip fracture and on another provisional patent application for medication kits and formulations for preventing, treating, or reducing secondary fractures after a previous fracture, C. Pieper Grant / Research Support from: Novartis, S. Boonen Grant / Research Support from: Novartis, G. Su Employee of: Novartis, P. Mesenbrink Employee of: Novartis, J. Magaziner Grant / Research Support from: Novartis and Merck, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, Aventis and GTx, Merck and Pfizer, C. Bucci-Rechtweg Employee of: Novartis, J. Adachi Grant / Research Support from: Amgen, Eli Lilly, GlaxoSmithKline, Merck, Novartis, Pfizer, Procter & Gamble, and Roche, Consultant / Speaker's bureau / Advisory activities with: Amgen, AstraZeneca, Eli Lilly, GlaxoSmithKline, Merck, Novartis, Pfizer, Procter & Gamble, Roche, Sanofi-Aventis, and Servier

P439 - ENHANCED HEALING OF LATERAL FEMORAL NECK FRACTURES IN ELDERLY WOMEN WITH TERIPARATIDE: NEW THERAPEUTIC HORIZON

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Aims: In severe osteoporotic patients the osteosynthesis of proximal femoral fractures are often complicated by delayed union or mobilization of the implants. Recent researches on animal models have demonstrated that intermittent use of human parathyroid hormone (1-34) improves the healing process of diaphyseal fracture. The objective of this study was to determine if teriparatide (TPTD) may enhance healing of lateral femoral neck fractures treated with intramedullary nails and prevent complications in osteoporotic women.

Methods: 31 compliant women between 60 and 94 years-old presenting a lateral femoral neck fracture were recruited during hospitalization on the basis of bone turnover markers, lumbar and contralateral femoral BMD measured by DXA, dorsal and lumbar standard x-rays. Then they were divided in two subgroups without or with vertebral compression fracture (VCF). Both groups received 1g of calcium daily and 10.000 U.I. of cholecalciferol weekly from the first post-operative week. To the patients with VCF (TPTD group) a daily subcutaneous injection of 20 ug. of TPTD was administrated. All the patients repeated x-rays of affected segment and bone turnover markers at 1,2,3,6 months from the begin of therapy. The recovery of pain symptoms through a self-reported visual analogue scale (VAS) and walking and quality of life collected in a questionnaire were also considered.

Results: All lateral femoral neck fracture were treated with intramedullary nail by the same surgical equipe. In TPTD group more than one VCF in average was present. 25-OH vitamin D was under lower levels at admission but the supplementation determined a normalization. Between 1st and 3rd month only in TPTD

group bone alkaline phosphatase and osteocalcin peaked within the callus formation detected by x-rays. Osteocalcin remained still elevated at 6th month. Moreover earlier walking of TPTD group vs. control group was correlated to significant decrease of pain and increase of quality of life. At 6th month BMD was significantly increased only in TPTD group while in control group two patients needed a re-operation, two were afflicted by delayed union and another two by VCF.

Conclusions: Enhanced healing of osteoporotic femoral fractures with stability of implants of osteosynthesis after TPTD assumption opens new therapeutic horizon.

References: Kakar JBMR 2007; Corradini Osteoporos Int Suppl 2, S467, 2008; Glover Bone 2009

Disclosure of Interest: None Declared

P440 - COMPARISON OF TRANSDERMAL AND SUBCUTANEOUS TERIPARATIDE EFFECTS ON MARKERS OF BONE TURNOVER AND SAFETY IN POSTMENOPAUSAL WOMEN

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Aims: TransPharma has developed a system for transdermal (TD) delivery of teriparatide to alleviate the discomfort of subcutaneous (SC) injections and to improve acceptance and compliance. The aim was to compare the effects of TD 50, 80, and SC 20 μg teriparatide on biochemical markers of bone turnover and safety.

Methods: A 3-month, randomized, multicenter study was conducted in postmenopausal women with osteoporosis (mean±SD, age 65.1±6.8 yr). The transdermal delivery of teriparatide utilized radiofrequency ablation to create microchannels in the skin, allowing rapid diffusion into the systemic circulation from a subsequently-applied drug patch. The primary objective was percent change from baseline to day 96 in procollagen type I N-terminal propeptide (PINP), a marker of bone formation. Secondary objectives included changes from baseline in PINP and CTX (C-terminal cross-linked telopeptide of type I collagen), a marker of bone resorption, at days 48, 72, and 96, and safety monitoring of TD compared with SC teriparatide.

Results: A total of 99/104 women (95.2%) completed the study, a withdrawal rate<5%. Bone markers were measured in 33, 31, and 36 women in the TD 50, 80, and SC 20 μg groups, respectively. PINP and CTX increased significantly from baseline (Table). No clinically significant differences across study groups or time were observed for hypercalcemic, dermatologic, or other adverse events (AEs). The number of patients with predose and 4,6,8 hours postdose serum total calcium levels exceeding the upper limit of normal in the TD50, TD80, and SC20 groups were 7 (20.6%), 9 (28.1%), and 14 (38.9%), respectively. Four severe AEs were determined by investigators to be unrelated to study treatment: 1/34 (2.9%, screening AE), 2/34 (5.9%), 1/36 (2.8%) in TD50, 80 and SC20 groups, respectively.

Table: Time course of PINP and CTX median percent change from baseline by treatment group

	Baseline (Median μg/L)	Day 48 (%)	Day 72 (%)	Day 96 (%)
PINP TD50	51.6	53‡	71‡	88‡c
TD80	43.4	83‡	122‡	172‡
SC20	47.0	83‡	88‡	150‡
CTX TD50	0.432	29†a	34‡a	53‡b
TD80	0.351	72‡	99‡	116‡
SC20	0.392	11*a	34‡b	79‡

*P=0.0029, †P=0.0002, ‡P<0.0001 vs. baseline; [a]P<0.001; [b]P<0.01; [c]P<0.05 vs. TD80

Conclusions: Teriparatide was well tolerated by all groups. Transdermal teriparatide 50 and 80 demonstrated significant increases in PINP and CTX, similar to subcutaneous 20 teriparatide.

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Disclosure of Interest: Y. Kenan Employee of: TransPharma, E. Kochba Employee of: TransPharma, M. Shahar Employee of: TransPharma, H. Gadasi Employee of: TransPharma, G. Levin Employee of: TransPharma, A. Foldes Grant / Research Support from: TransPharma, S. Ish-Shalom Consultant / Speaker's bureau / Advisory activities with: TransPharma, T. Matsumoto Consultant / Speaker's bureau / Advisory activities with: TransPharma, R. Lindsay Consultant / Speaker's bureau / Advisory activities with: TransPharma, C. Christiansen Consultant / Speaker's bureau / Advisory activities with: TransPharma, R. Neer Board member of: Advisory board - TransPharma, Other: Consultant - TransPharma

P441 - ASSOCIATION OF VITAMIN B-12 AND FOLIC ACID LEVELS WITH THE FEMUR BONE MINERAL DENSITY IN OLDER MEN

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Aims: The prevalence of osteoporosis and osteoporotic fractures are expected to increase dramatically in coming years as men live longer. Accumulating evidence suggests that deficiencies of vitamin-B12 and folic acid may be associated with osteoporosis[1-2]. However, data indicating the protective levels of vitamin-B-12 and folic acid for bone mineral density of older men is limited and therefore examined in the present study.

Methods: One hundred eighty two consecutive older men (mean age 77.30±6.97) were enrolled to the study. Exclusion criteria included conditions known to cause osteoporosis (hypogonadism, chronic steroid use and etc.), bilateral hip arthroplasties, inability to ambulate independently, and current treatment with

bisphosphonates, calcitonin, calcium or D vitamin. Biochemical analyses were performed on serum including vitamin B12 (pg/ml) and folic acid (ng/ml). The bone mineral density (BMD) was measured at the hip by dual energy x-ray absorptiometry (DXA). Mean BMD measures were estimated for three categories of vitamin B-12 (<200, ≥200 - ≤400, >400 pg/ml) and folic acid (<5, ≥5 and ≤10, >10 ng/ml).

Results: Osteoporosis and low-bone mineralization observed in 31 (17.0%), and 109 (59.9%) patients, respectively. Levels of vitamin B-12 higher than 400 pg/ml were mild associated with femur total BMD and T-score, respectively (p=0.045, p=0.049). This level for vitamin B-12 did not show statistical significance with femur neck BMD and T-score. There were no significant differences in BMD and T-score for femur total and neck according to the vitamin B-12 levels of<200 and ≥ 200 pg/ml - ≤ 400 pg/ml. No differences were observed in total femur BMD and T-score among the three categories for folate levels. In addition, femur neck BMD and T-score were not different according to folate levels.

Conclusions: The data suggest that vitamin B-12 of > 400 pg/ml is associated with increased hip density in older men. Our opinion is that high vitamin B-12 level is needed to preserve of BMD in older men. Further studies on bone health are required to explore the underlying mechanisms.

References: 1. Cagnacci A et al, Bone 2003;33:956; 2. Tucker KL et al, J Bone Miner Res 2005;20:152.

Disclosure of Interest: None Declared

P442 - SHORT TERM EFFECT OF STRONTIUM RANELATE ON BIOCHEMICAL PARAMETERS OF CALCIUM METABOLISM IN POSTMENOPAUSAL WOMEN WITH PRIMARY HYPERPARATHYROIDISM

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Aims: We previously showed a potential "in vivo" agonist effect of Strontium Ranelate (SrR) on renal and parathyroid Calcium Sensing Receptor (CaSR) in postmenopausal (PM) women with osteoporosis (OP)[1]. This study aimed to evaluate short term effect of SrR on biochemical parameters of calcium (Ca) metabolism in PM osteoporotic women with primary hyperparathyroidism.

Methods: 14 female patients (mean age 66.5±7.2 years) were treated with SrR 2 gr/day together with 1 g/day of calcium and 800 UI/day of cholecalciferol. Metabolic studies were performed at baseline (B) and following 7 and 30 days (d) of treatment, while on a controlled diet. A fasting blood sample was taken to measure serum (s) total (Ca) and ionized (Ca++) calcium, phosphorus (P), creatinine (Cr), and intact parathyroid hormone (PTH). The patients also underwent both a 24h and a 3h fasting morning urinary collection to determine Ca and Cr. The following indices were calculated: the clearance Ca/clearance Cr (ClCa/ClCr) ratio, and the calcium excretion per 100 ml of GFR (mg/dL GFR)(CaEx). The patients were then operated on and a parathyroid adenoma was found in all the cases.

Results: Mean sCa++ values significantly decreased at all time points in respect to B (B: 1.41±0.07 mmol/L vs. 7-d: 1.38±0.07 and 30-d: 1.34±0.07, both p<0.01). Concomitantly, serum P progressively increased (B: 3.05±0.34 mg/dl vs. 7-d: 3.14±0.32, p=ns; 30-d: 3.35±0.37 vs. B, p<0.01). No significant changes were found as far as serum PTH levels were concerned (B: 79±39 pg/ml; 7-d: 81±43; 30-d 74±32); however, in 10 patients the values at 30-d were lower than the basal ones. Urinary Ca significantly increased considering both the CaEx (7-d: 0.180±0.09 and 30-d: 0.187±0.1 vs. B: 0.139±0.09, both p<0.05), and the ClCa/ClCr ratio (24h 7-d: 0.026±0.009 and 30-d: 0.023±0.009 vs. B: 0.019±0.007, p<0.001 and p<0.05 respectively; 3h 7-d: 0.017±0.009 and 30-d: 0.018±0.009 vs. B: 0.012±0.008, p<0.05 and p<0.01, respectively).

Conclusions: All these short-term metabolic changes are compatible with a possible agonist effect of SrR on CaSR at renal levels. The effect on CaSR of parathyroid cells could be partly masked by the functional autonomy of the adenoma.

References: [1] Del Fiacco R et al, Bone 44(S2):S442, 36th European Symposium on Calcified Tissues

Disclosure of Interest: None Declared

P443 - STUDY OF RALOXIFENE TREATMENT ON THE BONE'S MICROARCHITECTURE OF POSTMENOPAUSAL OSTEOPOROTIC WOMEN

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Aims: The antifracture efficacy of Raloxifene shows a weak correlation with its densitometric effect. Apart from its anti-resorptive action and its bone mass preservation effect, does this product act favourably on bone architecture parameters? The aim of this pilot open trial is to observe the effect of Raloxifene on bone microarchitecture parameters assessed in vivo by 3D-Computed tomography at tibia and radius level.

Methods: Inclusion criteria: women between 55 and 70 years old, postmenopausal for at least one year and having suffered from non-fracture osteoporosis defined by T-score<-2.5 at vertebral or femoral neck level.

Exclusion criteria: secondary osteoporosis, prior use of Hormone Replacement Therapy during menopause, SERM, bisphosphonate, calcitonins or strontium ranelate.

Daily administration of Raloxifene (60 mg) over a period of 12 months. No vitamin-calcium supplementation.

Tests carried at M0 and at M12:

- determination of bone microarchitecture parameters at distal radius and tibia level by HR-pQCT (Xtreme CT, Scanco Medical AG, Bruettisellen, Switzerland): BV/TV, Tb/th, Tbn, Tbsp, Cth, Mean Density, Trabecular Density, Compact Density
- measurement of Bone Mineral Density at vertebral column and neck of femur level
- test to determine serum CTX concentration

Statistical analyses: T-tests

Results: 16 patients were included: mean age was 59.2±2.4. Baseline T-scores were – 2.8±0.6 for vertebral column and – 2.2±0.7

for neck of femur. 13 patients were examined one year later with an interpretable QCT results. After one year of Raloxifene treatment, we noted a significant increase in radius trabecular bone thickness: + 2% (p: 0.04), an increase in radius cortical bone thickness: + 1.8± (p: 0.003) (thickness of tibia cortical has also increased by + 1.9±, although this increase is not significant (p: 0.06)), a greater mean tibial bone density: + 2% (p: 0.01), a greater radius compact density: + 0.7± (p: 0.01). The other parameters have not been significantly changed. Furthermore, we found a 2.4% increase in BMD at vertebral level (p: 0.001) and a 22% CTX drop (p:0.008)

Conclusions: In osteoporotic 60-year-old women, Raloxifene preserves the bone architecture by improving certain microstructural parameters at peripheral bone level.

Disclosure of Interest: M. Laroche Consultant / Speaker's bureau / Advisory activities with: Pierre Fabre Medicament, V. Delagnes Charasson Employee of: Pierre Fabre Medicament, A. Beck Consultant / Speaker's bureau / Advisory activities with: Pierre Fabre Médicament

P444 - EFFECT OF ZOLENDRONIC ACID IN TREATMENT OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Aims: Zolendronic acid is a new bisphosphonate used for treatment of postmenopausal osteoporosis. We have based our findings on results of intravenous infusions of zoledronic acid in 103 cases, 13 of which – secondary. The aim was to determine the efficacy and safety of intravenous infusions of zoledronic acid, and effects on vertebral pain, bone mineral density (BMD) in postmenopausal women with osteoporosis.

Methods: 41 postmenopausal women with osteoporosis aged 49-83 years were examined: average age – 65.90±0.76 years, average height – 159.23±0.67cm, mean body mass – 67.84±1.25 kg. Evaluation of pain syndrome and life quality was made with questionnaires. BMD was determined with Dual-energy X-ray absorptiometer "Prodigy" (GE Medical systems). 5 mg of zoledronic acid (Novartis) was administrated by intravenous injection. During the complex treatment patients received 1 tablet of calcium combined medicine (Calcium – 500 mg, Vit. D – 400 IU) 2 times a day during 12 months. Examination was performed before and after three, six, nine and twelve months of treatment course.

Results: A reliable decrease of vertebral pain syndrome by visual analogue scale was observed up to nine months. The pain syndrome increased up to twelve months. However, the given index was lower than before treatment (insignificant changes). According to EuroQol 5D scale, life quality significantly improved. BMD of spine significantly increased in comparison with indexes before treatment after three (t=5.68; p<0.00), six (t=4.88; p<0,00), nine (t=7.59; p<0,00) and twelve (t=5.55; p<0,00) months. The BMD of femur (total) increased significantly after three (t=4.76; p<0.00), six (t=8.06; p<0.00), nine (t=2.36; p=0.03) and twelve (t=2.60; p=0.02) months. Dynamics of BMD were 6.48%, 8.57% on lumbar spine and 2.75%, 3.15% on femur (total) at six and twelve months, accordingly. The BMD of forearm increased considerably after three (t=4.70; p<0.00) and twelve (t=2.30; p=0.004) months. BMD of total body significantly increased after three (t=2.65; p=0.01), six (t=3.31; p=0,003), nine (t=5.53; p<0,00) and twelve (t=2.83; p=0.01) months.

Conclusions: Intravenous infusions of zoledronic acid (5 mg) were shown to be effectively increasing BMD, decreasing pronounced vertebral pain syndrome and improving life quality in postmenopausal women with osteoporosis.

Disclosure of Interest: None Declared

P445 - DOES SOCIOECONOMIC FACTORS INFLUENCE THE PERSISTENCE IN USE OF ALENDRONATE? A NATIONWIDE REGISTER STUDY IN NORWAY

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Aims: To examine the influence of socioeconomic factors on persistence of alendronate drug treatment against osteoporosis among 40-79 years old in incident users in Norway during 2005-2008.

Methods: Data from patients who were 40-79 years and received alendronate in 2005, both weekly and daily dosing, were retrieved from the Norwegian Prescription Database (NorPD). The NorPD covers the total population of Norway. We included only patients who did not receive medication against osteoporosis in 2004. Information about marital status, education and income from Statistics Norway was linked to our data. Medical possession ratio (MPR) was used to measure persistence to alendronate therapy. The ratio for each patient in this study was calculated as the number of dispensed DDD, divided by the number of days each patient was included in the study. A patient was persistent if MPR ≥ 80±. Mean and standard deviations were used as descriptive statistics. Odds ratios with 95± confidence intervals were estimated by logistic regression. The level of significance was set to p<0.05.

Results: The total study population included 6326 patients (88.5± women). Mean age, both genders taken together, was 66.5 years. One year (365 days) after the first dispensation of alendronate 62.5± were persistent (MPR≥80%), two and three years after the first dispensation of alendronate 55.9± and 51.1± were persistent, respectively. Of all the patients 50.2± was persistent throughout the 4 year study period. A higher proportion of persistent patients was found in those exclusively using alendronate once a week (70 mg) than in those using these drugs daily (10 mg) (p<0.001). Increasing age was a predictor of being a persistent alendronate user ($OR_{70\text{-}79}$=1.38 (95± CI 1.20-1.58 with 40-49 years as reference). Being of male sex compared to female OR_{male}= 0.85 (95± CI 0.73-1.00), and being divorced compared to being married $OR_{divorced}$= 0.85 (95± CI 0.76-0.96), reduced the odds of being persistent.

Conclusions: More than half of the study population was persistent throughout the four year study period. The most important factors for being persistent were increasing age, being married and being female. Income and education did not influence persistence.

Disclosure of Interest: H. Devold: None Declared, K. Furu: None Declared, S. Skurtveit: None Declared, A. Tverdal: None Declared, J. A. Falch Consultant / Speaker's bureau / Advisory activities with: Novartis, GlaxoSmithKline, MSD, Sanofi-Aventis, Amgen, Eli Lilly, Novo Nordisk, Other: part-time employed (20%) by the Norwegian Osteoporosis Society (the Norwegian patient organization)., A. J. Sogaard: None Declared

P446 - SPINE DEFORMITY INDEX SCORES ARE NEGATIVELY ASSOCIATED WITH THE FUNCTIONAL OUTCOME AFTER HIP FRACTURE IN WOMEN

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Aims: Vertebral fractures are associated with increased mortality, reduced quality of life, and a significant decline in ability to function in activities of daily living. Our aim was to assess the association between prevalent vertebral fractures and the functional recovery after a fracture of the hip in older women.
Methods: We evaluated 180 hip-fracture women admitted consecutively to our Physical Medicine and Rehabilitation division. A total of 16 of the 180 women were excluded from the study, because their hip fracture was caused by major trauma or cancer affecting the bone, or because they died or were transferred to other hospitals during in-patient rehabilitation. The final study sample included 164 women aged 80.3±6.8 (mean±SD) years. Functional evaluation, both at rehabilitation admission and at discharge from the rehabilitation hospital, was assessed by using the Barthel index Lateral view radiographs of the spine were taken 20.0±5.1 days (mean±SD) after fracture occurrence. For each vertebra, the extent of fracture deformation was graded by Genant's method. To obtain a summary measure of the vertebral fracture status of the spine, we calculated the spinal deformity index (SDI) by summing the fracture grades of all vertebrae (T4 to L4).
Results: In the 164 women, the median SDI score was 2 (interquartile range=0 to 3; total range=0 to 18). At a Spearman rank test we observed a significant negative correlation between SDI scores and Barthel Index scores at discharge from rehabilitation (r=-0.23; p=0.003). The association between SDI and Barthel index scores was confirmed (p=0.039) after adjustment for eight potential confounders: age, cognitive impairment, pressure ulcers, neurologic impairment, infections during the stay length, Barthel index scores at admission to rehabilitation, length of stay in hospital, and serum levels of 25-hydroxyvitamin D. Similarly, multiple regression showed a significant negative association between SDI scores and increase in Barthel Index scores during rehabilitation (p=0.012). The panel of prognostic factors we included in multivariate analysis accounted for 62% of the variance in the Barthel index scores at discharge from rehabilitation and 43% of its increase during rehabilitation.
Conclusions: We conclude that the spine deformity index score, i.e., a summary measure of the burden of prevalent vertebral fractures, was negatively associated with the functional recovery in activities of daily living after hip-fracture in women.

Disclosure of Interest: None Declared

P447 - OSTEONECROSIS OF THE JAWS BISPHOSPHONATE RELATED: PERSONAL EXPERIENCE

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Aims: Osteonecrosis of the jaws (ONJ) represents a rare adverse effect associated with the use of bisphosphonates (bisphosphonates related ONJ: BRONJ) Aim of this study was to report our personal experience regarding patients admitted at the Department of Oral and Maxillofacial Surgery for maxillofacial pathology between June 2008 and September 2009.
Methods: The reference population included all patients admitted at the Department of Oral and Maxillofacial Surgery. These patients were evaluated by a team of specialists from the Departments of Maxillofacial Surgery and of Endocrinology in order to identify cases of BRONJ based on: i) exposed bone in the maxillofacial region that has persisted for more than 8 weeks, ii) history of current or previous BPs therapy, iii) no history of radiation therapy to the jaws
Results: We found 14 patients with ONJ over a total population of 3000 subjects with oral diseases: 7 women (60.1 ±6.0 yrs) and 7 men (66.1±2.5 yrs). Thirteen (92.8%) received intravenous BPs (10 zoledronate, 3 pamidronate followed by zoledronate) for the treatment of cancerous conditions. Only 1 woman (7.2%) received oral BP (alendronate) for the treatment of osteoporosis. The mean duration of treatment with BP i.v. was 46.5±7.0 months and in particular for the zoledronate was 40.8±7.2 months. The duration of treatment with alendronate in patients with osteoporosis was 84 months. Of the 13 patients with tumor (92.8%), 12 referred previous chemotherapy (92%), 5 corticosteroid therapy (38.5%), 4 radiotherapy (30.8%). Among women with breast cancer (6), 4 had received tamoxifen, 2 received exemestane as adjuvant therapy. Previous dental procedures and / or oral diseases were in 78.6% of cases. In particular, 9 patients had undergone tooth extraction, 1 patient had undergone dental implants, 1 patient was suffering from periodontal disease, no data were available to regard for the remaining 3 patients. None of the patients was alcohol consumer, 8 patients were smokers (57.1%). Seven patients (50%) were affected by cardiovascular disease .
Conclusions: Thus, multidisciplinary evaluation and follow-up in patients treated with BPs, particularly cancer patients, should be performed on a regular basis, in order to monitoring the risk ONJ and eventually providing appropriate treatment.

Disclosure of Interest: None Declared

P448 - PERCUTANEOUS VERTEBROPLASTY FOR OSTEOPOROTIC COMPRESSION FRACTURES IN POSTMENONPAUSAL WOMEN TREATED WITH PTH 1-84: EFFICACY AND EVALUATION OF SHORT-TERM OUTCOMES

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Aims: Percutaneous polymethylmethacrylate vertebroplasty (PPV) is indicated in some patients with osteoporotic vertebral compression fractures characterized by debilitating pain that lasts for weeks or months. In addition, incidence of re-fractures or new fractures has been reported after PPV. Several drugs have effectiveness to prevent these events. PTH 1-84 is an anabolic drug that has demonstrated efficacy on fracture risk reduction in postmenopausal osteoporotic women with high risk of fracture (HRF). Our purpose is determinate the efficacy of PTH 1-84 in reducing risk of fracture and pain and increasing quality of life after PPV.
Methods: This study was undertaken to report the clinical experience with PPV using PTH 1-84 treatment for a group of postmenopausal osteoporotic women. Over 6 months, 4 patients were treated at 4 vertebral segment levels with PPV and PTH 1-84 after PPV treatment. Follow-up was performed at 1, 3 and 6 months after PPV and PTH 1-84 treatment initiation. PTH 1-84 efficacy was measured by appearance of new fractures confirmed by radiography. Visual analogical scale (VAS), Oswestry disability questionnaire and SF-36 were administrated to all patients before PTH 1-84 treatment and at 1, 3 and 6 months. Patients underwent follow-up x-rays at 1, 3 and 6 months and vertebral body collapse, adjacent or new vertebral fracture and polymethylmethacrylate (PMMA) leakage.
Results: The age mean was 73,5 (67-81), the Baseline VAS: 8,62, baseline Oswestry: 52 and baseline SF-36:47; VAS value at 1 month: 1,75. There have not been taken other 1 month follow-up questionnaires. VAS (3 month): 2,25, Oswestry (3 month): 49,75, SF-36 (3 month): 44,75, VAS value (6 month): 2,75, Oswestry (6 month): 47,25, SF-36 (6 month): 50,25. No PMMA leakage was observed in the radiologic studies and just a sole new vertebral fracture was diagnosed during the 6 months follow-up. The four patients showed their satisfaction with the procedure and they did not manifest any complain, wound discomfort or any other complication with the vertebral augmentation.
Conclusions: In our study population PPV and PTH 1-84 have demonstrated efficacy for the relief of pain and disability after osteoporotic vertebral compression fractures.

Disclosure of Interest: None Declared

P449 - PRIMARY HYPERPARATHYROIDISM AND PREGNANCY: A CASE REPORT AND REVIEW OF THE LITERATURE

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Aims: Introduction: The exact incidence primary hyperparathyroidism (PH) during pregnancy is unknown . This condition poses a significant danger in relation to maternal (nephrolithiasis, pancreatitis, coma) and fetal complications (sudden death, miscarriage, preterm birth, intrauterine growth restriction, low birth weight and neonatal hypocalcemia).
Methods: Case report: A 28-year-old Caucasian woman was hospitalized at the 20th week of pregnancy, after detection of hypercalcemia in routine blood exams performed for mild abdominal cramps. Fetal ultrasounds showed an intrauterine pregnancy with appropriate fetal growth and normal amniotic fluid. Serum calcium level was 13.2 mg/dl, ionized calcium was 6.63 mg/dl at pH 7.4, serum phosphorus was 2.4 mg/dl, intact PTH level was 209 ng/L (n.v. 10-70). Her urinary calcium excretion was elevated with a value of 634 mg/24 h. Familial anamnesis revealed a maternal grandfather died for a jaw tumor. Calcitonin, tireoglobulin, neuron-specific enolase, cromogranin A, urinary catecholamines, and pituitary hormones (TSH, GH, ACTH) were performed with normal results. DNA analysis for *ret* gene (MEN 2a) and MEN1 gene were performed with negative results. A study of the parents revealed absence of primary hyperparathyroidism and radiological jaw alterations. Intravenous 0.9% Nail hydratation was infused with only limited success regarding hypercalcemia correction. An ultrasound of the neck identified a nodular lesion suspect for parathyroid adenoma (8x9 mm). At 22 week of pregnancy she underwent a minimally invasive paratiroidectomy and the adenoma was completely removed. The intraoperative serum PTH decreased from 150 ng/L to 17 ng/L after removal.
Results: Results: Oral replacement therapy with calcium chloride and magnesium supplementation was started. A progressive reduction of calcium levels followed in the immediate postsurgical course was documented. The patient remained normocalcemic through the remainder of pregnancy. She delivered a viable, healthy male with Apgar score of 8 at 1 minute and 9 at 5 minutes without evidence of neonatal hypocalcemia. Normal growth has been documented in the six moth following birth.
Conclusions: This case report confirms that surgical removal of a parathyroid adenoma is a safe therapeutic option in the second trimester of pregnancy. Evidence-based guidelines are needed to assist clinicians in earlier recognition of hypercalcemia, screening of genetic syndromes associated with PH and precocious clinical management.

Disclosure of Interest: None Declared

P450 - THE ROLE OF THE COMPLEX REHABILITATION PROGRAM FOR OLD PATIENTS WITH KNEE OA IN AMELIORATION THE PAIN AND THE DISABILITIES

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Aims: The purpose of this study was to assess the efficiency of a program of physical and kinetics rehabilitation for elders with knee osteoarthritis in improving the pain, the physical impairments and the disabilities.
Methods: This study was performed in The National Institute of the Physical Rehabilitation, Bucharest and consisted of two groups: study group 1 and control group 2, each with 45 patients (males and females), of different ages (>60 years) with knee osteoarthritis. Distinction between the two groups was made based on the treatment applied: the control group(group 2) included patients has received drugs treatment and physical treatment, the study group (group 1) included patients has associated drugs, physical treatment and kinetotherapy. The clinical and functional parameters assessed were: pain, physical impairments (included: muscular strength, static disorders and mobility of knee) and disabilities (included: Tinetti Gait Scale, ADL 24 and movement capacity). We also used the scales: visual analog scale (VAS), Tinetti Gait Scale, Tinetti Balance Scale, ADL 24.
Results: After the physical- kinetics program, the scores for functional parameters recorded improvements as follows: pain- 45,7% (group 1) and 41,4% (group 2); physical impairments: muscular strength- 14,6% (group 1), without improving by group 2, static disorders- 25,3% (group 1) and 16,5% (group 2), mobility of knee- 39,4% (group 1) and 29,7% (group 2); disabilities: Tinetti Gait Scale- 37,8% (group 1) and 28,3% (group 2), ADL- 56,5% (group 1) and 45,4% (group 2), movement capacity- 52,9% (group 1) and 43,7± (group 2).
Conclusions: Improvement of pain, physical impairments and disabilities for the study group, has received drugs and recovery treatment, certifies the efficacy of the rehabilitation program-physical treatment and kinetotherapy- for the older patients suffering from knee osteoarthritis.

Disclosure of Interest: None Declared

P451 - INCREASING THE QUALITY OF LIFE AT THE PATIENTS WITH HIP OA – EFFECT OF THE KINETOTHERAPY BASED ON POSTURAL THERAPY

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Aims: The purpose of this study was to assess the efficiency of a rehabilitation program including postural therapy, in increasing the quality of life at the patients with hip OA.
Methods: This study was performed in The National Institute of the Physical Rehabilitation, Bucharest and consisted of two groups: study group 1 and control group 2, each with 30 patients (males and females), of different ages (40-70 years: middle age- 58,26 years for the study group and 58,93 years for the control group) with hip osteoarthritis. Distinction between the two groups was made based on the treatment applied: the control group(group 2) included patients has received drugs treatment, physical treatment: ET, TT and KT; the study group (group 1) included patients has associated postural therapy as part of kinetotherapy. The clinical and functional parameters assessed were: pain, physical impairments (included: muscular strength, static disorders and mobility of hip), depression, disabilities (included: disorders of the gait and movement capacity), decreasing of drugs consumption, self evaluation of the health state. We also used the scales: visual analog scale (VAS), HAM-D Scale, D´Aubigné Scale, ADL 24.
Results: After the physical- kinetics program, the scores for functional parameters recorded improvements as follows: pain- 52,4% (group 1) and 39,5% (group 2); physical impairments: muscular strength- 16,2% (group 1) and 9,7% (group 2), static disorders- 23,6% (group 1) and 14,9% (group 2), mobility of hip- 41,8% (group 1) and 32,6% (group 2); depression- 31,3% (group 1) and 23,8% (group 2), disabilities: ADL- 56,7% (group 1) and 47,4% (group 2), D´Aubigné Scale- 42,1% (group 1) and 33,7% (group 2), movement capacity- 51,8% (group 1) and 42,5± (group 2), decreasing of drugs consumption- 41,4% (group 1) and 29,5% (group 2), self evaluation of the health state- 51,5% (group 1) and 37,9% (group 2), quality of life- 41,2% (group 1) and 31,8% (group 2).
Conclusions: The superior results obtained for patients with hip OA from the study group (emphasizing on postural therapy inside the recovery program), argues the efficiency of this therapy's application in increasing the quality of life.

Disclosure of Interest: None Declared

P452 - BONE MINERAL DENSITY AND BONE TURNOVER MARKERS AFTER ONE-YEAR TERIPARATIDE TREATMENT IN KOREAN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Aims: Recombinant teriparatide, a bone anabolic agent, is known to result in a net positive bone balance and reduce vertebral and nonvertebral fracture incidence. The objective of this study was to evaluate the changes of bone mineral density (BMD) and bone turnover markers after one-year teriparatide treatment in Korean postmenopausal women with osteoporosis.
Methods: The enrolled postmenopausal women with osteoporosis were administered teriparatide 20 μg/day injection for one year. BMD at the lumber spine and the hip were measured at baseline and after one year by dual-energy X-ray absorptiometry. Also, serum bone turnover markers, such as osteocalcin, C-telopeptide of collagen cross-links (CTX), and alkaline phosphatase were measured at baseline and after one year.

Results: Lumbar spine BMD increased from baseline (4.4%, p<0.01), but femoral neck BMD decreased from baseline (-9.7%, p<0.05). Bone turnover markers, such as osteocalcin (148.5%), CTX (67.6%), and alkaline phosphatase (56.7%) increased from baseline (p<0.001 for all).

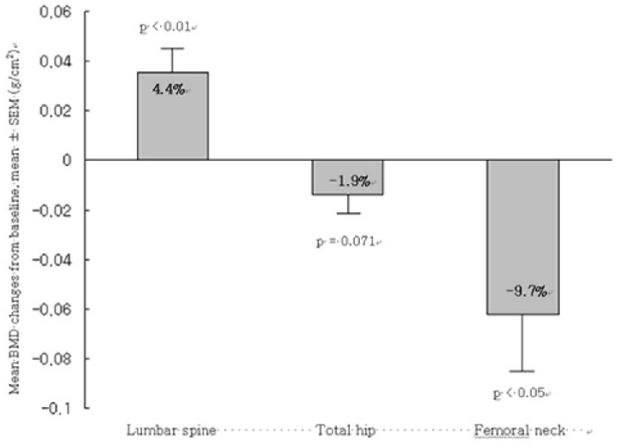

Fig. 1. Mean BMD changes from baseline after one-year of teriparitide treatment at lumbar spine, total hip, and femoral neck (mean ± SEM).

Conclusions: One year of teriparatide treatment significantly increased lumbar spine BMD and bone turnover markers in Korean postmenopausal women with osteoporosis. The large-populated prospective study with longer administered period will be needed in the future.

Disclosure of Interest: None Declared

P453 - OSTEOPOROSIS RISK FACTORS AND PRACTICES: A SURVEY OF JORDANIAN WOMEN

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Aims: Aim: The aim of this study was to explore osteoporosis (OP) risk factors among Jordanian women. Background: Osteoporosis (OP) is a chronic complex health problem for millions of women worldwide, 80% of whom are postmenopausal women. Unless prevented or treated, this silent disease will continue to limit both the quantity and quality of life of many older women and significantly add to the health care cost for this group.
Methods: A sample of Jordanian women in different settings in Jordan (N=192; mean age=43years). The study was descriptive and data were collected over a two month period in 2005 with the use of a self-administered questionnaire.
Results: Although women reported having a diet high in calcium, and did not smoke, the majority (68%) did not exercise and consumed a large amount of caffeine.
Conclusions: There is an overwhelming need for more public education and for wider dissemination of information about OP prevention, and treatment with special attention to targeting younger women to improve women's health early on and halt the progression of this silent disease.

Disclosure of Interest: None Declared

P454 - ALENDRONATE WITH ALFACALCIDOL YIELDS GREATER EFFECTIVENESS THAN MONOTHERAPY WITH ALENDRONATE IN POSTMENOPAUSAL ELDERLY PATIENTS WITH OSTEOPOROSIS: RESULTS FROM THE JOINT-02 RANDOMIZED CONTROLLED TRIAL

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Aims: Japanese Osteoporosis Intervention Trial-02 (JOINT-02) was conducted to clarify effectiveness of alendronate with alfacalcidol for postmenopausal women with osteoporosis.
Methods: We established the A-TOP research group within the Japan Osteoporosis Society to confirm the clinical significance of concurrent use of osteoporotic drugs. JOINT-02, our second protocol started in 2003, was conducted to evaluate the effectiveness of the most frequent combination therapy at that time in Japan. Subjects were postmenopausal osteoporosis patients nationwide with a high risk of fractures, randomly allocated between the monotherapy group (alendronate, 5mg/day) and the combination therapy group (alendronate, 5mg/day; alfacalcidol, 1 μg/day). They were observed at baseline and at 6-month intervals for 2 years at each site. The primary endpoint was the incidence of new vertebral fractures identified radiographically using a semiquantitative morphometry criterion.
Results: We enrolled 2,164 subjects onto the trial and primarily analyzed 2,022 (combination therapy group: 995; monotherapy group: 1,027). There were no significant differences in incidence of new vertebral fractures between both groups during the observed period. However, the combined therapy group showed a statistically significant reduction of new vertebral fractures in the early phase of the intervention, and greater effectiveness than monotherapy for subgroups of several backgrounds. Moreover, no other severe adverse events were observed; gastrointestinal events were the most common in both groups.
Conclusions: Alendronate plus alfacalcidol was found to reduce risk of vertebral fracture during the first 6 months and for subgroups of several backgrounds through the period observed. Combination therapy is therefore of benefit to the treatment of postmenopausal osteoporosis compared to monotherapy.

Disclosure of Interest: None Declared

P455 - CASE REPORT: PREGNANCY-ASSOCIATED OSTEOPOROSIS

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Aims: To present a case of osteoporosis associated with pregnancy, it's risk factors and treatment.
Methods: The patient was diagnosed pregnancy-associated osteoporosis (PAO) on the basis of bone mineral density (BMD) measurement, after thoracolumbar vertebral fractures were shown on radiograms. Serum and urinary tests supported the increase of bone turnover and excluded secondary osteoporosis causes.
Results: A 22-year-old woman applied to our clinic with severe back pain after delivering her first child. The patient has a low body mass index (BMI) of 18,86 kg/m². Her calcium intake was before pregnancy 150mg/week, during pregnancy 1500mg/week. She has sedentary life, low exposure of sunshine, covered dressing style. Radiograms showed multiple thoracolumbar vertebral compression fractures, without any trauma history. Bone densitometry measured by dual-energy X-ray was consistent with lumbar osteoporosis (lumbar total T-score:-3.3, Z score:-3.2). Serum prolactine (24.06 ng/mL) and urinary deoxypyridinoline (35.65 nmol/L) were elevated, serum 25 (OH) vitamin D (36 nmol/L) was lower than normal. After determining normal results for secondary osteoporosis causes, the patient was diagnosed with PAO. Lactation was terminated. She was treated by 300.000 IU cholecalciferol for loading, then 1200 mg calcium, 800 IU cholecalciferol/day, and 200 IU nasal calcitonin/day. At 3th month control there wasn't any back pain and any new vertebral fractures.
Conclusions: PAO is a rare disorder which comes out mostly by back pain in late pregnancy or early postpartum period [1]. Although the etiology of PAO is unclear, genetic factors, physical activities, dietary habits, causes of secondary osteoporosis are some of the risk factors. Pregnancy and lactation are characterized by alterations in the maternal hormone environment. By those changes they can cause loss of bone mass but mostly recovers spontaneously within 6-12 months after weaning. In our case PAO induced vertebral fractures and severe back pain. Her low BMI and lifestyle were the risk factors for PAO. By regulating her diet, supplementation with calcium, vitamin D, treatment with drugs causes inhibition of bone resorption, we aim to prevent additional bone loss and improve BMD. At 3th. month control there wasn't any back pain and any new vertebral fractures.
References: [1] Ensom MH, Liu PY, Stephenson MD. Obstet Gynecol Surv 2002;57:99.

Disclosure of Interest: None Declared

P456 - SCINTIGRAPHIC, BIOCHEMICAL AND CLINICAL RESPONSE TO ZOLEDRONIC ACID TREATMENT IN PATIENTS WITH PAGET'S DISEASE OF BONE

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Aims: The aim of this study was to evaluate the early (up to 3 months) and late (at 24 months) scintigraphic, biochemical and clinical response to a single 5 mg infusion of zoledronic acid in patients with Paget's disease of bone (PDB).
Methods: Blood tests were performed to measure levels of SAP in 50 patients (27 males, 23 females) with PDB (28 monostotic and 22 polyostotic), aged 42-89 years. Quantitative bone scintigraphy (QBS) was performed before and at 3 and 24 months after zoledronic acid infusion and the results were expressed as a ratio, obtained by comparing isotope uptake at an affected and an unaffected control site. Visual analog scales (VAS) were performed before, 3, 6, 12, 18 and 24 months after infusion.
Results: At 3 months after zoledronic acid infusion SAP levels were normalized in 44 cases out of 50 (88%). The SAP levels generally remained unchanged over the subsequent 21 months period. The infusion resulted in improvements measured on VAS scale in 45 cases out of 50 patients (90%). There were no significant correlation between the duration of the disease and the changes of SAP levels and the duration of the disease and the changes of VAS. QBS ratio changed significantly after zoledronic acid infusion ($p<0,001$). No significant changes from baseline were noted in either serum calcium or creatinine at 3 months. The most frequent side effect were flu-like symptoms observed in 16 cases.
Conclusions: Single 5 mg infusion of zoledronic acid leads to a favorable clinical, biochemical and scintigraphic response in patients with Paget's disease of bone and remission will be longer than with other bisphosphonates.
References: 1: Silverman SL, J Clin Rheumatol 2008;14:299; 2: Seton M, Krane SM, Ther Clin Risk Manag 2007;3:913; 3: Walsh JP et al, Bone 2008;42:1219.

Disclosure of Interest: None Declared

P457 - RELATIONSHIP BETWEEN REDUCTION IN BONE TURNOVER MARKERS (BTM) AND CHANGE IN BONE MINERAL DENSITY (BMD) IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS TREATED WITH DENOSUMAB

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Aims: In the FREEDOM trial, denosumab (DMAb) reduced levels of bone resorption markers (BRMs) below the premenopausal reference range in all women rapidly following administration, and BRMs increased to within premenopausal range in some, but not all, subjects at the end of the 6-monthly dosing intervals. In this analysis, we assessed 1) the relationship between change in BTM and change in BMD and 2) whether similar BMD increases

were seen in women with sustained BTM reduction compared to those who had a transient attenuation of BTM reduction at the end of the 6-monthly dosing intervals.

Methods: FREEDOM was a randomized, placebo-controlled trial. Women aged 60–90 years with postmenopausal osteoporosis (T-score ≤−2.5 at the spine or hip) were randomized to receive DMAb 60 mg sc or placebo every 6 months for 36 months. Subjects also received daily calcium (1000mg) and vitamin D (400–800 IU). We measured BTM (serum CTX [ELISA, Osteometer] and PINP [RIA, Orion]) in 944 women (505 DMAb, 439 placebo) at baseline, 1, 6, 12, 24 and 36 months; DXA BMD of the proximal femur annually; and DXA BMD of the lumbar spine at baseline and 36 months.

Results: At 6 months, the median (interquartile range) change in CTX was −0.40ng/mL (−0.59, −0.26) with DMAb and −0.07ng/mL (−0.20, +0.04) with placebo, and median (interquartile range) change in PINP was −39ng/mL (−54, −25) with DMAb and −14ng/mL (−26, −5) with placebo. At 36 months, the mean (SD) change in lumbar spine BMD was +0.08g/cm^2 (0.04) with DMAb and 0.00g/cm^2 (0.04) with placebo, and mean (SD) change in total hip BMD was +0.04g/cm^2 (0.02) with DMAb and −0.01g/cm^2 (0.03) with placebo. BTM changes with DMAb and placebo at 6 months negatively correlated with BMD changes at 36 months (Table). Mean (SD) BMD changes with DMAb at 36 months were identical [+0.08g/cm^2 (0.04) lumbar spine; +0.04g/cm^2 (0.02) total hip] in women treated with DMAb who had a sustained reduction in BTM (n=146 CTX; n=103 PINP) vs. those who had transient attenuation of BTM reduction before repeat dosing (n=359 CTX; n=402 PINP).

Table. Spearman Correlation Between BMD Change From Baseline at 36 Months and BTM Change at 6 Months

	CTX change, 6 mo		PINP change, 6 mo	
	Placebo	DMAb	Placebo	DMAb
Lumbar spine change, 36 mo	−0.09	−0.20**	−0.07	−0.31**
Total hip change, 36 mo	−0.16*	−0.34**	−0.09	−0.39**

*p<0.01, **p<0.001

Conclusions: Larger reductions in BTMs at 6 months were associated with larger gains in BMD at 36 months with weak to modestly strong correlations. The BMD increases at the hip and spine with DMAb were similar between subjects with sustained reduction in BTMs below the premenopausal range throughout the study and those exhibiting some release of the BTM reduction at the end of a dosing interval.

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P458 - THE RELATIONSHIP BETWEEN SERUM 25-HYDROXY VITAMIN D AND FALL FREQUENCY IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Aims: Vitamin D is an independent risk factor for falls in osteoporotic patients. Proximal muscle weakness and neuromuscular incoordination due to vitamin D deficiency increases fall risk and fracture in these patients. The aim of this study is to determine the association between serum 25-hydroxy vitamin D [25(OH)D] concentrations and fall frequency in patients with postmenopausal osteoporosis.

Methods: A total number of 155 postmenopausal osteoporotic patients who referred to the Osteoporosis Diagnosis and Treatment Unit in the Department of Physical Medicine and Rehabilitation in Istanbul University, Istanbul Faculty of Medicine without any diseases or disorders lead to secondary osteoporosis included in the study. The patients were assessed about the presence and frequency of falls. Serum 25(OH)D concentrations were measured and classified according to levels of 25(OH)D (G1<10 ng/ml, n_1=27; G2=10-20 ng/ml, n_2=47; G3=20-30 ng/ml, n_3=38; G4>30 ng/ml, n_4=43). The association between serum 25(OH)D concentration and fall frequency was assessed with Spearman's correlation.

Results: The mean age of the patient was 66.11±10.40. The mean of serum 25(OH)D concentration was 6.60±1.95 in G1, 14.92±2.95

in G2, 24.99±2.98 in G3 and 42.99±16.79 in G4. There was a significant inverse relationship between the classified levels of serum 25(OH)D and the frequency of falls (r=-0.215, p=0.003).
Conclusions: These results suggest that the elevated levels of serum 25(OH)D can reduce the frequency of falls in patients with postmenopausal osteoporosis. These results suggest that vitamin D supplementation may be effective in reduction of fall rates in postmenopausal osteoporotic women.

Disclosure of Interest: None Declared

P459 - THE EFFECT OF TIMING OF TERIPARATIDE TREATMENT ON BONE REMODELING MARKERS AND 1,25-DIHYDROXYVITAMIN D3

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Aims: The timing of teriparatide treatment (TPD) is able to alter the circadian rhythm in bone resorptive activity as well as serum calcium in women with severe postmenopausal osteoporosis (Zikan et al. ASBMR 2009). We speculated that drug efficacy to stimulate bone formation might also vary with its dosing time. The aim of the present study was to investigate the effects of TPD treatment, given either in the morning or evening, on the circadian variation of bone formation marker procollagen I N-terminal propeptide (P1NP) and osteoprotegerin. In addition, the serum levels of 1, 25-dihydroxyvitamin D3 (1,25-(OH)2D3) were measured.
Methods: The part of the study concerned to the circadian rhythm of bone resorption marker and serum calcium has been presented previously (Zikan et al., ASBMR 2009). The study was undertaken in 14 women with established postmenopausal osteoporosis that were long-term treated with TPD, given either in the morning (8:00) or evening (20:00). Blood was drawn every 3 h from 08:00 until 08:00 the following day. Patients received TPD at either 08:00 (n =7) or 20:00 (n=7).
Results: A sc injection of TPD was followed by a significant decrease in serum PINP levels at 6 h after TPD administration (RM ANOVA, $p<0.05$) with a subsequent increase in both dosing groups. No significant changes were observed in OPG secretion during 24 h observation. Serum PINP and OPG levels tended to be higher in the evening TPD treatment group. Serum 1,25-(OH)2D3 increased significantly at 12 h after evening TPD administration (RM ANOVA, p=0,004). No significant changes in serum 1,25-(OH)2D3 were observed after morning TPD administration.
Conclusions: We concluded that marker of bone formation PINP as well as serum levels of 1,25-(OH)2D3 were varied with dosing time of TPD injection. Significant increase of 1,25-(OH)2D3 levels after evening TPD administration may contribute to the stimulation of bone formation.

Disclosure of Interest: None Declared

P460 - RELATIONSHIP BETWEEN QUALITY OF LIFE AND LONG TERM REHABILITATION PROGRAM IN A GROUP OF PATIENTS WITH OSTEOPOROSIS FROM ORADEA ROMANIA

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Aims: to assess the multiple factors (somatical, psychological) responsible for life satisfaction and quality of life in postmenopausal women with osteoporosis who sustained a long term rehabilitation program.
Methods: Our group of study consisted in 78 postmenopausal women with osteoporosis(DXA method),from Oradea, Romania; the mean age was 63.12, standard deviation 3.75 years. The patients were assessed with Qualeffo 41, Life Satisfaction Index A(LSIA), Beck Depression Inventory(BDI). All of the patients underwent a rehabilitation program consisted in specific physical exercises, twice a week for 12 months.
Results: The evolution was favourable at 6 months and more significantly at 12 months(Qualeffo-41, LSIA, BDI) which shows an improvement in quality of life of the patients from our study.
Conclusions: Regular physical exercise has a positive impact on life satisfaction and improves quality of life in osteoporosis. Qualeffo-41 shows to be a valid tool in assessing favourable evolution under rehabilitation treatment in patients with osteoporosis.

Disclosure of Interest: None Declared

P461 - THE ASSESSMENT OF A GROUP OF PATIENTS WITH KNEE OSTEOARTHRITIS AND OBESITY FROM ORADEA ROMANIA USING SHORT FORM 36

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Aims: to asses a group of patients with knee osteoarthritis(OA) and obesity undergoing a specific dietary and regular physical exercise program for 1 year, with SF-36.
Methods: Our group of study consisted in 84 patients, first subgroup 43 women (age 54.3±10,2 y) and second subgroup of 41 men (age 55,1±12,3 y) with knee OA and obesity and comorbidities (hypertension, diabetes mellitus). All of the patients underwent rehabilitation treatment for 12 months including individual dietary program, specific kinetotherapy 3 times a week. The assessment of patients was made with Short Form 36 at baseline and at 6 and 12 months. Effects were analysed with sensitivity statistics (effect size, ES).
Results: the physical component of the SF36 in female subgroup was 0.39 at baseline, 0.42 at 6 months and 0.46 at 12 months and in the male group was 0.51 at baseline, 0.54 at 6 months and 0.57 at 12 months; the mental component in women was 0.42 at baseline, 0.45 at 6 months, 0.51 at 12 months and in men was 0.54 at baseline, 0.57 at 6 months and 0.61 at 12 months.
Conclusions: Regular physical exercise and dietary control has a positive effect in reducing weight and improving quality of life at

patients with knee OA and obesity. However, even a slower improvement in quality of life represents a gain for such disabilitating diseases. The treatment should begin as early as it can, in order to delay the evolution of these diseases.

Disclosure of Interest: None Declared

P462 - RADIOFREQUENCY (RF) KYPHOPLASTY IN COMPARISON TO (VP) VERTEBROPLASTY: A PROSPECTIVE EVALUATION

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Aims: Radiofrequency Kyphoplasty (RFK) provides a new minimally invasive procedure to treat vertebral compression fractures (VCF). The purpose of our study was to investigate the functional outcomes, safety and radiographic outcomes after the treatment of painful osteoporotic vertebral fractures treated with RF Kyphoplasty. The VP group served as control group.
Methods: Sixty patients (39 females and 21 males, mean age 68) with 92 osteoporotic vertebral compression fractures (VCF) were treated with RFK using the StabiliT Vertebral Augmentation System (DFine Inc. San Jose, CA). The StabiliT System provides a navigational osteotome to create a site and size specific cavity prior to delivering an ultrahigh viscosity cement with an extended working time. Three months follow up in 52 patients (33 females and 19 males) with 80 treated VCFs are reported. Thirty nine patients (28 females and 11 males, mean age 66 years) underwent 52 VP procedures. Three months follow up in 28 patients (22 females and 6 males) with 38 vertebrae treated are reported. Patient-related outcomes of pain (Visual Analogue Scale) and disability (Oswestry Disability Index) were assessed pre- and postoperatively and after 3 months. Correction of vertebral height and kyphotic deformity were assessed by radiographic measurements. Cement leakage was evaluated by CT scan postoperatively.
Results: Mean pain visual analogue scale and Oswestry Disability Index significantly improved in both patients groups from pre- to post-treatment (P<0.0001), this improvement being sustained up to 3 months follow up. A gain in height restoration and a reduction of the post-operative kyphotic angle were seen post-operatively and at 3-months in the RF Kyphoplasty group. Cement leakage was noted in of 5.4% of the RFK procedures and 59.6% of the VP procedures. No symptomatic cement leaks or serious adverse events were seen in the RFK group during 3-months of follow up. Two patients in the VP group had a lung embolism due to a cement leakage, both of which were treated conservatively.
Conclusions: RF Kyphoplasty and vertebroplasty are two minimally invasive procedures that provide immediate pain relief and improved functional ability in patients with osteoporotic VCFs. Both procedures are able to stabilize the fracture in the three months follow-up. Site specific cavity creation and delivery of ultra-high viscosity cement in RF Kyphoplasty resulted in the added benefits of height restoration and lower cement leakages intra-operatively.

Disclosure of Interest: None Declared

P463 - CORRELATION BETWEEN BMD PERCENTAGE CHANGE AND TEN-YEAR PROBABILITY OF MAJOR OSTEOPOROTIC FRACTURE BY FRAX® AND HYPOVITAMINOSIS D IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN TREATED WITH PTH 1-84: EFFICACY AND TOLERABILITY

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Aims: Assessment of clinical risk factors (RF) in patients with osteoporosis by FRAX® tool helps us to establish therapeutic criteria. PTH 1-84 is an anabolic drug that has demonstrated efficacy on fracture risk reduction in postmenopausal osteoporotic women with high risk of fracture (HRF). In addition, hypovitaminosis D (HYD) is a possible RF that is not addressed by FRAX® tool. Our purpose is determinate the efficacy of PTH 1-84 by FRAX® and HYD value in postmenopausal osteoporotic women with HRF.
Methods: 31 postmenopausal osteoporotic women with HRF treated with PTH 1-84, at least for 1 year, were included. Before treatment, baseline RF was calculated by FRAX® tool to assess the 10- year probability of major osteoporotic fracture (MOF) including femoral neck bone density (BMD). Additionally, basal vitamin D, serum calcium and PTH were obtained. Patients were classified according to basal HYD value (< 40 ng/ml). PTH 1-84 efficacy was assessed by± change in lumbar BMD at 1 year of treatment. Correlation between RF at baseline and PTH 1-84 efficacy was examined by Pearson correlation coefficient.
Results: Age: 74,7 (SD:7,9) MOF risk by FRAX® (with femoral neck BMD): 16,3% (SD:8,7). Basal lumbar BMD:–3,4 SD (SD:1,0). Basal femoral neck BMD:-2,6 SD(SD: 1,2)± change in lumbar BMD at 1 year:14,3%. Basal vitamin D, calcemia and PTH were: 22,8 ng/ml (SD: 14,1 ng/ml), 9,3 mg/dl (SD: 0,5), 79,2 pg/ml (SD: 60,5). Correlation between MOF by FRAX® and± change of lumbar BMD was no significant (p=0,778). However, it was observed tendency between basal HYD and percent change of lumbar BMD (p=0,097) corresponding to 14,6%. In addition, it was observed a correlation between the increase of serum calcium and decrease of PTH after 1 year PTH 1-84 treatment (p=0,041) but hypercalcemia events were not diagnosed.
Conclusions: PTH 1-84 increases lumbar BMD significantly in our study population. Furthermore, it was observed a positive tendency between HYD value and± change in lumbar BMD with PTH 1-84. We should take into account other RF as the HYD factor to help us to therapeutic decisions. PTH 1-84 has been showed well-tolerated on these patients.

Disclosure of Interest: None Declared

P464 - THE BISPHOSPHONATE COMPLIANCE PROTOCOL – A STUDY TO DETERMINE INFLUENCE FACTORS AND IMPACT OF NONCOMPLIANCE AND NON-ADHERENCE UNDER BISPHOSPHONATE THERAPY

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Aims: The possible bone mineral density (BMD) loss in breast cancer patients under adjuvant therapy can be prevented by early-onset Bisphosphonate (BP) therapy. Nevertheless, discontinuation and non-adherence are common in patients treated with Antiresorptive therapy (ART). Little is known about the impact of noncompliance on therapy success. The Bisphosphonate Compliance Protocol analyzes the classical situations, in which BP therapy is indicated, to develop solutions to improve compliance and adherence in ART.
Methods: 103 women were enrolled in this prospective, open observational study. 41 women (Group I) with an indication for ART are questioned every six months on compliance/adherence, side effects, bone pain and quality of life using the QUALEFFO questionnaire. BMD is measured at baseline and after 24 months by DXA scans. The patients are subdivided into two subgroups according to their underlying disease: 25 women with breast-cancer induced bone disease (BCIBD), i.e. bone metastases (n=5) or significantly low BMD under adjuvant endocrine therapy with aromatase inhibitors (n=20) are compared with 16 women with postmenopausal osteoporosis in whom ART was also indicated (n=16).The control group (II) with adjuvant antihormonal breast-cancer treatment and/or osteoporosis but without ART indication is followed up for BMD measurements and QUALEFFO (n=62) once after 2 years.
Results: 84 (81,6%) women had a history of BC. At baseline 69 (67%) of all participants related skeletal complaints, 59 (57,3%) reported of prior fracture. Patients in group I had significant lower BMD at baseline compared to group II. In group I 12 patients had been treated with tamoxifen prior to baseline (29,3%), in group II this proportion was 22 (35,5%). 14 (34,1%) women had AI therapy in group I, and 33 (53,7%) in group II. There was no significant correlation between time span of adjuvant endocrine therapy and baseline BMD.
Conclusions: Consideration of multiple influencing factors helps towards a joint decision approach in the prevention of BCIBD with ART.

Disclosure of Interest: None Declared

P465 - GLUCOSAMINE SULPHATE VS PLACEBO IN A RCT ON EFFICACY, SAFETY AND CARRY-OVER EFFECT IN THE TREATMENT OF KNEE OSTEOARTHRITIS

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Aims: Osteoarthritis (OA) is the most common form of arthritis, and it is often associated with significant disability and an impaired quality of life. The aim of the study was to compare glucosamine sulphate (GS) and placebo in a double-blind prospective parallel groups randomized controlled trial assessing the efficacy, safety and carry-over effect in the treatment of knee OA.
Methods: Sixty outpatients affected by primary mono or bilateral knee OA were included in the study. Patients were randomized and allocated in two balanced groups of 30 patients: group I was treated with GS 1500 mg (Rottapharm|Madaus, Monza Italy) once a day and group II received placebo. Treatment duration was for twelve weeks and this period was followed by a 12-week treatment-free observation period, to allow the evaluation of a possible GS carry-over effect. Visit timing for each patient was: baseline and 4, 8, 12, 16, 20 and 24 weeks after the treatment start. The primary end-point was pain at rest and pain on movement on a 0 to 100 mm visual analogue scale. The secondary end-point included Womac Index for knee OA -evaluated as total pain score, total stiffness score and total physical function score- and rescue analgesics (paracetamol or NSAIDs.) The statistical analysis was performed as intent-to-treat analysis.
Results: Of 60 randomized patients (30 per group), 56 completed the study (28 treated with GS and 28 who received placebo). Statistically significant improvements in symptomatic knee OA were observed, as measured by differences in resting pain at weeks 8, 12, and 16 (all, $P<0.05$ vs. placebo) and in pain during movement at weeks 12 and 16 (both, $P<0.05$). W-TPS was lower with GS than placebo at weeks 8, 12, and 16 (all, $P<0.01$), and at week 20 ($P<0.05$). W-TSS was also lower with GS than placebo at weeks 8, 12, 16, and 20 (all, $P<0.05$). W-TPFS was lower with GS than placebo at weeks 8 ($P<0.05$), 12 ($P<0.01$), 16 ($P<0.05$), and 20 ($P<0.05$). Drug consumption was lower in the GS group than the placebo group at weeks 8, 12, 16, and 20 (all, $P<0.05$). The incidence of adverse events was 36.7% with GS and 40.0% with placebo.
Conclusions: GS appeared to be effective in reducing pain and improving function, displaying a carry-over effect and a good safety profile.

Disclosure of Interest: None Declared

P466 - BREAST CANCER AND CONCOMITANT PRIMARY HYPERPARATHYROIDISM WITH MARKEDLY ELEVATED PARATHYROID HORMONE

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Aims: Breast cancer is commonly associated with hypercalcemia. We report a female 69-year-old patient with advanced breast cancer who presented with hypercalcemia (3.4 mmol/l).
Methods: description of the clinical, imaging and laboratory findings of the patient
Results: Bone scan revealed no evidence of skeletal metastasis. Parathyroid hormone (PTH) concentration was elevated more than 10 times the upper limit of normal (793 ng/l). Both osteocalcin and bone-specific alkaline phosphatase were elevated whereas β crosslaps were normal. The patient complained of bone pain, fatigue and dyspepsia. Neck ultrasound showed a large multinodular goiter (80 ml). Single-photon emission computed tomography after admission of technetium Tc99-sestamibi revealed a focus of abnormal tracer uptake behind the lower pole of the left thyroid lobe. Preoperatively, the patient's hypercalcemia was managed with cinacalcet resulting in a decrease of calcium to 3.0 mmol/l. The patient underwent thyroidectomy with an excision of the left inferior parathyroid mass. Microscopic examination identified a benign pseudomultinodular parathyroid adenoma (2.5x1.5 cm) and adenomatous goiter. Postoperatively serum calcium normalized and PTH remained mildly elevated. Bone mineral density (BMD) assessed by DXA was decreased at the femoral neck and at the distal radius (T-score -2.5 and -3.5, respectively). Replacement of calcium, vitamin D, thyroxine and bisphosphonate treatment were initiated. 3 months after operation PTH and osteocalcin levels normalized and the patient was asymptomatic.
Conclusions: This case demonstrates a patient with breast cancer and hypercalcemia unrelated to the malignant disease. Primary hyperparathyroidism should be considered as a possible cause of hypercalcemia in breast cancer patients in the setting of elevated PTH, the absence of bone metastasis, elevated bone formation markers and mildly deteriorated BMD.

Disclosure of Interest: None Declared

P467 - SAFETY AND EFFICACY OF 18 MONTHS TREATMENT OF POSTMENOPAUSAL OTEOPOROTIC WOMEN WITH STRONTIUM RANELATE

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Aims: The objective of this work was to describe the efficacy of strontium ranelate (a new therapeutic drug who reduces the bone resorption and increases bone formation) in bone mineral density (BMD) change, in postmenopausal osteoporosis.
Methods: We examined 230 postmenopausal women with osteoporosis. The diagnosis was based by WHO - criteria, using Dual X-ray Absorptiometry (DXA). Thirty-six women (15.6%) were treated with strontium ranelate 2g/d orally, eighteen months. Thirty postmenopausal women with normal BMD were control group. The mean ages of patients was 62.11±2.39 years, for treated women vs. 59.13±4.3 years for untreated women; time since menopause 15.7±1.3 years for treated patients vs. 14.6±3.4 years for untreated women.
Results: The mean lumbar spine BMD in the first group (treated) was at the debut 0.699g/cm^2 and 0.806g/cm^2 after the treatment (+15.3%). T - score means increased from -3.2 to -1,7 SD. The mean hip BMD was 0.670g/cm^2 at debut and 0.705g/cm^2 after the treatment (+5.2%). T - score was -2.2 before treatment and -2.0 SD after. The mean femoral neck BMD was 0.577g/cm^2 before treatment and 0.602 after (+4.3%). T - score was -2.5 and increased to -2.3 SD. In the control group no change in BMD after eighteen months. No fractures under strontium ranelate treatment.
Conclusions: Treatment with strontium ranelate was generally well tolerated. Our result demonstrate that strontium ranelate provides sustained efficacy in vertebral BMD change. For more conclusions we need more patients treated for long term.

Disclosure of Interest: None Declared

P468 - CALCIUM AND VITAMIN D INTAKE AND THE NEED OF SUPPLEMENTS IN PATIENTS OLDER THAN 50 YEARS AT THE TIME OF FRACTURE

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Aims: Adequate calcium and vitamin D intake is advocated in guidelines of osteoporosis and was calculated in patients at the time they presented with a fracture.
Methods: Of 902 consecutive fracture patients, 502 were available for evaluation of calcium intake (by questionnaire) and serum 25(OH)D. We calculated the percentage of patients who needed ^{3}500mg/d of calcium to achieve ^{3}1000 mg/d and who needed ^{3}800 IU/d of vitamin D to achieve ^{3}50 nmol/l.
Results: Mean calcium intake was 839 mg/d (range 250-2050 mg) and mean 25(OH)D 43 nmol/l (range <10 to 130 nmol/l). To achieve 1000 mg/d of calcium, 12% needed 1000 mg/d and 56% needed 500 mg/d, and to achieve 1200 mg/d, 32% and 61%, respectively, without surpassing 1500 mg/d. Systematic supplements of 500 mg/d would achieve 1000 mg/d in 88% and of 1000 mg/d in all, and increased the intake to >1500 mg/d in 30% of patients with 500 mg/d and in 85% with 1000 mg/d. To achieve 50 nmol/l of 25(OH)D, 40% needed 800 IU/d vitamin D, 26% needed higher doses, and, to achieve 75 nmol/l, 9% needed 2400 IU/d. Systematic supplements of 800 IU/d would achieve 50 nmol/l in 75% of patients and 2000 IU/d in 91%. None of the these individualized or systematic doses of vitamin D supplements would bring serum 25(OH)D above the toxic level.
Conclusions: Baseline values and future need of adequate calcium and vitamin D intake vary between fracture patients. Sup-

plements need to be titrated according to the desirable need and safety limits.

Disclosure of Interest: None Declared

P469 - POST-FRACTURE TREATMENT FOR OSTEOPOROSIS IN ELDERLY MALES

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Aims: Osteoporotic fractures are an important source of morbidity among males, second only to cardiovascular disease. In the US, bisphosphonates were approved in year 2000 for the treatment of osteoporosis among men; however, the medical literature regarding the use of bisphosphonate therapy among male patients is sparse. Our aims in this study were to: 1) Estimate the frequency of bisphosphonate therapy initiated within 12 months post fracture from 2001 through 2005; 2) Determine the patient related factors associated with post fracture treatment; 3) Evaluate the physician characteristics associated with treatment.
Methods: We used the claims of a large health insurance company with enrolees throughout the United States to identify 17,683 men 65 and older who had a claim for a fracture during the period 2000-2005. Claims data on patients' characteristics, diagnostic procedures, types of therapies, co-morbidities, and provider characteristics were compared for fracture patients who received with those who did not receive bisphosphonate or teriparatide therapy following the index fracture.
Results: A total of 1434 (8%) patients were treated and 16,249 (92%) were not treated with a bisphosphonate or teriparatide. The proportion treated increased from 7% in 2001 to 9% in 2005 ($p<0.001$). Age was also associated with receipt of a bisphosphonate with the proportion treated ranging from 6% at ages 65-69 to 11.6% at ages 80-85 ($p<0.001$). Important predictors of post-fracture osteoporosis treatment among enrolees without pre-fracture treatment were: a diagnosis of osteoporosis (OR:8.7, 95% CI: 7.4-10.2), receipt of glucocorticoids (OR:3.2, 95% CI:2.4-4.3), having a bone mineral density measurement (3.4, 95% CI:2.9-4.0), and treatment with tricyclic antidepressants (OR:2.1, 95% CI: 1.2-2.4) or selective serotonin receptor uptake inhibitors (OR:1.7, 95% CI: 1.3-2.4). Other important predictors included fracture site (vertebral more commonly than hip), and provider visit (primary care providers more likely associated with treatment compared with specialty providers).
Conclusions: These results suggest that although an increasing trend of post fracture treatment for osteoporosis among elderly males has occurred in the US from 2001 to 2005, the magnitude of this increase has been small (7% to 9%) and osteoporosis treatment may be underprescribed.
Acknowledgement: The claims data used in this study are contained in the LabRx database, which is maintained by i3 Innovus, a member company of the United Health Group.

Disclosure of Interest: None Declared

P470 - VITAMIN D STATUS AFFECTS ONE YEAR BMD RESPONSE TO IBANDRONATE TREATMENT IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Aims: Vitamin D insufficiency and deficiency are quite prevalent among women with postmenopausal osteoporosis in our country, 61.2% and 22.2%, respectively*.We investigated whether ibandronate treatment in postmenopausal osteoporosis is equally effective according to the patients vitamin D status.
Methods: There were 76 osteoporosis patients with the following initial characteristics (mean±SD):age (62.6±7.9 yr), BMI(24.5±4 kg/m^2), spine BMD(0.789g/cm^2), hip BMD(0.714±0.09g/cm^2), PTH(73.6± 48.6pg/ml), 25OHD(17.69± 8.09 ng/ml), C-terminal telopeptides of Type I collagen(0.700±0.4 ng/ml), osteocalcin(22.82±17.63 ng/ml); 9.2% had prevalent vertebral fractures and 25% non-vertebral fractures. They were treated for one year with monthly oral or quarterly iv ibandronate and mean percent BMD changes at the spine and total hip were assessed by DXA; serum 25OHD concentrations were measured at baseline and after one year. The patients were grouped according to their 25OHD concentration, in 10 ng/ml increments: less than 10ng/ml;between 10-20 ng/ml; more than 30 ng/ml. Most of the patients received oral vitamin D supplementation(400-1300 IU/day).
Results: At baseline, the proportion of patients in each vitamin D group was: less than 10 ng/ml (13.11%), between 10-20 ng/ml(55.74%), between 20-30 ng/ml(21.31%) and more than 30ng/ml (9.84%) and after one year the respective figures were 1.32±, 23.68%, 38.16% and 36.84%, respectively. Mean 25OHD concentration increased from 17.6± 8.1 ng/ml to 27.6±9.5 ng/ml, and mean spine BMD increased by 4.77% ±3.91.There was no correlation between final 25OHD concentration and mean percent increase in spine BMD, but a good correlation (r=0.56) with mean percent increase in hip BMD. There was also a good correlation between mean percent increase in spine (r=0.37) and hip BMD (r=0.45) and the absolute or mean percent increase in serum 25OHD concentration. Moreover, 63.9% of the patients which moved to an upward vitamin D group gained more BMD(5.11% vs. 3.17%) than the patients (36%) which remained in the same group or regressed.
Conclusions: The BMD increase in response to ibandronate in patients with postmenopausal osteoporosis seems to be dependent on the increase in serum 25OHD during therapy.
References: *Grigorie D. et al, 2008, Acta Endocrinologica (Buc) IV:33

Disclosure of Interest: None Declared

P471 - ORAL HEALTH AWARENESS IN PATIENTS RECEIVING BISPHOSPHONATES

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Aims: Osteonecrosis of jaw(ONJ) although rare is a serious complication with bisphosphonates. In June 2006 American guidelines were published on dental management of patients to aid clinicians in preventing dental complications. No British guidelines are available. Patients on bisphosphonates should be aware of dental hygiene, precautions and possible side effects. We assessed awareness of two cohort of patients receiving bisphosphonates about dental precautions and side effects.
Methods: We conducted a questionnaire study on 2 groups of patients receiving bisphosphonates- Group A (those attending osteoporosis clinic) and Group B (attended hospital for other reason)
Results: Group A included 75 patients (80% females) and Group B included 80 patients(85% females). 75% in Group A and 20% in Group B were aware of need for proper dental hygiene. 80%(Gp A) and 10%(Gp B) were aware of risk of osteonecrosis. 50%(Gp A) and 80%(Gp B) had at least one tooth of poor prognosis predisposing to ONJ
Conclusions: There is lack of awareness of the need for dental precautions and major dental side effects associated with bisphosphonate therapy. Educational measures need to be implemented amongst both health professionals and patients with osteoporosis on long term bisphosphonate therapy.

Disclosure of Interest: None Declared

P472 - HEALTH PROFESSIONALS KNOWLEDGE ON SECONDARY OSTEOPOROSIS PREVENTION

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Aims: Despite the availability of research evidence and management guidelines there a wide variation in current clinical practice of management of osteoporotic fractures. Aim of this study was to assess knowledge and opinions amongst different health professionals on secondary prevention of fragility fractures.
Methods: We collected information from local general practitioners(Gp A),Orthopedic doctors(Gp B) and physicians(Gp C) by a questionnaire study.
Results: Gp A(n=70) Gp B(n=50) Gp C(no=65) all acknowledged need for assessment and secondary prevention of fragility fractures. 90%(Gp A) 70%(Gp B) 85%(Gp C) were aware of bisphosphonates as first line therapy. 75%(A) 50%(B) 50%(C) were aware of NICE 2005 guidelines recommending treatment without DXA scan above 75 years age. 80% (A) and 100%(C and D) felt monitoring and compliance was responsibility in primary care. 50% GPs and 90% orthopaedic doctors felt prescribing of bisphosphonates should be initiated by orthogeriatrician/physician with expertise in osteoporosis. 80% GPs 90% (B) and 70%(C) did not have a protocol for identification and management of fragility fractures.
Conclusions: Primary and secondary care practitioners have different opinion on management of fragility fractures regarding secondary prevention. A common care pathway protocol and educational program needs to be developed in the UK across community and hospital care and implemented by developing dedicated fracture liaison services.

Disclosure of Interest: None Declared

P473 - THE RAPID ONSET AND SUSTAINED EFFICACY (ROSE) STUDY: ZOLEDRONIC ACID VS. ALENDRONATE

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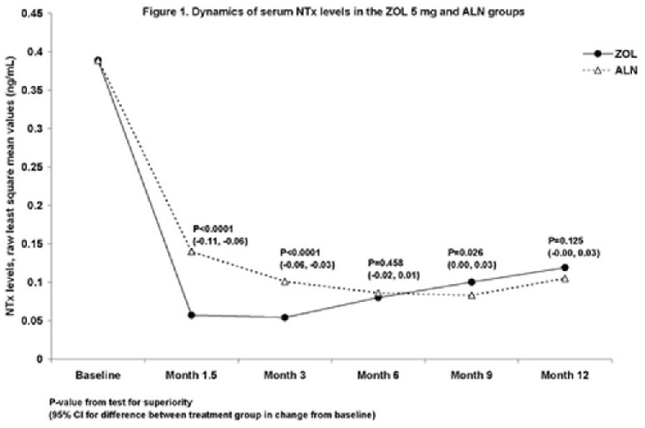
Aims: Once-yearly i.v. infusion of zoledronic acid (ZOL) 5 mg is an effective treatment for osteoporosis and has demonstrated better patient compliance over daily or weekly use of oral bisphosphonates.[1] The Rapid Onset and Sustained Efficacy (ROSE) study compared the efficacy and safety of once-yearly i.v. infusion of ZOL 5 mg vs. once-weekly oral Alendronate (ALN) 70 mg.
Methods: This was a 1-year, open-label study in postmenopausal women aged 55–90 years with documented osteopenia/osteoporosis (T-score ≤ -2.0 at total hip or spine measured by DXA). 604 patients were randomized (2:1) to receive once-yearly i.v. infusion of ZOL 5 mg (n=408) or once-weekly oral ALN 70 mg (n=196) along with 1200 mg calcium and 800 IU vitamin D per day. Primary objective was to compare the reduction in serum N-telopeptide (NTx). Secondary objectives were to compare the reduction in serum N-terminal propeptide of type I collagen (P1NP) and NTx over the 12-month study duration. Safety was also monitored.
Results: 602 patients received treatment and 561 completed the study. Baseline demographic and clinical characteristics were comparable between the treatment groups. ZOL demonstrated a rapid onset of action with larger reductions in NTx levels as early as month 1.5. Significantly greater reduction in NTx levels from baseline with ZOL were sustained until month 12 vs. ALN as determined by area under the curve (reduction at month 12, ZOL 0.28 ng/mL [95% CI, 0.28, 0.29]; ALN 0.27 ng/mL [95% CI, 0.25, 0.28], P=0.012 [2-sided test for superiority]). NTx levels at month 12 were slightly higher in the ZOL group (P=0.125) (**Figure 1**). Reduction in the levels of P1NP were also rapid and significant with ZOL. Similar incidences of AEs (78.4% *vs.* 74.7%) and SAEs (10.5% vs. 10.8%, drug-related <1% in both groups) were reported for ZOL and ALN, respectively. Study discontinuation due to AEs were higher with ALN (ALN 9.8% vs. ZOL 0.5%).



Conclusions: Once-yearly i.v. infusion of zoledronic acid 5 mg showed a faster onset and greater reduction in NTx levels as compared with once-weekly oral alendronate 70 mg, and was well-tolerated.

References: Bartl R et al, Dtsch Med Wochenschr 2006;131:1257

Disclosure of Interest: P. Hadji: None Declared, D. Gamerdinger: None Declared, W. Spieler: None Declared, P. Kann: None Declared, H. Loeffler Employee of: Novartis, K. Articus Employee of: Novartis, R. Moericke: None Declared, V. Ziller: None Declared

P474 - REAL WORLD COMPLIANCE AND EFFICACY OF IBANDRONATE 3 MG IV QUARTERLY VS. ORAL ALENDRONATE – THE NON-INTERVENTIONAL STUDY VIVA

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Aims: The efficacy of Bisphosphonates in the treatment of postmenopausal osteoporosis has been clearly demonstrated in large clinical trials. Bisphosphonates have been shown to reduce bone pain, bone loss and fracture risk and as such are currently the standard of care treatment. However, oral formulations of bisphosphonates are associated with poor gastrointestinal absorption, an increase in gastrointestinal adverse events necessitating complicated dosing regimens. As with other chronic diseases, patient adherence to oral bisphosphonate treatment has been shown to be poor. Suboptimal adherence to bisphosphonate therapy has been associated with an increased risk of fracture. In contrast to oral bisphosphonates, Ibandronate iv is applied directly by a physician and therefore optimal absorption and adherence seem to be secured. The objective of this non-interventional study is to investigate compliance and persistence of patients with Ibandronate 3 mg iv quarterly vs. alendronate 70 mg weekly with a 3:1 ratio in a real world setting. Additionally we will investigate the management and controllability as well as patient preference of intravenous Ibandronate vs. oral alendronate. Furthermore the impact of compliance and persistence and of intravenous or oral therapy on factors reflecting real life efficacy like pain intensity, quality of life, mobility and incidence of new osteoporotic fractures will be assessed and patient questionnaires for prospective assessment of probable compliance (SSAS and BMQ) will be used at the beginning of the study.

Methods: This non-interventional study is planned to start in Germany in Q1/2010 with an observation period per patient of 12 months. Overall 6.000 patients with postmenopausal osteoporosis will be enrolled by 1.500 to 2.000 office based physicians. Since the interest of our study is focused mainly on Ibandronate, a 3:1 ratio has been chosen.

Results: First results are expected in autumn 2012.

Conclusions: We will include a more detailed overview of the study outline and the materials and methods used in this important study.

Disclosure of Interest: None Declared

P475 - GASTROPROTECTIVE EFFECTS OF EFFERVESCENT ALENDRONATE FORMULATION SHOWN BY SCINTIGRAPHIC AND GASTRIC PH MONITORING

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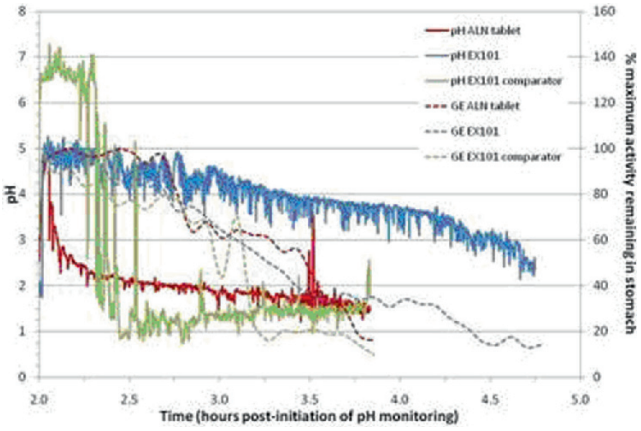
[1]Scientific Affairs, [3]Corporate Management, EFFRX, Jupiter, United States, [2]R&D, [4]Gastroenterology, Bioimages, [2]R&D, [4]Gastroenterology, Glasgow Royal Infirmary, [6]Pharmaceutics, University of Strathclyde, Glasgow, United Kingdom, [5]Product Development, SwissCo Services AG, Sisseln, Switzerland

Aims: This study evaluated gastric emptying (GE) and gastric pH after administration of alendronate (ALN) tablets, a novel effervescent ALN formulation (EX101) and an effervescent ALN comparator. Mucosal exposure to bisphosphonates at pH<3 is irritating to esophageal tissue, but is benign at pH>3. EX101 was designed to reduce the dosing restrictions and GI side effects of ALN.

Methods: This was a single center, open label, randomised, 3-way crossover study in 12 fasted healthy female volunteers. Nasogastric pH probes were inserted to monitor pH from 2 hours pre-dosing. ALN 70mg tablets were radiolabelled with 4MBq [SPECIAL;99mSPECIAL;Tc]-DTPA using a drill and fill procedure and were administered with 240ml water. EX101 and a comparator, both with 70mg ALN, were administered in 100ml radiolabelled water (4MBq [SPECIAL;99mSPECIAL;Tc]-DTPA at time of dose). Scintigraphy was performed at dosing and then every 5 min. until GE was complete. pH was monitored for 4 hours post dosing. GE is measured as± activity remaining in the stomach.

Results: The solutions and tablet rapidly entered the stomach after ingestion. There was considerable variability in GE after ingestion of all 3 formulations, and no clear trend was observed across the treatments. Mean pH at GE T50% was significantly higher in EX101-treated subjects compared to those treated with ALN tablets (3.5±1.3h vs. 1.9±0.5h; p<0.008). At T90%, all the mean pH values were similar.



Conclusions: There were no statistically significant or physiologically relevant differences in GE emptying time between ALN tablets and the effervescent formulas. There were highly significant differences between the effervescent formulations and tablet regarding gastroprotection. ALN tablets provided no pH protective effects, while EX101 was superior in providing pH protection. Ingestion of ALN tablets resulted in ALN being present in the stomach at a pH<3 within minutes of dosing. EX101 minimised the possibility of exposing the stomach and esophageal mucosa (in case of reflux) to acidified ALN, for in no subject were the stomach contents below pH 3 during the crucial 30 min. post-dose fasting period.

Disclosure of Interest: None Declared

P476 - TREATMENT FOR PSEUDOARTHROSIS OF VERTEBRAL FRACTURE: SURGERY VERSUS CONSERVATIVE TREATMENT

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Aims: The aim of this study is to discuss the results of radiographic and functional outcome comparison of conservative and surgical treatment for vertebral pseudoarthrosis.
Methods: If vertebral cleft or vertebral instability, which means a difference in vertebral body height between conventional and supine cross-table lateral radiography (XP), was present, and intermittent back pain continued at least 3 months, vertebral pseudoarthrosis was diagnosed. A total of 15 (13 women and 2 men) conservative patients and 14 (13 women and 1 man) surgical patients with vertebral pseudoarthrosis were the subject for this study.

Conventional lateral and supine cross-table lateral XP were performed. We measured kyphotic angle as a radiographic evaluation which was measured between the cranial and caudal endplate of affected vertebrae in conventional lateral XP. Back pain was classified into five grades by Denis scale.
Results: Pain point assessed by the Denis scale significantly decreased from a mean of 4.7±0.6 at first admission to 4.0±0.8 after 1 months, 2.7±1.2 after 3 months, to 2.5±1.1 after 6 months, to 2.3±1.2 after 1 year and to 1.9±0.9 after 2 year in conservative group ($p<0.05$). And point decreased from a mean of 4.3±0.8 before surgery to 2.7±0.8 after 1 months, 2.0±0.8 after 3 months, to 2.2±0.8 after 6 months, to 2.3±0.8 after 1 year and to 2.2±0.8 after 2 year in surgical group ($p<0.05$). At 1months Denis scale in surgical group was significantly smaller than conservative group. However, both groups were not significant over 3months.The mean kyphotic angle of affected vertebrae increased to 2.5% after 3 months, to 5.6% after 6 months, to 5.9% after 1 year and to 6.7% after 2 year in conservative group, and significantly decreased to 26.7% after 3 months, to 35.2% after 6 months, to 48.1% after 1 year and to 54.5% after 2 year in surgical group ($P<0.05$). The mean kyphotic angle was significantly higher in conservative group at each point. A new fracture was seen in 3 patients, affecting 3 vertebrae in conservative group, and in 5 patients, affecting 7 vertebrae in surgical group.
Conclusions: Disabling back pain was successfully treated both conservative and surgical treatment. In surgical group, pain was decreased earlier, and kyphotic angle was improved. In conservative group, pain was decreased the same at 3months. A new fracture tended to be little in conservative group. For painful VPA, surgical treatment to improve back pain should be performed only after sufficient conservative treatment.

Disclosure of Interest: None Declared

P477 - SUPPRESSION OF BONE TURNOVER MARKERS WITH MONTHLY ORAL IBANDRONATE IS SUSTAINED OVER 5 YEARS: THE MOBILE LTE STUDY

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Aims: In the 2-year, multinational, randomised, double-blind MOBILE study in women with postmenopausal osteoporosis, significantly greater increases in lumbar spine bone mineral density (BMD) were seen with ibandronate 150mg monthly than 2.5mg daily.[1,2] Here, we assess sustained response over 5 years in the MOBILE long-term extension (LTE) study.
Methods: Eligible patients previously receiving monthly oral ibandronate 100mg [n=176] or 150mg [n=176] in MOBILE for 2 years continued treatment for an additional 3 years. The primary endpoint was the change in mean lumbar spine BMD (5 years continuous treatment, pooled intent-to-treat analysis). Bone turnover marker concentrations (sCTX and sP1NP) were measured in a subpopulation of patients (per-protocol population at 5 years: 100mg n=18, 150mg n=19).
Results: After 5 years' continuous monthly ibandronate 100mg or 150mg, mean lumbar spine (L2–L4) BMD increased by 8.2% (95%CI: 7.2%, 9.2%) and 8.4% (95%CI: 7.5%, 9.4%) respectively, from baseline. BMD also increased at the hip. A rapid and pro-

nounced decrease in median trough sCTX from baseline was seen during the first 3 months of treatment: 100mg [n=141] –50% (95%CI: –57%, –45%); 150mg [n=140] –66% (95%CI: –70%, –60%). The magnitude of suppression was generally sustained at year 5: 100mg [n=18] –52% (95%CI: –69%, –20%); 150mg [n=19] –57% (95%CI: –65%, –30%). Similarly, a pronounced decrease in median trough sP1NP from baseline was seen at month 12: 100mg [n=23] –69% (95%CI: –74%, –65%); 150mg [n=23] –72% (95% CI: –79%, –67%). These decreases in sP1NP were sustained at a similar magnitude at year 5: 100mg [n=18] –52% (95% CI: –66%, –28%); 150 mg [n=19] –61% (95% CI: –75%, –56%). The proportion of patients with at least one adverse event over 5 years was similar between both regimens (100mg: 92%; 150 mg: 90%), with no new or unexpected events reported.

Conclusions: In women with postmenopausal osteoporosis, 5 years' treatment with the licensed dose of oral ibandronate (150mg monthly) improved BMD at lumbar spine and hip sites and was generally well tolerated. The early suppression of bone turnover markers sCTX and sP1NP achieved in MOBILE was sustained over 5 years of ibandronate therapy.

References: 1. Miller PD et al, J Bone Miner Res 2005;20:1315; 2. Reginster JY et al. Ann Rheum Dis 2006;65:654.

Disclosure of Interest: D. Felsenberg: None Declared, R. Recker Grant / Research Support from: Merck, Lilly, Wyeth, Procter & Gamble, Amgen, Roche, Glaxo Smith Kline, Novartis, NPS Allelix, and Sanofi-Aventis, Consultant / Speaker's bureau / Advisory activities with: Merck, Lilly, Wyeth, Procter & Gamble, Amgen, Roche, Glaxo Smith Kline, Novartis, and NPS Allelix, A. Kenwright Employee of: Roche Products Ltd, D. Masanauskaite Employee of: F. Hoffman-La Roche, P. Miller Consultant / Speaker's bureau / Advisory activities with: Roche

P478 - CORTICAL STRESS REACTIONS IN PATIENTS WITH ALENDRONATE-ASSOCIATED FEMORAL INSUFFICIENCY FRACTURES

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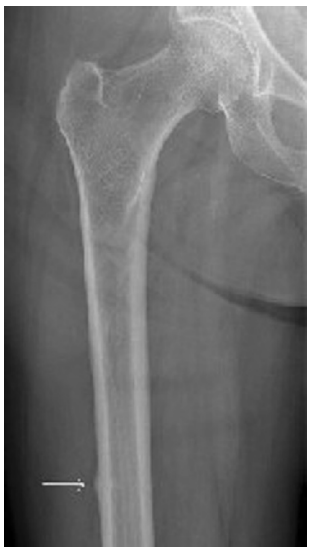
Aims: Alendronate is a popular medication used in the treatment of osteoporosis. Increasing evidence suggests a strong link between long-term alendronate therapy and atypical femoral insufficiency fractures. Some authors have suggested that in patients with these fractures, easily recognizable cortical stress reactions often precede a complete fracture. However, there is no literature describing the nature of these stress reactions or how they should be treated. We describe the frequency, presentation, treatment, and outcomes of femoral stress reactions in a group of patients who had already sustained contralateral femoral insufficiency fractures associated with alendronate therapy (FIFA).

Methods: Using medical records and radiographs, we identify all patients who presented to our institution between 2007 and 2009 with fractures consistent with FIFA. Radiographs were further analyzed to identify those with a contralateral femoral stress reaction. Patients were contacted via telephone to confirm symptoms and post-operative outcomes. Bone densitometry, serum biochemical markers, and intra-operative histopathology results were collected when available.

Results: Eight patients with FIFA were identified. Average duration of alendronate use was 6.2 years. Five out of eight patients were concurrently on long-term glucocorticoid therapy. Four were found to have radiological evidence of cortical stress reaction on the contralateral femur. (see image) Stress reactions on three patients were symptomatic, and these patients received prophylactic surgical treatment with intramedullary (IM) nailing. Following treatment, all three patients had marked improvements in their pain, with one patient having complete resolution of symptoms in one week. Radiographs at review demonstrate persistent cortical abnormalities but no new stress reactions or fractures.



Conclusions: Patients on long-term alendronate who suffer from FIFA often display evidence of cortical stress reactions on the contralateral femur. These should be recognized early for consideration of prophylactic treatment. Prophylactic IM nailing improves symptoms and may prevent progression to complete fractures.

Disclosure of Interest: None Declared

P479 - AN ACTION TO CONTROL OSTEOPOROTIC FRACTURES IN THE FUTURE: EXAMINATION AND TREATMENT FOR THE DAUGHTERS OF HIP FRACTURE PATIENTS

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Aims: Children of hip fracture (HF) patients have a risk factor of osteoporotic fracture. In Japan, we have the guideline that recommends them anti-osteoporosis medication when the bone mineral density (BMD) is less than 80% of young adult mean value (YAM). In order to control osteoporotic fractures in the future, I propose a method based on this guideline.

Methods: I recommended the daughters of HF patients to undergo dual energy X-ray absorptiometry (DXA) and began medi-

cation according to the guideline while HF patients stayed in our hospital. Then, I evaluated the economical effects of this method in a simulation.

Results: Twenty daughters underwent DXA in our hospital and BMDs of 13 daughters were less than 80% of YAM. Six daughters consulted local doctors, and 10 daughters declined my recommendation. I prescribed bisphosphonate for 5 daughters (mean age, 60.4 yrs) whose BMDs were less than 70% of YAM, and raloxifene or bisphosphonate for 8 daughters (mean age, 55.1 yrs) whose BMDs were less than 80% more than 70% of YAM. I advised 7 daughters (mean age, 52.0 yrs) to receive follow-up because their BMDs were over 80% of YAM. All daughters treated with medication were continuing to take medicine a year later. In my simulation, this method is indicated for 100,000 daughters, and 80% of them undergo DXA. We begin medication for 2/3 of the examinees now, for 1/6 of them 5 years later, and for 1/12 of them 10 years later. The adherence rate of the medication is 80%. The incidence of fractures is reduced to half with the medication. I estimate that HFs and VFs will occur in 45,600 and 57,000 daughters respectively in the natural course considering their risk for each fracture. However, in this simulation, we can prevent 13,300 HFs and 16,700 VFs by this method, and we can save 33 billion yen for fracture treatment and 70 billion yen for care. By the way, the medication will cost 152 billion yen if it continues constantly up to 85 years old.

Conclusions: The daughters of HF patients are in age of rapid loss in BMD when their parental HFs occur, however, majority of them are ready to receive treatment and to accept our advice. Total dosage of medicine required in controlling their fractures will reduce if we begin medication for them properly at this age. Moreover, this method may save other expense in health economics.

This method is efficient in choice of the therapeutic objectives. And its cost-effectiveness is appropriate in controlling osteoporotic fractures in the future.

Disclosure of Interest: None Declared

P480 - THE ROLE OF HEIGHT MEASUREMENT IN FRACTURE RISK ASESSMENT IN PATIENTS WITH OSTEOPOROSIS

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Aims: Osteoporosis is a metabolic bone disease predisposing to low energy fractures. In Poland pharmacological treatment for osteoporosis is introduced when 10-years fracture risk is higher than 20%, regarding densitometry results and clinical risk factors. One of the most important risk factors are low energy fractures. Spine fractures are almost asymptomatic. More than 70% of them are clinically silent. Height loss between 4 and 8 cm may be the only sign of a facture. A history of fractures is crucial for introducing pharmacological treatment. The aim of the study was the evaluation of the effect of active screening for osteoporotic spine fractures on 10-years fracture risk.

Methods: In 351 female patients from Wielkopolska region (Poland) treated for osteoporosis in Osteoporosis Outpatient Clinic 10-years fracture risk based on FRAX®-10 was calculated. Patients with a negative history of spine fractures and height loss of more than 5cm had two different FRAX®-10 estimations. In the first according to negative history of fractures no spine fractures were analysed, in the second height loss of more than 5cm was treated as an occult spine fracture.

Results: Patients' mean age was 70.1 years (47 to 90). The average FRAX® score was 14%. Scores above treatment point (≥20%) were reached by 74 women (21% of the study group). Positive history of spine fractures was obtained from 133 patients (38% of the study group). In this group mean age was 71.8 years, mean FRAX® score was 19%. In the group with a negative history of fractures (218 patients-62%) mean age was 69 years, mean FRAX® score was 11%. In this group 112 women (51%) had a height loss of more than 5 cm. Mean FRAX® score in a group without fracture was 11% and when height decrease was treated as a fracture the score was 17%. Height loss of more than 5cm qualified as a clinically silent spine fracture in 7% of patients with negative fractures' history decided about introduction of pharmacological treatment

Conclusions: 1. Regarding a large number of clinically silent spine fractures it is advised to perform a screening height measurements for all osteoporotic patients.

2. Undiagnosed and clinically silent spine fractures may delay the introduction of pharmacological treatment in patients with osteoporosis.

Disclosure of Interest: None Declared

P481 - CLINICAL APPLICATION OF FRAX® FOR JAPANESE

T. Hosoi [1,*], S. Fujiwara [2], I. Gorai [3], H. Ohta [4], T. Kuroda [4], S. Tanaka [5], M. Shiraki [6], H. Hagino [7], T. Nakamura [8], H. Orimo [9] and The Japanese committee on FRAX®

[1]Department of Clinical Research and Development, National Center for Geriatrics and Gerontology, Ohbu, [2]Radiation Effects Research Foundation, Hiroshima, [3]Hori Hospital, Yokohama, [4]Tokyo Women's Medical College, Tokyo, [5]Kyoto University, Kyoto, [6]Research Institute and Practice of Involutional Diseases, Nagano, [7]Tottori University, Yonago, [8]University of Occupational and Environmental Health, Kitakyushu, [9]Health Science University, Yamanashi, Japan

Aims: FRAX® is a fracture risk assessment program developed by WHO working group to calculate 10-year risks for hip fracture and major osteoporotic fragile fractures. The Japanese committee on FRAX® tried to position FRAX® in the clinical practice in Japan.

Methods: Because the incidence of vertebral fractures in Japanese is much higher than that in Caucasians, we focused on the 10-year risk for major osteoporotic fractures as the FRAX® risk in this study. We examined the FRAX® risk in the patients under the pharmacological treatment of osteoporosis at four independent clinics. Then, proportion of those who will have the 10-year risk over some cut-off values were described for general population and hospital samples. The observed incidence of vertebral fractures in the prospective cohorts was compared with the FRAX®

risk. These data were examined in view point of not only cut-off point for pharmacological treatment but also screening of osteoporosis.
Results: The current Japanese guideline for the prevention and treatment of osteoporosis recommends pharmacological therapy for the patients with fragile osteoporotic fractures, those with bone mineral density (BMD) lower than 70% of young adult mean (YAM), and those of osteopenia with one of the clinical risk factors (smoking, excessive alcohol, parents' history of hip fracture). The mean FRAX® risk of the patients under treatment according to this guideline was 15-20±. When the cut-off value of 15% for major osteoporotic fracture risk was applied to the general population, more than 90% of women aged 75 or older had the risk higher than this cut-off value. Substantial percentage of younger women with normal BMD had the FRAX® risk higher 15%. These results indicated that age and/or BMD should be considered when FRAX® is applied for Japanese. The incidence of vertebral fractures in the prospective cohorts was higher than that predicted by FRAX®, showing one of the limitations of FRAX® in clinical application.
Conclusions: FRAX® will give a track of clinical decision which is additional to the current Japanese guideline. The committee recommends the cut-off value of 15± for major osteoporotic fractures in the patients with osteopenia (YAM 70~80%), but this cut-off value is applicable for the women under 75-year old. Younger patients, e.g. those in fifty, should be assessed by the current guideline. The limitations of FRAX® in clinical setting should be considered.

Disclosure of Interest: None Declared

P482 - INTRA-VERTEBRAL EXPANDABLE PILLAR AS AN ALTERNATIVE AUGMENTER IN THE TREATMENT OF OSTEOPOROTIC VERTEBRAL FRACTURE

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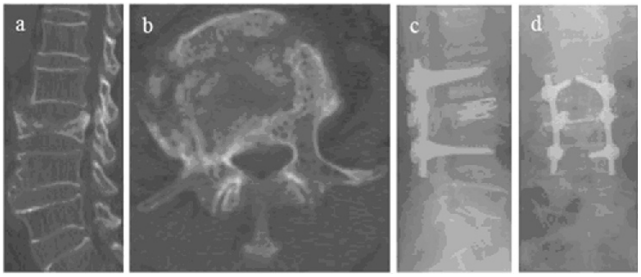
Aims: Osteoporotic Vertebral Fracture (OVF) can be managed by various options which have their limitations or biomechanical issues. Intra-Vertebral Expandable Pillar (I-VEP) is a new device to provide long-lasting relief of pain and to reduce kyphosis.
Methods: 21 patients were subjected to I-VEP implantation between September 2006 and January 2008. 5 patients were just underwent I-VEP insertion and other 16 patients were underwent additional implantation of pedicle screws and fusion. All patients were evaluated by preoperative and postoperative Visual Analog Scale (VAS) Pain Scores, anterior vertebral body height (AVBH), and the kyphotic angle (KA) of the lesion site. The AVBH of the adjacent segments were also measured.
Results: The mean follow-up period was 27.8 months. The two groups were both significant differences in reduced VAS score, increased AVBH and corrected KA between the preoperative phase and the final follow-up. In contrast, there was no significant difference of the AVBH of the adjacent segments.



Conclusions: The collapsed VB could be restored by expanded I-VEP and maintained by effective bony fusion inside and outside of the I-VEP. Also, the preservation of the end plate diminished the risk of subsidence of the I-VEP into the adjacent segments. Isolated implantation of I-VEP is suitable for younger and less osteoporotic patients. Supplemental screw insertion provides the initial stability and ensures the kyphotic correction. I-VEP seems reliable and safe in the treatment of patients with symptomatic OVF.
References: 1. Johnell O, J Intern Med 1996;239:299; 2. Andrade SE et al, Arch Intern Med 2003;163:2052; 3. Kaplan PA, Orton DF, Asleson RJ, Radiology 1987;165:533; 4. Iqbal MM, Sobhan T, Mo Med 2002;99:19.

Disclosure of Interest: J. Hsieh Consultant / Speaker's bureau / Advisory activities with: one of authors is the adviser of Aaxter Co., Ltd., P. Chen: None Declared

P483 - ANTI-NOCICEPTIVE EFFECTS OF ELCATONIN INJECTION FOR POSTMENOPAUSAL WOMEN WITH BACK PAIN: A RANDOMIZED CONTROLLED TRIAL

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Aims: Eel calcitonin (elcatonin) injection is widely used for elderly patients suffering from somatic pain in Japan. However, there have been few reports on the analgesic effects of elcatonin injection. The purpose of this study was to examine the analgesic effects of elcatonin injection in postmenopausal women with lower back pain.
Methods: This study was designed as a double-blind, randomized, placebo-controlled study. Thirty-six women aged ≥50 years with acute lower back pain participated in this study. They were randomly divided into two treatment groups according to whether they received a placebo or a weekly trigger point injection of elcatonin (20 units). They were observed for 5 weeks and the extent of pain at motion and at rest according to the visual analog scale (VAS) was evaluated. The mean VAS scores for the elcatonin group were then compared with those of the placebo group.

Results: Thirty-six patients participated in the trial, and four of these were excluded before opening the study key. Seventeen patients were in the elcatonin group and 15 patients were in the placebo group. There were no statistically significant differences in the mean VAS scores for pain at rest between the two groups during the 5-week treatment course. However, the mean VAS scores for motion pain in the elcatonin group were significantly lower than those in the placebo group at the third, fifth and sixth weeks.
Conclusions: Elcatonin injection (20 units) significantly relieved motion pain in the lower back in postmenopausal women after three weeks of treatment. This analgesic effect continued for the subsequent 3 weeks.

Disclosure of Interest: None Declared

P484 - DOES BISPHOSPHONATES COMPLIANCE HAVE INFLUENCE ON FRACTURE RISK? SYSTEMATIC REVIEW AND META-ANALYSIS

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Aims: To estimate the influence of low bisphosphonates compliance on fracture risk in osteoporotic patients.
Methods: We performed a systematic review of observational studies that compare fracture risk of higher versus lower bisphosphonates compliant patients.
Inclusion criteria:

- Prospective analysis of administrative databases of pharmacy refills.
- Analysis using conditional logistic regression or Cox proportional hazards models.
- Follow-up period between 1 to 2.5 years.
- Not self-reported data.
- Compliance must be measured by the Medication Possession Ratio (MPR).

The meta-analysis combined fracture risk using a Dersimonian and Laird random effects model, weighted by the inverse of the variance. Heterogeneity, publication bias and studies' quality were assessed. A sensitivity analysis was performed to explore the heterogeneity of results according to age, drug, fracture location, confirmed versus not confirmed osteoporosis diagnosis and compliance level. For the assessment of compliance level, two subgroups were established. The former included studies that used a MPR threshold of 80% to distinguish between poorly and highly compliant patients; and the latter included studies that compare MPR > 90% versus MPR<20-50%.
Results: Six articles, totalling 171,063 patients, met our inclusion criteria. These articles included 27,820 patients (16.26%) that received hormone replacement therapy, 27 patients (0.016%) that received calcitonin, and 143,216 patients that received bisphosphonates. The 2.4% of the patients were men. Only one study included patients younger than 45 years old. This study analysed data of 7,047 patients between 18 and 60 years old. The risk of fracture was 46% greater for patients with poor bisphosphonate compliance (less than 80% of MPR) versus highly compliant patients (equal or more than 80% of MPR). The increased fracture risk was lower for non-vertebral (16%) and hip (28%) than for clinical vertebral fractures (43%). Heterogeneity was partially explained by fracture location and drug. Fracture risk ratios were not altered by age, osteoporosis confirmation, and compliance level.
Conclusions: The published evidence indicates that poor bisphosphonates compliance is associates with an increased fracture risk, which is lower for non-vertebral than for clinical vertebral fractures.
Acknowledgement: Research and Development Programme of the Spanish Ministry of Health (grants PI07/90076 and PI06/0816) and Novartis Farmacéutica SA.

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P485 - CALCIUM AND VITAMIN D INTAKE IN RESIDENTS LIVING IN LONG-TERM-CARE (LTC) HOMES: THE VITAMIN D OSTEOPOROSIS STUDY (VIDOS)

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Aims: ViDOS was designed to calculate the osteoporosis care gap and to enhance the management of the disease in residents living in LTC homes.
Methods: The study is a clustered randomized control trial involving a multidisciplinary, multifaceted integrated disease management process that consists of a small group of individuals employed by LTC homes who meet regularly to examine work related challenges and propose solutions. The study will involve 40 LTC homes randomized to either intervention (n=20) or control groups (n=20). The project phases for the intervention homes consist of 3 data collection periods and 3 educational interventions (wave I data collection, 1st educational intervention, wave II data collection, 2nd educational intervention, and wave III data collection, 3rd educational intervention/close-out). In control homes, usual care and 3 data collection periods are planned. The study duration will be approximately 16 months. For each data collection wave, medical records will be examined for all residents living in the homes. This interim analysis evaluated wave I (baseline) use of calcium and vitamin D supplements for residents living in 16 LTC homes. Individuals were categorized as using or not using calcium and vitamin D (yes/no) and by the dose (calcium: ≥ 500 mg/day; vitamin D ≥ 800 IU/day).
Results: A total of 2259 medical records were selected and analyzed. The mean (SD) age of the residents was 82.1 yr (11.1) and

31% (688/2247) were men. Results showed that 33% (751/2259) of individuals were taking calcium and 32% (712/2259) were taking ≥ 500 mg/day. Furthermore, 48% (1093/2259) of residents were taking vitamin D and 32% (727/2259) were taking ≥ 800 IU/day.
Conclusions: In this cross-sectional analysis of 16 Canadian LTC homes, many residents were not taking calcium or vitamin D, and for those who were taking supplements, the doses were inadequate. Enhancing optimal calcium and vitamin D nutrition among residents in LTC may improve health care outcomes.

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P486 - USE OF BISPHOSPHONATE THERAPY IN RESIDENTS LIVING IN LONG-TERM-CARE (LTC) FACILITIES WHO ARE AT HIGH RISK FOR FRACTURES: THE VITAMIN D OSTEOPOROSIS STUDY (VIDOS)

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Aims: The ViDOS project was developed to quantify and reduce the gap in the care gap of patients with osteoporosis in residents living in LTC homes.
Methods: The study is a clustered randomized control trial that will evaluate the effect of a multidisciplinary, multifaceted integrated disease management process on the management of osteoporosis. The intervention consists of the creation of small working groups of physicians, nurses, pharmacists and staff employed by LTC homes who will be given the mandate to identify and analyze osteoporosis management-related problems and recommend solution. The study will involve 40 LTC homes randomized into either intervention (n=20) or control arms (n=20). The project phases for the intervention arm consist of 3 data collection periods and 3 educational interventions (wave I data collection, 1st educational intervention, wave II data collection, 2nd educational intervention, and wave III data collection, 3rd educational intervention/close-out), whereas only 3 data collection periods are scheduled for the control arm. The study duration will be approximately 16 months. For each wave, demographic, medications, falls, and disease condition data will be collected for all residents, using medication administration records (MAR) and entered into an electronic database. This interim analysis evaluated wave I (baseline) use of bisphosphonate therapy for residents who are at high risk for incident fractures in 16 LTC homes. High risk was defined as residents who had osteoporosis recorded on their MAR sheets or had a prior hip fracture documented.
Results: A total of 2259 MAR were selected and analyzed. The mean (SD) age of the residents was 82.1 yr (11.1) and 69.8% (1559/2247) were women. Results revealed that 11.8% (266/2256) of residents had documented osteoporosis and 6.1% (138/2256) had a prior hip fracture documented. A total of 50.4% (134/266) and 34.8% (48/138) of residents with osteoporosis or prior hip fractures were prescribed bisphosphonate therapy, respectively.
Conclusions: A large care gap exists in Canadian LTC homes, in terms of treatment of established osteoporosis. Ensuring optimal osteoporosis management may reduce the probability of future fractures and the negative consequences associated with fracture in high risk individuals.

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P487 - OSTEOPOROSIS COST UNITS STUDY IN THE TURKISH ELDERLY POPULATION WITH OSTEOPOROTIC HIP FRACTURE

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Aims: Objective of the study is to determine the cost of hip fractures and to collect the relevant data related to osteoporosis in the elderly Turkish population.
Methods: The present study was conducted with 1118 osteoporotic hip fracture patients selected by screening 35 hospitals connected to a Disease Related Group (DRG) network. The treatment choices, thus the percent distribution of different costs by type of hospital were applied to the estimations made using DRG data. The main variables were demographics, place of fracture, type of treatment and duration of hospital stay, estimation of the direct cost and extrapolation of costs to Turkey based on numbers of hospitals, hospital beds and patient by hospital.
Results: Out of 1118 selected patients (mean age: 75.3±9.9 years), 62.8% (n=701) were females. Male patients were significantly younger than females (p<0.000). The majority of the patients (%98.6) were diagnosed with femoral neck fracture. The average length of hospital stay was 11.0±7.9 days. The DRG costs used for cost estimates did not cover the costs of prosthesis or implant utilized, but only the direct medical costs of the primary hospitalization of the hip fractured osteoporotic patients. The total weighed costs of 1118 hip fractured patients is $ 2,177,080 per year indicating an average direct medical cost of $3,018 per patient in the 35 DRG hospitals. Number of patients was estimated to be 15602 by number of hospitals; 8521 by number of hospital beds, and 9365 by number of hospitalization which cost $31,530 million; $14,793 million and $18,948 million, respectively.
Conclusions: The gradual increase in the prevalence of osteoporotic hip fractures in Turkey, as observed in other countries (1) seems to continue challenging health economics in Turkey in the near future. Based on representation of 12.6% of the countrywide number of hospital beds by DRG hospitals supporting our estimations, raising awareness of osteoporotic hip fractures among physicians might facilitate to consider total costs and consequences of the illness to develop accurate national database to avoid incoherence and lack of standard data.
References: 1. P Piscitelli et al, SIOMMMS study group, and CERSUM research group, Osteoporos Int 2007;18:211.
Acknowledgement: The study is granted by sanofi-aventis Türkiye

Disclosure of Interest: None Declared

P488 - USE OF ZOLEDRONIC ACID IN REDUCING CLINICAL FRACTURES AND MORTALITY AFTER HIP FRACTURE

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Aims: The aim of this study is to document the antifracture efficacy and reduction of mortality by the use of zoledronic acid after hip fracture.
Methods: The study was carried out, between 1 January 2008and 31 December 2009 on a population of 200 patients, aged 68-85 years (mean age 74,8 years) who had undergone a low trauma hip fracture. 100 patients (the 1st subgroup) were received yearly intravenous zoledronic acid within 90 days after surgical repair of hip fracture, 1000mg calcium and 400-800IU vitamin D per day. The 2nd subgroup (100 patients) was received only 1000mg calcium and 400-800IU vitamin D per day. The median follow-up was 1,8 years.
Results: In the 1st subgroup, the rates of any new clinical fracture were 8,97% and 13,8% in the 2nd subgroup, a 35% risk reduction with zoledronic acid. The respective rates of a new clinical vertebral fracture were1,8% and 3,85% while the respective rates of new nonvertebral fractures were 7,7% and 10,8%. 10 of 100 patients in the zoledronic acid group (10%) and 14 of 100 patients in the 2nd subgroup (14%) died, a reduction of 28% in deaths in the zoledronic acid group. The most frequent adverse events in patients receiving zoledronic acid were pyrexia, myalgia and musculoskeletal pain. No cases of osteonecrosis of the jaw were reported, and no adverse effects on the healing of fractures were noted. The rates of cardiovascular adverse events were similar in the two groups.
Conclusions: An annual infusion of zoledronic acid within 90 days after repair of a low trauma hip fracture is associated with a reduction in the rate of new clinical fractures and improved survival.

Disclosure of Interest: None Declared

P489 - DOES IBANDRONATE POSSESS EQUAL EFFICACY IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS WITH AND WITHOUT CORTICOSTEROIDS

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Aims: To evaluate the efficacy of intravenous Ibandronate 3 mg/3 ml once quarterly within one year, on bone mineral density (BMD), in patients with postmenopausal osteoporosis (PMO) with and without corticosteroid (CS) treatment.
Methods: Hundred and one women were included; 67 women of mean age 63±13,02 with PMO (T-score<-2,5) without CS treatment, and 34 women with PMO (T-score<-2,5) at mean age

58±9,50, with rheumatic diseases under CS more than one year. BMD at the lumbar spine (LS) on DXA and x-ray at the thoracic and lumbar spine were measured before, and after one year of treatment. The patients were treated with intravenous Ibandronate 3 mg/3 ml once quarterly, within one year. All of them received calcium (1200 mg/d) and Vit.D3 (1000 I.U./d) supplementation. Statistical analysis was performed by T-Test and Mann-Whitney test, using SPSS 11.5 for Windows.

Results: Intravenous Ibandronate 3 mg/3 ml once quarterly for one year brought in both groups to significant increase in the mean BMD from baseline (056±0,109 g/cm^2; 6,7±; p<0,0001). Significant increase in the mean BMD from baseline was noted in the group of PMO without CS (0,069±0,125 g/cm^2; 8,74±; p<0,0001). In patients with PMO under corticosteroid treatment also there was significant increase in the mean BMD from baseline (0,032±0,060 g/cm^2; 3.8%; p=0,005). There is not statistically significant difference between both groups within one year of treatment (0,068 vs. 0,032 g/cm^2, p=0,060). The low incidence of new fractures in both groups at the 1st year of treatment (2±), compared to baseline (40,6±), is statistically significant (p<0,0001). There is not significant difference between both groups (p=0,055).

Conclusions: The patients with PMO under CS treatment improved by the treatment as much as the patients with PMO without CS treatment. There is a considerable trend towards low incidence of new fractures in both groups. The adverse events are insignificant and transient.

References: 1. American College of Rheumatology Ad Hoc Committee on Glucocorticoid-Induced Osteoporosis, Arthritis Rheum 2001;44:1496; 2. JD Ringe et al, Rheumatology 2003;42:743.

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Disclosure of Interest: None Declared

P490 - HIGH VERSUS LOW DOSE VITAMIN D IN ACUTE HIP FRACTURE PATIENTS: A RANDOMISED, CONTROLLED TRIAL

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Aims: In this study, we examined whether supplementing acute hip fracture patients with one large loading dose of vitamin D in addition to 1000IU vitamin D daily for 3-months increased vitamin D levels more effectively compared to only prescribing 1000IU vitamin D daily.

Methods: This was a parallel, double-blind, randomized controlled trial. The treatment and follow-up period was 3-months. The three study arms varied according to vitamin D loading dose: Group A: Placebo bolus; Group B: 50,000 D_2; Group C: 100,000 D_2. Following the loading dose, all study arms took 1000 IU D_3 daily for 3-months. Serum 25-hydroxyvitamin D_3 (25-OHD), was measured at baseline, on discharge from acute care and rehabilitation (approximately 4-weeks), and at 3-month follow-up. We compared amongst treatment arms 1) the proportion of patients reaching an optimal level of 25-OHD (≥75 nmol/L) 2) the mean 25-OHD. In analysis of covariance, time to follow-up and baseline 25-OHD were controlled for. We also examined the mean percent change in 25-OHD levels in a multivariable regression model; the last observation carried forward was used as the outcome measure (and controlling for time in analysis).

Results: By the 2nd measure (approximately 4-weeks), 54% percent of all study patients reached the target 25-OHD therapeutic level (≥75 nmol/L), and 64% by the final measure (approximately 3-months). There were no significant differences between the treatment groups. Similarly, in ANCOVA analyses, there was no significant differences in mean 25-OHD between treatment groups at the 2nd or 3rd measures. In the multivariable model, baseline 25-OHD was a strong predictor of percent change in 25-OHD (b=-2.76, p<0.001); treatment group was not significant. Age, gender, weight and time between baseline and final measure did not add any further predictive value. The percentage of patients who were at least 80% adherent to daily Vitamin D in-hospital was 83%. Of 46 participants for whom we could calculate final adherence (including those discharged home), 61% achieved 80% adherence.

Conclusions: It appears that patients receiving the additional loading dose of 50,000 or 100,000 D_2, in addition to 1000 IU daily vitamin D_3, had no added benefit over individuals receiving only 1000 IU daily vitamin D_3. Although the majority of individuals reached therapeutic 25-OHD levels, 36% did not achieve this by the end of the study.

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P491 - MULTIPLE STUDIES WITH RISEDRONATE DEMONSTRATE CONSISTENT BONE TURNOVER REGARDLESS OF DOSE

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Aims: The purpose of this analysis was to study the robustness and consistency of the histomorphometric data from biopsies of postmenopausal women with osteoporosis (PMO) treated with risedronate at different dose levels and dosing frequency.
Methods: In a pivotal Phase III randomized, placebo-controlled clinical study, patients were treated with either 5 mg of risedronate daily or with placebo for 3 years. Analysis in paired biopsies showed that risedronate reduced mineralizing surface by 58% and activation frequency by 47%, which is consistent with its anti-resorptive activity[1]. Of 70 evaluable biopsies (33 placebo; 37 risedronate), double tetracycline labels, a reflection of on-going remodeling, were seen in all biopsies. In a subsequent 2 year extension study, double labels were identified in all paired biopsies indicating continuous bone remodeling[2] in patients treated with 5 mg/day for up to 5 years. Subsequently, three different regimens of risedronate were developed: 35 mg once-a-week (OAW)[3], one 75 mg dose on two consecutive days a month (2CDM)[5], and 150 mg once-a-month (OAM)[4]. Non-inferiority of these new regimens compared to the daily 5mg dose was demonstrated, based on a prospectively defined primary endpoint (Table). The 35 mg OAW study also included a 50 mg weekly dose. In all three studies, biopsies were taken at 24 months.
Results: Double tetracycline labels were found in 97 – 100% biopsies (Table). Key histomorphometric variables were comparable across these studies. These data indicate that risedronate preserved bone structure and quality with continuous remodeling in all groups regardless of dose and exposure.

	Risedronate dose (mg)	# evaluable biopsies	# biopsies w/ double label	% of double label
VERT-NA (36 month[1])	5	37	37	100
VERT-NA (60 month[2])	5	13	13	100
OAW (24 month)[3]	5	35	34	97
	35	29	29	100
	50	21	21	100
OAM (24 month)[4]	5	35	34	97
	150	27	27	100
2CDM (24 month)[5]	5	9	9	100
	75	5	5	100
PMO Total		211	209	99

Conclusions: The presence of double labels in 99% of all biopsies does not suggest compromise of bone remodeling during treatment with these established regimens, up to 5 years with the 5mg/day dose.
References: [1]E Eriksen et al, Bone, 2002; [2]LG Ste-Marie et al, CTI, 2004; [3]R Recker et al, ECTS, 2003; [4]P Chavassieux et al, ECTS, 2009; [5]PGP data on file.

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P492 - LATERAL CORTICAL STRESS LESIONS IN PROLONGED BISPHOSPHONATE THERAPY: INDICATIONS FOR SURGICAL INTERVENTION

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Aims: Femoral insufficiency fractures have been reported after long term bisphosphonate therapy [1,2]. Lateral cortical stress reactions have been documented to precede these fractures and were also identified in the contralateral femur in 53± of patients [3].

This study follows the natural history of femoral stress lesions associated with long term bisphosphonate therapy, with emphasis on features that pre-dispose to complete stress fractures.
Methods: A prospective clinical and radiological review of all patients with radiologically documented femoral stress lesions associated with bisphosphonate therapy was carried out for evidence of progression or resolution of the lesions. Radiological features of stress lesions culminating in fractures were compared with those which remained intact.
Results: Of 1,463 geriatric hip fractures occurring from 1 May 2004 to 31 July 2008, 33 were of a distinct metaphyseal-diaphyseal configuration. Thirty-two were on prior bisphosphonate therapy. Sixteen femurs showed a lateral cortical thickening either in pre-fracture radiographs (4 femurs) or on radiographs of the contralateral femur (12 femurs). All four cases which fractured had a " dreaded black line" in the lesion while only one out of 12 patients had this feature in femurs which remained intact (100% vs. 8.3%, p= 0.003). All patients who fractured reported thigh discomfort over 1.0 month (0.1-9.0 months, SD 4.0 months) while three of 12 patients who did not fracture reported thigh discomfort. (100% vs. 25%, p= 0.019)
Conclusions: Cortical stress reactions associated with prolonged anti-resorptive therapy, in the presence of pain and the "dreaded black line", have an increased risk for complete stress fractures. Prophylactic surgical stabilisation is indicated when these features are present.
References: 1. SK Goh et al, J Bone Joint Surg (Br) 2007;89-B:349; 2. Neviaser AS et al, J Orthop Trauma 2008;22:346; 3. Kwek EB et al, Injury 2008;39:224.

Disclosure of Interest: None Declared

P493 - CORRELATION OF BLOOD SERUM LEVELS CTX, NTX, PTH AND FRACTURE RISK IN THE 90 MONTHS OF TREATMENT WITH RISEDRONATE IN PO GREEK WOMEN

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Aims: The aim of this study was to investigate the effect on sNTX, sCTX and PTHi following daily continuous administration of Risedronate for 90 months in early postmenopausal Greek women.
Methods: Forty, early postmenopausal women, between 48 and 53 years old (mean±50 years), 6 months to one year after the menopause, with T-score<2 SD on lumbar spine DXA and without any prior metabolic disorders or fractures were separated into 2 groups: Group A (n=30) received) 0,25mg Acacidol,35 mg Risedronate, and 1000 (mg/day) Calcium carbonate, while group B (n= 10) 0,25mg Acacidol and calcium. Serum and urine bone resorption markers were measured at 0, 6, 12, 24, 36, 48, 60, 84 and 90 months intervals by automated electrochemiluminescence assay. No premonopausal values were available for comparison. Two patients in group B discontinued treatment because they made fracture the one patient in the under 1/3 of forearm and second in the vertebral Thoracic 11.
Results: 1) Group A showed a statistically significant decrease in sNTX(16.15%, p<0.0005) as early as 6 months changes whilst the annual fluctuation remained with no statistically significant changes p<0.0005 (90 months). In group B sNTX was increased (10.9%,19,58% p<0.0005). 2) Group A in the first 6-months showed an early statistically significant decrease in sCTX (11.69%p<0.0005) whilst the annual fluctuation remained with no statistically significant changes p<0.0005 (90 months). In group B sCTX was increased (13.32%, 18,97%,p<0.0005). No values with was not decreased under the physiologic levels of laboratory.3) PTHi±changes in both of groups are not significant.
Conclusions: Changes in sNTX, sCTX, demonstrate that Risedronate effectively decrease bone markers of bone resorption as early as 6 months after treatment and the effect is maintained without further changes from the end of the first year of treatment. The bone markers they continued to remain constant in the physiologic levels at the duration of next years of treatment without clinical fracture in the 90 months period. Risedronate treatment helped in does not become fracture during the 90 months and this has direct cross-correlation with the correct regulation bone resorption markers.

Disclosure of Interest: None Declared

P494 - EFFECT OF COMBINATION OF GENISTEIN, POLYUNSATURATED FATTY ACIDS (N-3 PUFAS) AND VITAMINS K1 AND D3 ON BONE MINERAL DENSITY (BMD) IN POSTMENOPAUSAL WOMEN

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Aims: Osteoporosis is a major health problem with increasing prevalence as the population ages. Nutritional factors play an important role in the prevention of osteoporosis; however, controlled human studies investigating the possible benefit of several micro nutrients on bone health are limited. To investigate the effect in humans, a pilot, randomized, placebo-controlled, double-blind study was initiated in postmenopausal women (PMW).
Methods: PMW were recruited to receive a combination of 30 mg genistein, 1 g n-3 PUFAs, 800 IU vitamin D_3 and 150 ug vitamin K_1 supplementation + 500 mg calcium, or placebo + 500 mg calcium. Primary objective was to investigate the effect of the combined supplementation over a period of 6 months on BMD at lumbar spine and femoral neck compared with calcium alone. Secondary objectives were to investigate the effect of the supplementation on other bone sites, biomarkers of bone health and safety, compared with only calcium.
Results: Fifty-eight healthy, early PMW with an average age of 55y and BMI of 25 kg/m^2 were investigated. After 6 months there was a significant increase in BMD at femoral neck (delta 1.3% compared to calcium alone, P<0.05) and Ward's Triangle (delta 3.4% compared to calcium alone, P<0.05) whereas there was no difference compared to calcium alone at lumbar spine and other hip sites or whole body. NTX and BALP were significantly increased compared to calcium alone (P≤0.05). No effect on endometrial thickness was observed. Tolerability was very good.
Conclusions: The combined supplementation (30 mg genistein, 1 g n-3 PUFAs, 800 IU vitamin D_3 and 150 ug vitamin K_1) appeared to protect against bone loss better than calcium alone and to increase BMD at hip sites by up to 3.4% after 6 months supplementation.

Disclosure of Interest: None Declared

P495 - COMPLEX DRUG THERAPY AND REHABILITATON IN ENDOCRINE DISORDERS ASSOCIATED WITH SECONDARY OSTEOPOROSIS – ONE YEAR FOLLOW-UP

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Aims: To identify the most common endocrine disorders associated with secondary osteoporosis and to evaluate the effect of a complex drug therapy and rehabilitation program on bone loss.
Methods: In a four year period, we evaluated 136 patients (82.93% female, mean age 48.13±12.06 years) diagnosed with one endocrine disorders and secondary osteoporosis. The bone loss was

evaluated at the beginning of the treatment and after one year, by DXA osteodensitometry
Results: The endocrine disorders associated with secondary osteoporosis were hyperthyroidism (60.97%), hypogonadism (35.37%), primary hyperparathyroidism (1.83%), and Cushing syndrome (1.83%). 105 patients followed the prescribed treatment (specific treatment for endocrine disorder, antiosteoporotic treatment and a rehabilitation program – aerobics, weight bearing and resistance exercises) for one year, with an improvement of the bone mineral density of 9.73% at hip level, respectively with 13.43% at lumbar spine level (p<0,001). 22,79% of initially evaluated patients haven't completed the prescribed treatment.
Conclusions: In our study, we found that hyperthyroidism is the most frequent endocrine disorders associated with secondary osteoporosis, followed by hypogonadism. The association between a complex drug therapy (for the underlying disease and osteoporosis) and a rehabilitation program seems to have beneficial effects in cases of secondary osteoporosis with endocrine causes.

Disclosure of Interest: None Declared

P496 - DO LIFESTYLE CHANGES IMPROVE QUALITY OF LIFE IN OSTEOPOROSIS?

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Aims: In current study we want to find an adequate physical activity program for women with postmenopausal osteoporosis and to evaluate the outcomes regarding the quality of life of our subjects.
Methods: For one year we followed 76 women (age 47-72) with postmenopausal osteoporosis, under treatment with biphosphonates. Initially, at 6 and 12 months, we evaluated the patients, using DXA osteodensitometry and Qualeffo-41 questionnaire. We recommended a short program (30 minute) of ROM exercises, at least 3 times weekly, and free continuous walk sessions of 40-50 minute, at least 5 times weekly.
Results: The adherence to physical activity program was poor, only 23.7% respected the schedule. After 6 months the Qualeffo-41 score was better in patients who performed the prescribed physical training program. 6 patients left the study at this moment. The average score of Qualeffo-41 was significantly improved after 1 year. We did not find significant BMD changes after one year.
Conclusions: The implementation of a regular physical activity lifestyle may be difficult and requires optimal methods for educating osteoporosis patients. Moderate physical activity has no influence on bone mineral density but seems to improve the quality of life in women with postmenopausal osteoporosis.

Disclosure of Interest: None Declared

P497 - COMPARISON OF THE EFFECTS BETWEEN GROWTH HORMONE AND HYALURONIC ACID ON DEGENERATIVE CARTILAGE OF KNEE IN RABBIT

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Aims: To explore whether the growth hormone is effective in the treatment of degenerative cartilage of knee in rabbits.
Methods: Thirty New Zealand white rabbits were administered intra-articular injection with monosodium iodoacetate (Sigma, St. Louis, USA) 2.5 mg and divided into 3 groups. Each group was administered with hyaluronic acid (LG life science, Seoul, Korea) (group A) 0.6 ml, growth hormone (LG life science, Seoul, Korea) (group B) or saline (group C) 0.6 ml intra-articular once a week for 4 weeks, beginning 4 weeks after the degeneration induction. All rabbits were killed 9 weeks after degeneration induction. The histologic morphology was observed by optical microscope with knee cartilage.
Results: Mankin score was 2.4±1.3 in group A, 3.9±1.7 in group B, 7.4±0.8 in group C. Yoshimi score was 1.5±0.7 in group A, 2.2±0.9 in group B, 4.4±0.6 in group C. Gross and microscopic morphologic findings showed that group C represented the more severe than group A & B (p<0.01), also group A was better than group B (p<0.05).
Conclusions: Growth hormone is effective on degenerative knee cartilage in rabbit model, but less than the hyaluronic acid.

Disclosure of Interest: None Declared

P498 - STUDY OF THE EXPEDIENCY OF IMPLANTATION IN UKRAINE THE INFORMATIONAL INTERNET-SYSTEM ABOUT OSTEOPOROSIS

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Aims: The medical and pharmaceutical fields in Ukraine are experiencing changes. In this work the aim was to develop a model of pharmaceutical informational system about the osteoporosis based on Internet technologies.
Methods: The development and introduction of the model of non-commercial web-site "Osteoporosis in Ukraine. Pharmaceutical information" is supposed to be done in several stages, which include the analysis of need in pharmaceutical information (questionnaire method was used), projecting interfaces and structure, introduction itself, evaluation of results.
Results: Stage I: studying the need of specialists in pharmaceutical information (82 questionnaire sheets were received). Concerning the information level about drugs used for treatment of osteoporosis: 35.5% consider it insufficient and 51% consider it partially sufficient. Among the spheres of pharmaceutical information, which are the most interesting for specialists on the corresponding Internet resource, there are the following: evidentiary medicine data – 83%, information on new drugs available on the market – 73%, drug interaction – 72% etc.
Stage II: projecting interfaces and the resource structure. The project structure is based on ATC groups and is drug-oriented,

i.e. the base page is a pharmaceutical card which contains links to corresponding materials for this pharmaceutical after the eight directions. The site is available by the address: http://osteo.doctor.ua

Stage III: introduction of the project. Information sources are strategically important, that is why only reliable information sources are used for adding information on the web-site. For standardization of the quality of information during introduction of the project all HON (Health On the Net) principles are observed, and the project was submitted for licensing to this organization for getting the conformity mark.

Realization of the **last stage** is planned for late 2010. It includes getting expert conclusions concerning web-site contentment among the specialists, also carrying out the interrogation on the web-site among its visitors for their opinions on the resource and their development wishes and statistic analysis of attendance.

Conclusions: Introduction of this web-site is being carried out in compliance with certain quality standards, which provides healthcare professionals and population with relevant and competent information. Using the Internet in building new sustainable systems of medical and pharmaceutical information in Ukraine proved its feasibility.

Disclosure of Interest: None Declared

P499 - AMINOGUANIDINE, AN ADVANCED GLYCATION END-PRODUCT INHIBITOR, PREVENTS THE DECREASE IN BONE MINERAL DENSITY IN STREPTOZOTOCIN-INDUCED DIABETIC MICE

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Aims: Diabetic osteopenia and osteoporosis are common long-term complications in patients with insulin-dependent diabetes mellitus, which may increase fracture rate and delay fracture healing (1). The levels of advanced glycation end products (AGEs) have been found to be elevated in serum of patients with osteoporosis (2). However, the effect of AGEs on bone mineral density (BMD) still needs to be clarified. Here, we evaluate the *in vivo* effect of AGEs inhibitor aminoguanidine on the alteration of BMD in an insulin-dependent diabetic mouse model.

Methods: Male ICR mice (6-8 weeks) were injected intraperitoneally with streptozotocin (STZ) 100 mg/kg. STZ was dissolved in sodium citrate buffer, pH 4.5, and injected within 15 min of preparation. An ELISA kit (Abcam, Cambridge, MA, USA) was used to detect the serum AGEs levels. After one week, chose the mice in which fasting blood glucose had >200 mg/dl to test the alteration in BMD with or without aminoguanidine (50 mg/kg) treatment for 4 weeks. The BMD of tibia and lumbar vertebra were determined by dual-energy X-ray absorptiometry (DXA, Norland Stratec, Ft. Atkinson, WI, USA).

Results: There were hyperglycemia and increased serum AGEs levels in STZ-induced diabetic mice. Aminoguanidine did not attenuate the hyperglycemia, but significantly decreased the increased serum AGEs levels in STZ-induced diabetic mice (from 220±11 (STZ-diabetes group) to 120±6 (aminoguanidine treatment group)± of control, n=6, $P<0.05$). The BMD of tibia and lumbar vertebra were lower in STZ-induced diabetic mice than that in control group. Additionally, aminoguanidine significantly reduced the decrement of BMD in diabetic mice (from 77±3 (STZ-diabetes group) to 92±4 (aminoguanidine treatment group)± of control in tibia, n=6, $P<0.05$). Similarly, the improvement of histomorphological changes in bone of diabetic mice by aminoguanidine was also shown.

Conclusions: The results showed that hyperglycemia elevated the serum AGEs levels and reduced the BMD in STZ-induced diabetic mice, which could be significantly reversed by AGEs inhibitor aminoguanidine. These findings suggest that AGEs may be involved in the bone lose during diabetic hyperglycemia.

References: 1. White et al, Clin Orthop Relat Res 2003;414:37; 2. Hein et al, Rheumatology 2003;42:1242.

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Disclosure of Interest: None Declared

P500 - BAZEDOXIFENE REDUCES NON-VERTEBRAL FRACTURES IN PATIENTS AT HIGH PROBABILITY OF FRACTURE

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Aims: In a phase III study, bazedoxifene significantly decreased the risk of vertebral fractures in postmenopausal women. No significant effect was noted on non-vertebral fractures, but fracture risk reduction was reported in a post hoc subgroup analysis in a high risk group categorised on the basis of BMD and prior fracture. We recently demonstrated a significant reduction in all clinical fractures with bazedoxifene in higher risk patients assessed by FRAX®. We have now re-evaluated the efficacy of bazedoxifene on non-vertebral fracture outcomes in the pivotal study.

Methods: The present analysis compared the effects of two doses of bazedoxifene (20 and 40 mg daily combined) with placebo on the risk of all non-vertebral clinical fractures. The risk of a major osteoporotic fracture was assessed using the FRAX® algorithms, and the relationship between pre hoc 10 year fracture probabilities and efficacy examined by Poisson regression.

Results: This independent re-analysis confirmed that hazard ratios for the effect of bazedoxifene on all non-vertebral fractures decreased with increasing fracture probability, and that at low probability values, the 95% confidence estimates crossed unity. At the higher probabilities, the effect became significant. In the more complete FRAX® model (i.e., with BMD), treatment with bazedoxifene reduced non-vertebral fractures in women with a ten year probability at or exceeding 20%, representing 11.9% of the population studied (Table). Bazedoxifene (20 and 40 mg doses combined) significantly decreases the risk of non-vertebral clinical fractures in women at or above a FRAX® based fracture probability threshold. The efficacy increases with increasing fracture probability.

Table Hazard ratio for non-vertebral fracture between treatments (bazedox. vs. plac.) at or above threshold of major fracture probabilities.

Probability threshold	Sample size	HR	95% CI
10.0%	2118	0.73	0.51- 1.06
12.5%	1563	0.68	0.45- 1.03
15.0%	1153	0.68	0.43- 1.07
17.5%	845	0.60	0.35- 1.04
20.0%	618	0.45	0.24- 0.82

Conclusions: These results, consistent with the previous clinical fracture analysis, suggest that bazedoxifene should be targeted preferentially to women at increased fracture risk.
Acknowledgement: Independent analysis supported by a grant from Pfizer Inc.

Disclosure of Interest: E. McCloskey Grant / Research Support from: Pfizer Inc, H. Johansson: None Declared, A. Oden: None Declared, A. Chines: None Declared, J. Kanis: None Declared

P501 - FRACTURE RISK ASSESSED BY FRAX® TRANSLATES BONE CELL ACTIVITY

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Aims: The Fracture Risk Assessment Tool (FRAX®) is an algorithm which takes into account clinical risk factors for fracture and DXA results. It has been shown to be a useful tool in risk prediction but the structural, mechanical and biological bone properties that it implicitly translates are unknown. The aim of this study was to evaluate the association between bone biological parameters, bone strength and fracture risk calculated by the FRAX® tool.
Methods: Patients submitted to hip replacement surgery were consecutively recruited and evaluated for clinical risk factors for fracture and assessed by DXA. FRAX® was calculated.

Femoral epiphysis were collected and trabecular bone cylinders were drilled in order to perform compression mechanical tests in a universal mechanical test machine (Instron Corporation) to analyse bone strength. RNA was extracted from a small trabecular bone piece and expression of genes involved in bone cell metabolism was assessed by quantitative real-time RT-PCR.
Results: Seventy-five patients with 71±11 years were analysed. 26% were males and 74% were females. The average BMD was of 0.8±0.1 g/cm^3. The probability of a major osteoporotic fracture as calculated by FRAX® was of 12.7±11.1% and for a hip fracture of 5.9±8.1%. The FRAX® output for a major fracture was negatively correlated with the expression of cbfa1 (R^2=-0.327, p=0.005), osterix (R^2=-0.267, p=0.024), osteocalcin (R^2=-0.261, p=0.028), PPAR-gamma (R^2=-0.239, p=0.045) and positively with RANKL/OPG ratio (R^2=0.302, p=0.010). No relation was found with cathepsin K, bone alkaline phosphatase, DMP-1, RANK, OPG and RANKL. Regarding BMD, a positive correlation was found with cbfa1 (R^2=0.435, p=0.009), osterix (R^2=0.347, p=0.041), osteocalcin (R^2=0.361, p=0.033), PPAR-gamma (R^2=0.472, p=0.004), DMP-1 (R^2=0.358, p=0.035), OPG (R^2=0.332, p=0.051) and a negative correlation with RANKL/OPG ratio (R^2=-0.396, p=0.019). Bone mechanical properties were not correlated with any of the genes studied.
Conclusions: We have documented for the first time that fracture risk calculated by FRAX® also translates bone biological behaviour. Bone gene expression is also strongly correlated with bone mineral density but not with bone strength assessed by mechanical tests.

Disclosure of Interest: None Declared

P502 - CHANGES IN FEMORAL BONE STRUCTURE OF RATS AFTER AN INTRAPERITONEAL ADMINISTRATION OF CADMIUM

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Aims: Various changes in bone such as osteopenia, osteoporosis, and osteomalacia, with increased bone fragility and pathological structures have been noted in humans and experimental animals as a result of exposure to cadmium (Cd). It is generally known that chronic even low-level exposure to Cd disturbs bone metabolism during skeletal development and maturity by affecting bone turnover. The aim of our study was to investigate the effect of Cd on growth performance and morphological structure of the bone after a single intraperitoneal administration.
Methods: Ten 4-month-old male Wistar rats were injected intraperitoneally with a single dose of 2 mg $CdCl_2$/kg body weight and killed 36 h after cadmium supplementation. Ten 4-month-old males served as an untreated control group and were killed at the same period like Cd-treated animals. The changes in body weight, femoral weight, femoral length, and morphological structure of the femur were evaluated between both groups of rats. The unpaired Student's t-test was used for establishment of statistical significance.
Results: We found that intraperitoneal administration of Cd has no effect on the body weight, femoral weight and femoral length in rats. However, some differences in collagen fibers orientation were identified in postero-medial views between experimental and control groups suggesting that Cd may cause changes in collagen metabolism. Morphometrical measurements showed significant increase in all variables (area, perimeter, maximum and minimum diameter) of the primary osteons' vascular canals, and Haversian canals in Cd-treated animals (P<0.05). Also, a significant decrease in all variables of the secondary osteons was observed in experimental animals (P<0.05). On the other hand, no

resorption lacunae and/or osteoporotic fractures were found in rats after their exposure to Cd.
Conclusions: Our results allow for the conclusion that intraperitoneal administration of Cd at the level used in this study does not influence bone development significantly. On the contrary, it has a significant effect on morphological structure of the femur and leads to early stage of osteoporosis in rats.
Acknowledgement: This study was supported by the grant KEGA 3/7338/09. All procedures were approved by the Animal Experimental Committee of the Slovak Republic.

Disclosure of Interest: None Declared

P503 - ABSTRACT WITHDRAWN

P504 - THE INHIBITION OF REACTIVE OXYGEN SPECIES BY SIMVASTATIN IN OSTEOCLAST DIFFERENATIATION
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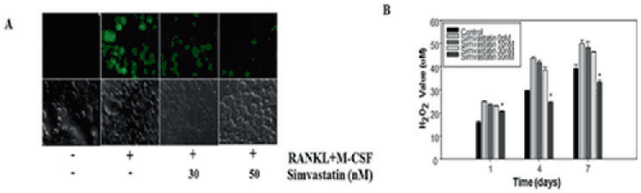
Aims: Simvastatin has been shown to be a potent antioxidant in vitro and in vivo. In addition, osteoclast formation are very sensitive to oxidative stress by increased generation of intracellular reactive oxygen species (ROS).Therefore, we hypothesis mechanism of simvastatin as inhibitor in osteoclastogenesis that simvastatin may inhibit osteoclast formation and osteoclast activity by decreasing the generation of intracellular ROS.
Methods: To test this hypothesis, we examined that the direct effect of osteoclast differentiation by simvastatin and also tested whether simvastatin could acts as osteoclastogenesis inhibitor by suppressing RANKL-mediated ROS production that mediates to regulate RANKL signaling pathways. Osteoclast formation was determined by TRAP staining and TRAP mRNA levels were measured by RT-PCR & real-time quantitative PCR. Intracellular reactive oxygen species (ROS) generation was measured using a fluorescent probe, product of 2',7'-dichlorofluorescein diacetate (DCFH). Also, intracellular RANKL signaling activities such as the mitogen-activated protein kinases (MAPKs), AKT and IkBa signals were measured by Western blotting.
Results: We found that simvastatin decreased expression of tartrate-resistant acid phosphatase (TRAP), genetic marker of osteoclast differentiation. Also, our results indicated simvastatin acts as antioxidant itself and inhibited intracellular ROS generation in RAW 264.7 cell. The ROS activated RANKL signaling pathways of IkBα, protein kinases B (AKT), the mitogen-activated protein kinases (MAPKs) signaling such as c-JUN N-terminal kinases (JNK), P38 MAP kinases (P38) and extracellular signal-regulated kinase (ERK). Then, simvastatin suppressed these H_2O_2-induced activating signaling in osteoclastogenesis.



Inhibition of ROS following RANKL stimulation in osteoclasts with simvastatin

Conclusions: Together, simvastatin acts RANKL-induced osteoclastogenesis inhibitor by attenuating H_2O_2-induced early signaling activity including AKT, JNK, p38, ERK and NF-κB signaling pathways in osteoclast differentiation, thereby proposing its potential usefulness for osteoporosis and diseases related bone resorption.
References: 1. WJ Boyle, WS Simonet, DL Lacey, Nature 2003;423:337; 2. VJ Thannickal, BL Fanburg, Am J Physiol Lung Cell Mol Physiol 2000;279:L1005.
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Disclosure of Interest: None Declared

P505 - INTRACELLULAR SUPEROXIDE DISMUTASE DEFICIENCY WAS NOT ENHANCED OVARIECTOMY-INDUCED BONE LOSS
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Aims: Oxidative stress increases with advancing age and has a malign influence upon human health. Postmenopausal osteoporosis is one of the worst factors to impair quality of life for elderly woman. Several reports suggest the link between postmenopausal osteoporosis and increased oxidative stress. Therefore, we aimed to examine the pathological role of oxidative stress on estrogen deficiency-induced bone loss in mice.
Methods: For oxidative stress model, we used the mice lacking in Cu/Zn-superoxide dismutase (*Sod1*), the metalloenzyme essential for dismutation of intracellular superoxide anion to H_2O_2 and O_2. At 5 weeks of age, female *Sod1*-deficient ($Sod1^{-/-}$) and wild-type mice ($Sod1^{+/+}$) had ovariectomy (OVX) or sham operation. After 4 weeks, we measured bone mineral density (BMD), bone mineral contents (BMC), and plasma estrogen level.
Results: The levels of BMD were significantly decreased in $Sod1^{-/-}$ mice compared to $Sod1^{+/+}$ mice in sham operation group, suggesting that oxidative stress leads bone loss in physiological state. OVX operation decreased the level of BMD and BMC in both $Sod1^{-/-}$ and $Sod1^{+/+}$ mice compared to those of sham operation group, although *Sod1* deficiency did not further enhance the bone loss by OVX. OVX-induced bone loss was approx 10% compared with sham operation group to a similar extent between $Sod1^{-/-}$ and $Sod1^{+/+}$. Similarly, plasma estrogen level showed no significant differences between them. Furthermore, we analyzed the bone remodeling state in those mice. In histomorphological analyses, *Sod1* deficiency suppressed both bone formation rate and osteo-

clast number, indicating that *Sod1* deficiency caused low turnover bone remodeling state and that is different from postmenopausal osteoporosis (high turnover).
Conclusions: In postmenopausal women, oxidative stress is considered to enhance osteoclastic activity and leads to bone loss. However, our data using *Sod1*-deficient mice failed to show the synergistic effect of oxidative stress and ovariectomy in bone loss. These results suggested that intracellular superoxide is less attributable to bone loss by estrogen deficiency in mice.

Disclosure of Interest: None Declared

P506 - NERIDRONIC ACID DIRECTLY REGULATES GENE EXPRESSION IN HUMAN OSTEOBLAST CELL LINE

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Aims: Bisphosphonates are stable analogues of pyrophosphate, in which the atom of oxygen is replaced by a single atom of carbon in the double link with phosphate. Although the inhibitory effects of BPs on activity, metabolism and life span of osteoclasts have been clearly elucidated (1), there is a lot of experimental evidence which is in concordance with the hypothesis that the alternative cellular target of BPs is represented by the osteoblasts, through which BPs could exert their metabolic effects on osteoclasts. Neridronate is a BP which contains an amino group in its chemical structure; it is structurally similar to alendronate and pamidronate, from which it differentiates in the number of methyl groups of the side chain (five for neridronate, three for alendronate and two for pamidronate. Several studies indicate that osteoblasts could be the alternative, or even the principal target cells for bisphosphonates. The aim of this study was to evaluate the in vitro effect of the aminobisphosphonate neridronate at different concentrations on proliferation, gene expression and osteoblast-specific protein synthesis in human osteoblast cell line.
Methods: METHODS: At confluence human osteoblasts were seeded in 24-well plates in α-MEM containing 10% FBS and antibiotics at 60,000 cells for every plate until semi-confluence was reached. At this point osteoblast cells were treated with neridronate (6-amin-1-idrossiexiliden-bisphosphonate, Abiogen Pharma, Pisa, Italy), at different concentrations (10–6 M and 10–4 M). The proliferation, cytokine production, gene expression by conditionally human osteoblast cell line were examined by Elisa, Western blot, immunocytochemistry, immunoelectron microscopy.
Results: Analysis of cellular markers of osteoblastic differentiation revealed that neridronic acid induced type I collagen secretion and alkaline phosphatase activity and inhibit osteoblast apoptosis. In addition, neridronate seems to enhance the differentiation of cultured osteoblasts in mature bone-forming cells acting on c-fos modulation.
Conclusions: The results of this study confirm the validity of neridronate, at the doses usually used, to treat diseases such as osteoporosis.
Acknowledgement: (1)Nicolin V, Bareggi R, Baldini G, Bortul R, Martinelli B, Narducci P. Effects of neridronic acid on osteoclasts derived by physiological dual-cell cultures. Acta Histochem. 2007;109:397-402.

Disclosure of Interest: None Declared

P507 - IL-6/C-SRC-MEDIATED REGULATION OF BONE MASS. IMPLICATIONS FOR THERAPY

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Aims: The pro-inflammatory cytokine IL-6 has a critical role in inflammation and osteoporosis. In transgenic mice overexpressing IL-6 (IL-6 TG) bone mass is low and bone formation is impaired. The non-receptor tyrosine kinase c-Src inhibits bone formation and we have identified an interplay between IL-6 and c-Src which reduces osteoblast differentiation through STAT3, a component of the IL-6 pathway, a transcription factor for IL-6 and a substrate for c-Src.
Methods: Wild type (WT), IL-6 TG mice and primary mouse calvarial osteoblasts were treated with c-Src inhibitors (CGP76030 or PP1). The impact of these treatments was investigated by histology/histomorphometry, RT-PCR, Western blot and ELISA.
Results: *In vivo* c-Src inhibition by CGP76030 reduced IL-6 mRNA in the tibias of IL-6 TG mice and of WT mice treated with LPS or turpentine. Treatment with CGP76030 mildly affected the bone structural parameters of WT mice, while in IL-6 TG mice it had a robust "anabolic" effect increasing bone volume and trabecular thickness/number, and decreasing trabecular separation of the distal femur secondary spongiosa. Treatment with CGP76030 also increased osteoblast and decreased osteoclast parameters. In mice intracardiacally injected with the human breast cancer cell line MDA-MB-231 c-Src inhibition reduced the incidence of bone metastases and decreased both tumour-derived (human) and bone-derived (mouse) IL-6 production. Prolonged treatment of osteoblasts with IL-6 induced c-Src activating-phosphorylation, suggesting an additional loop between the two pathways mediated by intermediate factors. Indeed, the IGF-binding proteins, IGFBP-3 and IGFBP-5, typically regulated by IL-6, were induced in osteoblasts treated with the c-Src inhibitor, PP1. The IGFBP-3 and -5 promoters have consensus sequences for Runx-2. c-Src inhibition upregulated Runx-2 and Runx-2 overexpression increased IGFBP-3 and -5 mRNAs in osteoblasts, suggesting a role for this transcription factor in c-Src-mediated induction of IGFBPs.
Conclusions: We have identified a link among c-Src, IL-6, IGFBP-3/-5 and Runx-2 which could regulate osteoblast function and affect bone mass. These observations are likely to have a high translational impact for the understanding of the pathogenesis of osteoporosis. They also have important therapeutic implications as both c-Src inhibitor and anti-IL-6 receptor antibody are already in clinical trials for other diseases, including cancer-induced and inflammatory disorders, respectively.

Disclosure of Interest: None Declared

P508 - THE EFFECT OF ENDOGENOUS PARATHYROID HORMONE ON ILIAC BONE STRUCTURE AND TURNOVER IN HEALTHY POSTMENOPAUSAL WOMEN

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Aims: It is known that the moderate increase in PTH resulting from mild primary hyperparathyroidism can preserve the skeleton enriched with cancellous bone, such as the lumber spine, in postmenopausal women. To our knowledge, little is known about the effect of the variation in endogenous PTH on the skeleton in postmenopausal women without hyperparathyroidism.
Methods: The effect of serum PTH on bone were investigated in 37 healthy white postmenopausal women aged 50-73 years. Iliac crest biopsies were used for the examination of bone structure and turnover.
Results: There was no woman associated with vitamin D deficiency (serum 25 (OH)D <10 ng/mL) and hyperparathyroidism (abnormal high serum calcium and PTH). Neither cancellous nor cortical bone structure was changed with PTH levels. In cancellous bone, the bone formation (wall thickness, osteoid surface, osteoblast surface, mineralizing surface and mineral formation rate) and turnover (bone formation rate at the surface and the volume levels and activation frequency) variables increased with increasing PTH levels (all $p<0.05$) in univariate analysis. Multiple linear regressions, adjusted for 25(OH)D, Ca, ALP, age and BMI, showed that PTH was independently associated with wall thickness, osteoid surface, osteoblast surface, mineralizing surface, and bone formation rate at the surface and the volume levels (all $p<0.05$). No histomorphometric variable in cortical bone was significantly correlated with PTH levels. On the endosteal surface, some of the bone formation (osteoid surface, osteoblast surface, mineralizing surface) and turnover (bone formation rate at the bone surface levels and activation frequency) variables were positively correlated with PTH levels (all $p<0.05$). None of these variables could be independently predicated by PTH variation.
Conclusions: We conclude that cancellous bone is the only place that can respond anabolically to the increased endogenous PTH in healthy postmenopausal women. The effects of PTH on the endosteal surface may probably be confounded by other factors.

Disclosure of Interest: None Declared

P509 - MOUSE LACKING IN INTRACELLULAR SUPEROXIDE DISMUTASE INCREASED REACTIVE OXYGEN SPICES IN OSTEOBLASTS AND SUPPRESSED OSTEOBLASTIC ABILITY LEADING TO OSTEOPOROTIC PHENOTYPES IN BONE

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Aims: Oxidative stress has been believed to have a malign influence upon human health including bone tissue, however, there were few reports revealing oxidative stress-induced bone loss *in vivo*. Therefore, we examined bones of mice lacking in Cu/Zn-superoxide dismutase (*Sod1*), the metalloenzyme essential for dismutation of intracellular superoxide anion to H_2O_2 and O_2, and also explored the role of SOD1 in bone cells.
Methods: Sixteen-weeks-old *Sod1*-deficient (*Sod1*$^{-/-}$) and wild-type mice (*Sod1*$^{+/+}$) were used for *in vivo* bone histomorphometry. Primary osteoblasts obtained from neonatal *Sod1*$^{-/-}$ and *Sod1*$^{+/+}$ littermates were used for *in vitro* study. For osteoclast development, bone marrow cells were cultured with supplementation of RANKL and M-CSF.
Results: Bone mineral density of whole body were significantly decreased in both male and female *Sod1*$^{-/-}$ mice compared to *Sod1*$^{+/+}$ mice. Bone strength was weakened in *Sod1*$^{-/-}$ mice in flexural rigidity test, indicating that *Sod1* deficiency exhibits "osteopenia". Histomorphological analyses of bone showed that mineralized surface, bone formation rate and osteoblast number were decreased in *Sod1*$^{-/-}$ mice, indicating that *Sod1* deficiency caused osteoblastic disability. In cellular level, *Sod1*$^{-/-}$ osteoblasts significantly increased reactive oxygen spices compared to *Sod1*$^{+/+}$ osteoblasts. In addition, TUNEL and BrdU assay showed increased cell apoptosis and decreased cell proliferation in *Sod1*$^{-/-}$ osteoblasts. These data suggest that intracellular superoxide might cause osteoporotic features in bone, and *Sod1* could be involved in the bone mass determination by regulating cell survival of osteoblasts. The other aspects of bone remodeling, bone resorption, were analyzed. The number of osteoclasts was decreased in *Sod1*$^{-/-}$ mice, however, *in vitro* osteoclast development, survival and pit-formation were not dysregulated in *Sod1* deficiency, indicating that *Sod1* deficiency does not impair osteoclast differentiation and function in cellular level. Therefore, we hypothesized that decreased number of osteoclasts *in vivo* was caused by the suppression of ability of osteoblast-dependent osteoclastogenesis. As expected, the expression level of *Rankl* mRNA was decreased in bones of *Sod1*$^{-/-}$ mice.
Conclusions: These results indicate that SOD1 is required for the maintenance of physiological bone metabolism by controlling osteoblastic cell ability, and suggest that oxidative stress, which increases in mammals with aging, could be one of the causes of age-related osteoporosis.

Disclosure of Interest: None Declared

P510 - EFFECT OF OMEGA-3 POLYUNSATURATED FATTY ACIDS SUPPLEMENTATION ON NEW-BONE FORMATION IN ECTOPIC MODEL

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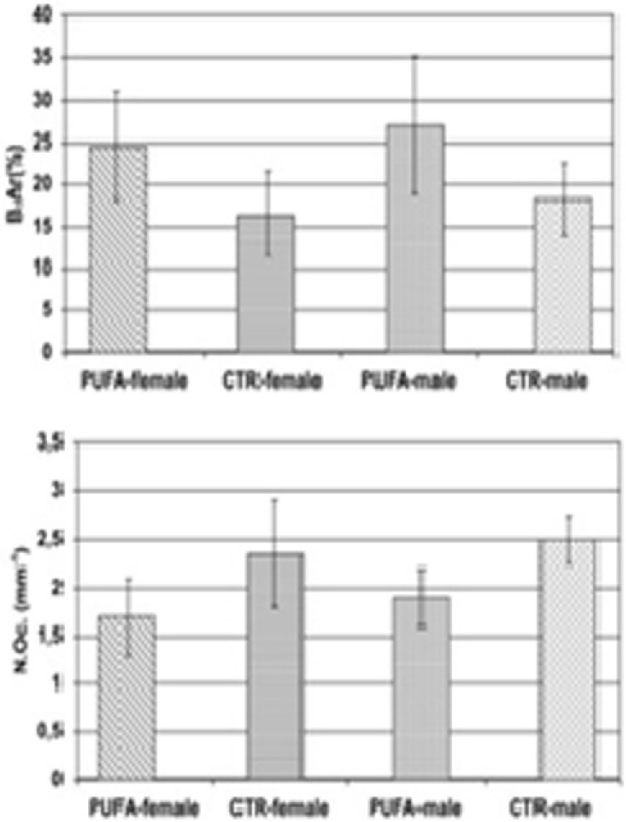
Aims: Positive effects of diet supplementation with omega-3 polyunsaturated fatty acids (w3PUFA) on cardio-vascular system are known. PUFA are substrates for synthesis numerous of bioactive molecules. PUFA significantly influence lipid metabolism and inflammatory process development. Osteoporosis, a systemic bone disease characterized by low bone mass and higher risk of bone fractures. Bone mass development is dependent to numerous

nutritional factors, including amount and pattern of fatty acids in diet. The aim of the study was estimation of ω3PUFA supplementation on bone formation during new-bone development in ectopic model.
Methods: A total of 40 albino Wistar rats (20 female and 20 male) divided into study group (10 PUFA-female and 10 PUFA-male) and control group (10 CTR-female and 10 CTR-male). All animals obtained standard laboratory how and rats from study group twice on week were treated with 300 mg commercial available ω3PUFA supplement. Ectopic bone formation was induced 10 days after start of treatment. In all animals devitalized and demineralised bone matrix grafts was implanted, intramuscularly into two thorax regions. Eight weeks later the ossicles were removed and prepared without decalcification in methylmetacrylate for histomorphometric analysis. In ossicles, the percent of new-bone area to total graft area (B.Ar.) and osteoclasts number to total graft area (N.Oc.) were measured.
Results: Results are shown in figures.



Conclusions: Supplementation with omega 3 polyunsaturated fatty acids increased new-bone formation and decreased osteoclasts number during ectopic bone development.

Disclosure of Interest: None Declared

P511 - SEROPHARMACOLOGICAL STUDY ON THE EFFECT OF CHINESE HERBAL MEDICINE ON OSTEOGENESIS

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Aims: To study the effects of metabolites of orally consumed Chinese herbal medicine in the serum on osteogenesis.
Methods: Two groups of rats were force-fed with either an aqueous crude extract of a Chinese herbal formula (consisting *Herba Epimedii* (E), *Fructus Ligustri Lucidi* (L) and *Fructus Psoraleae* (P)) or distilled water as control using gastric tube once per day for 10 days. Serum was collected at Day 10 for cell culture. Osteoblast cell line UMR106 and mesenchymal stem cell (MSC) of rats were cultured with 10% rat serum from ELP fed rats (ELP) or from water fed rats (Control). UMR106 was cultured for 3 and 5 days while MSC was cultured for 5 and 10 days. Alkaline phosphatase (ALP) activity and calcium level were analyzed.
Results: For UMR106, ALP activity was higher in the ELP group than the Control group at Day 3 only. No significant difference was observed on the calcium levels between the two groups. For MSC, ALP activities of the two groups were similar at both Day 5 and Day 10. However, the calcium levels of ELP group were higher than those of Control group at both time points.
Conclusions: The metabolites of ELP in serum could enhance osteogenesis by increasing osteoblastic activity and calcium deposition ability of MSC.
Acknowledgement: Ming Lai Foundation and The International Association of Lions Clubs District 303 – Hong Kong and Macau Tam Wah Ching Chinese Medicine Resource Centre

Disclosure of Interest: None Declared

P512 - MICROTOMOGRAPHY OF WHOLE TRABECULAR BODIES

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Aims: One of the most striking properties of trabecular bone is its heterogeneity: the architectural properties of trabecular bone dramatically change, depending on the distance from the cortical rim. Till now the heterogeneity of vertebral trabecular bone has not been well studied on the scale of whole bones.
Methods: At the mesoscopic level trabecular bone structure is characterized by a number of parameters, among them bone volume fraction, trabecular thickness, number and separation, structural anisotropy, non-metric indices (SMI, Euler number) to list the most important ones. Two dimensional histomorphometry is nowadays replaced by microCT in laboratory experiments, but, limited by the amount of data, the analyses are typically restricted to small trabecular samples (the volume of the order of $1cm^3$).
Results: In the present study a microCT images of whole vertebral bodies are acquired with pixel size of the order of 30 microns.

Trabecular interior is separated from the cortical shell. Trabecular structure is decomposed into individual trabeculae and then the histomorphometric parameters are measured locally. It is determined how the values of these parameters change with the distance from the cortical shell.

Conclusions: With the recent advances of microtomography and computer techniques it is now possible to acquire and analyze images of whole vertebral bodies. Because heterogeneity of a structure may lead to the localization of the structure failure [1-4], the quantification of this feature is necessary for better understanding of fracture etiology.

References: [1] Nazarian A, Muller R, J Biomech 2004;37:55; [2] Nazarian A, Stauber M, Muller R, J Biomed Mater Res B 2005;73:400; [3] Perilli E et al, Bone 2005;36(S2):191; [4] Tabor Z, Med Eng Phys 2007;29:298.

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Disclosure of Interest: None Declared

P513 - ISOLATION OF L-SER ANALOGS AS NOVEL INHIBITORS OF OSTEOCLASTOGENESIS AND BONE TURNOVER WITH A DISTINCT FUNCTIONAL MECHANISM

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Aims: Osteoclasts are multinucleated giant cells with bone-resorbing activity. We previously reported that the expression of the transcription factor NFAT2 (NFATc1) induced by receptor activator of NF-κB ligand (RANKL) is essential for the formation of mature osteoclasts[1)]. We subsequently identified L-Ser in the differentiation medium as necessary for the expression of NFAT2[2)]. Based on these findings, we searched for serine analogs that antagonize the function of L-Ser and suppress the formation of osteoclasts in mouse bone marrow cells.

Methods: 1) We screened a group of amino acids and their derivatives.

2) We selected compounds that were active as an inhibitor of osteoclastogenesis without showing any toxicity.

Results: One of these analogs thus identified, H-Ser(tBu)-OMe HCl, appeared to suppress the production of 3-keto-dihydrosphingosine by serine palmitoyltransferase, and the expression and localization of RANK, a cognate receptor of RANKL, in membrane lipid rafts was downregulated in the analog-treated cells. The addition of lactosylceramide, however, rescued the osteoclastic formation[3)]. The analog functions in human cells as well as in the mouse system at the equivalent efficiency. When administered *in vivo* and assessed by histomorphometric analysis, the analog appeared to significantly increase bone density in mice and prevent high bone turnover induced by treatment with soluble RANKL. The effects were apparent in a shorter period than those by bisphosphonates such as alendronate. Furthermore, neither acute toxicity nor the effect on survival rate was observed in those mice, and biochemical markers showed normal values.

Conclusions: These results demonstrate a close connection between the metabolism of L-Ser and bone remodeling and also potential of the analog as a novel therapeutic tool for bone destruction through the modulation of the RANKL/RANK signaling cascade.

References: 1) Ishida N et al, J Biol Chem 2002;277:41147; 2) Ogawa T et al, J Bone Miner Metab 2006;24:373; 3) Bahtiar A et al, J Biol Chem 2009;284:34157

Disclosure of Interest: None Declared

P514 - DISTURBANCE OF BLOOD CIRCULATION IN BONES INTENSIFIES OSTEOPOROSIS IN AGED PERSONS

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Aims: It is demonstrated on the basis of our observations and using the physicochemical model of the formation of inorganic bone tissue in blood plasma that vascular atherosclerosis enhances the manifestation of osteoporosis.

Methods: Comparative investigation of the microstructure of bone tissue of patients operated on account of spine fracture was carried out by mans of scanning electron microscopy (SEM) along with X-ray spectral analysis with energy spectrometer (EDS). The major attention was paid to the state of blood vessels in bone tissue. The samples of bone tissue were taken from the patients suffering from osteoporosis of spinal column, 3rd and 4th degree, and from healthy people. All the persons under investigation belonged to the age group 50 to 65 years.

Results: Tremendous overgrowth of organic tissue filling up the former paths for blood vessels was revealed by SEM and EDS. The organic material coats the inner surface of blood vessels and the mineral part of bone. In this situation, the mineral component present in the organic material does not differ in its chemical composition from that of the bone (Ca/P). Both partial and complete occlusion of blood vessels was observed in all the samples. Comparative characterization of the microstructure of the bone tissue of a healthy person and a patient suffering from osteoporosis showed that the distortions of this kind are not observed in a healthy bone.

Conclusions: Hydroxyapatite nanocrystals that were detected by us previously in the blood of healthy donors allowed us to make a conclusion concerning their physiological nature (1). The results of subsequent experiments on modeling the ion composition of blood confirmed our conclusions that the blood plasma due to its physicochemical properties may be the source of hydroxyapatite. We suppose that HAP formed in blood plasma participates in the formation of bone tissue (2). Because of this, it may be assumed that atherosclerotic phenomena leading to occlusion of blood vessels prevent hydroxyapatite nanocrystals from being delivered to osteoblasts. This causes disbalance of the inorganic bone mass.

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Meet. Bone Res. Soc. and British Soc. for Matrix Biology. 2009. London, UK. Abstract, p.137.

Disclosure of Interest: None Declared

P515 - STRONTIUM-INDUCING ADIPOSE TISSUE MESENCHYMAL STEM CELLS: EFFECTS ON DIFFERENTIATION INTO OSTEOBLASTIC PHENOTYPE

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Aims: Strontium (Sr^{2+}) is an alkaline earth trace metal cation that has a high affinity for hydroxyapatite. Strontium ranelate, an anti-osteoporotic agent with demonstrated antifracture efficacy, is composed of two atoms of Sr that are combined with ranelic acid. The latter is a carrier, while Sr^{2+} is the active cation with respect to the drug's skeletal effects. Previous work in this laboratory has demonstrated that adipose tissue mesenchymal stem cells (AMSCs) have the same ability to produce bone matrix as bone marrow derived stem cells, while being a better source of stem cells according to their abundance and accessibility. The aim of the present study was to evaluate a possible effect of Sr^{2+}on cell proliferation and on late-stage osteogenic differentiation of AMSCs.
Methods: Long-term culture of AMSCs were performed. Cell growth and viability were assessed by [^{3}H]-thymidine incorporation assay and by growth curve analysis in the presence of Sr^{2+} from 1 to 150 μg/ml. Expression of osteoblastic markers (*ALP*, *COLIA1*, *OCN*, *OPN*, *RUNX2)* and of important osteoclastogenesis regulators (*OPG* and *RANKL*) was examined in all cell lines treated with different concentrations (1-10-100 μg/ml) of Sr^{2+}using quantitative RT-PCR, after 15 and 30 days from osteogenic induction. The data were normalized for *GADPH* housekeeping genes.
Results: No statistically significant difference was observed in cell proliferation for all primary cell lines cultured in presence of the different concentrations of Sr^{2+}. Conversely, gene expression analysis showed that highest Sr^{2+} concentration strongly increased mRNA levels of *ALP*, *OCN* and *RUNX2* after 15 and 30 days from osteogenic induction. In addition, the presence of Sr^{2+} seems to increase the gene expression of the osteoclastogenesis inhibitor OPG and not to influence the mRNA levels of osteoclast formation mediator *RANKL*.
Conclusions: In conclusion our preliminary results showed that Sr^{2+}can promote osteoblast differentiation of AMSCs and also increase the *OPG/RANKL* ratio throughout the culture period, consistent with an effect to inhibit osteoblast-induced osteoclastogenesis. These findings open the possibility of the use of the Strontium ranelate for the *in vivo* treatment of cell transplantation in bone regenerations programs.

Disclosure of Interest: None Declared

P516 - ENHANCED NEW BONE FORMATION INDUCED BY MECHANICAL MARROW ABLATION IN SCLEROSTIN KNOCKOUT MICE

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Aims: Sclerostin is secreted by osteocytes and negatively regulates osteoblast-mediated bone formation. Sclerostin knockout (KO) mice have increased bone formation and bone strength. Mechanical ablation of bone marrow leads to the transient formation of new intra-membranous bone, which is subsequently resorbed by osteoclasts. The aim of this study was to determine whether sclerostin plays a role in the formation and maintenance of new bone induced by mechanical bone marrow ablation.
Methods: Two-month old KO and wild-type (WT) female mice were subjected to mechanical bone marrow ablation of the left femur. The mice were sacrificed on days 0 (non-ablated), 3, 7, 14, 21 and 42 post-ablation (n=10/group). Volumetric total density (vTot.D), volumetric trabecular density (vTb.D) and cortical bone area (Ct.Ar) were determined by pQCT analysis of both femoral shafts. Percentage change from left over right femur was used to determine the effect of marrow ablation in KO and WT mice.
Results: At baseline, vTot.D, vTb.D and Ct.Ar were significantly higher in KO compared with WT mice in both left and right femurs, confirming the bone phenotype of the KO mice. A transient increase in vTot.D, vTb.D and Ct.Ar of the ablated left femoral shafts compared to the non-ablated right femoral shafts was observed in WT mice as expected. However, marrow ablation induced a more profound increase in vTot.D, vTb.D and Ct.Ar in KO mice. For example, the peak increase in vTot.D, vTb.D and Ct.Ar was 6%, 40% and 4%, respectively, in WT, and 13%, 61%, and 17%, respectively, in KO mice. Further, the new bone was maintained longer in KO compared with WT mice. By day 42, all three parameters were still significantly higher in ablated femurs compared with non-ablated controls in KO but not in WT mice.

Table I Percent changes of left (ablated) over right (non-ablated) femur

	Days	0	3	7	14	21	42
vTot.D	WT	-1%	0%	6% a	5% a	6%	2%
	KO	-1%	-2%	7% b	13% c	10% b	5% b
vTb.D	WT	-5%	5%	40% b	24% a	33%	5%
	KO	-1%	-11%	38% c	61% c	57% c	17% a
Ct.Ar	WT	-1%	2%	4%	8% b	10% a	11% a
	KO	1%	1%	9% a	17% c	14% b	18% c

a: $p<0.05$; b: $p<0.01$; c: $p<0.001$

Conclusions: New bone formation was not only enhanced but also maintained longer in mice that lack sclerostin compared with wild-type mice. These data suggest that sclerostin plays an important role in the formation of new bone induced by mechanical marrow ablation.

Disclosure of Interest: Q. Zhang: None Declared, M. Liu: None Declared, J. Scholz-Carlson: None Declared, H. Z. Ke: None Declared, A. Vignery Grant / Research Support from: Amgen, Inc.

P517 - LOW-CONCENTRATION CAFFEINE DOES NOT AFFECT OSTEOBLASTOGENESIS, BUT ENHANCES OSTEOCLASTOGENESIS FROM BONE MARROW STEM CELLS

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Aims: It has been reported that caffeine-containing beverage consumption is associated with low bone mass and increased fracture risk in some studies, whereas some other studies did not have the same results (1, 2). Therefore, the effects of caffeine on bone metabolism seem to be still controversial. Some studies have indicated that the viability and formations of osteoblasts and mineralization were significantly decreased at concentrations of caffeine higher than 0.5 mM, even to 10 mM. Here, we investigate the *in vitro* effects of low-concentration (0.005-0.1 mM) caffeine on the osteoblastogenesis and osteoclastogenesis from bone marrow-derived stem cells.
Methods: 1. Bone marrow cells were prepared by removing femurs from 5-week-old ICR mice. Pre-osteoblast MC3T3-E1 cells were also used. 2. Osteoblastogenesis: cells were cultured with 10^{-8} M DXAmethasone, 5 mg/ml ascorbic acid and 10 mM β-glycerophosphate. The alkaline phosphatase activity and calcium deposition (mineralization) were detected at day 12 and day 22, respectively. 3. Osteoclastogenesis: cells were cultured in the presence of mouse recombinant soluble receptor activator of NF-kappaB ligand (RANKL) and murine macrophage colony-stimulating factor (M-CSF). Cells were subjected to a tartrate-resistant acid phosphatase assay at day 7. 4. Immunoblotting: the protein expressions of RANKL and osteoprotegerin (OPG) were determined by Western blot analysis.
Results: Caffeine (0.005-0.1 mM) did not affect the viability of bone marrow cells. Caffeine did not affect the alkaline phosphatase activity and mineralization during osteoblast differentiation. However, caffeine significantly enhanced the osteoclast differentiation. The alkaline phosphatase activity and osteoblastic mineralization in MC3T3-E1 cells under differentiation medium were not be affected by caffeine (0.005-0.1 mM). Nevertheless, caffeine could effectively enhance the RANKL protein expression and inhibit the OPG protein expression in MC3T3-E1 cells.
Conclusions: These findings suggest that low-concentration caffeine does not influence the osteoblastogenesis, but is capable of enhancing the RANKL-mediated osteoclastogenesis.
References: 1. Hannan et al, J Bone Miner Res 2000;15:710; 2. Heaney RP, Food Chem Toxicol 2002;40:1263.
Acknowledgement: This work was supported by a research grant from the National Science Council of Taiwan (NSC96-2313-B-033-001), and Department of Health, Executive Yuan of Taiwan (DOH93-TD-1002).

Disclosure of Interest: None Declared

P518 - DIETARY PROTEIN AND BONE METABOLISM IN RATS

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Aims: The aim of this study was to investigate the effect of high-protein diet and glutamine-enriched diet on the bone metabolism in rats.
Methods: 18 male Wistar rats were divided into 3 groups with 6 animals in each: 1. group (CO): fed by standard laboratory diet (SLD), 2. group (HPD): fed by high-protein diet (SLD with casein), 3. group (GLN): fed by glutamine-enriched diet (SLD with glutamine). The experiment lasted for 3 months. In serum were evaluated concentration of markers of the bone formation: osteocalcin (OC), amino-terminal propeptide of procollagen I (PINP) and marker of bone resorption: carboxy-terminal telopeptide of collagen I (ICTP) using an enzyme immunoassay method (ELISA). Bone mineral density (BMD) was measured with dual energy X-ray absorptiometry in three parts of rat's body: femur, lumbar and tail vertebrae. The significance between the groups of animals was analysed by the One-Way ANOVA test with $p<0.05$. The data were presented as mean and standard deviation (SD).
Results: Glutamine-enriched diet significantly ($p<0,05$) decreased the concentration of ICTP by 33± vs. CO. The levels of OC, PINP and BMD in tail vertebrae were decreased and BMD in femur part were increased in GLN vs. KO, but there was no statistical significance. The levels of ICTP, PINP and BMD in tail in HPD was decreased vs. CO, but not significantly.
Conclusions: Even though there was only one significant difference, our results indicated that glutamine-enriched diet and high-protein diet may tend to decrease in the bone turnover. This decrease in the bone turnover was probably follow by the decrease in the BMD only in tail vertebra with prevalence of more metabolic active trabecular bone.
Acknowledgement: The study was supported by the Research project MZO00179906 and MSM 0021620820.

Disclosure of Interest: None Declared

P519 - BONE MINERAL DENSITY IN PATIENTS WITH ULCERATIVE COLITIS

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Aims: This study was carried out to determine lumbar and femoral bone mineral density in patients with ulcerative colitis.
Methods: Twenty three ulcerative colitis patients and 22 control subjects without a history of inflammatory disease participated in our study. In the patients with ulcerative colitis and control

subjects, serum Ca, P, ALP levels and urinary desoxypiridinoline (Dpd) levels were measured. Bone mineral density (BMD) was determined at the lumbar spine (L1-4) and the femoral regions (neck and total) using dual energy X-ray absorptiometry.
Results: The demographic variables such as age, sex and body mass index (BMI) were similar between patients and controls ($p>0.05$). We found statistically significant difference in lumbar spine and femoral BMD between male patients and male control groups ($p< 0.05$). There was no statistically significant difference in BMD values between female patients and controls.
Conclusions: Our study indicates that lumbar spine and femoral neck BMD in male patients with ulcerative colitis may be lower than in healthy male subjects.

Disclosure of Interest: None Declared

P520 - ULTRASONIC ASSESSMENT OF THE FOREARM

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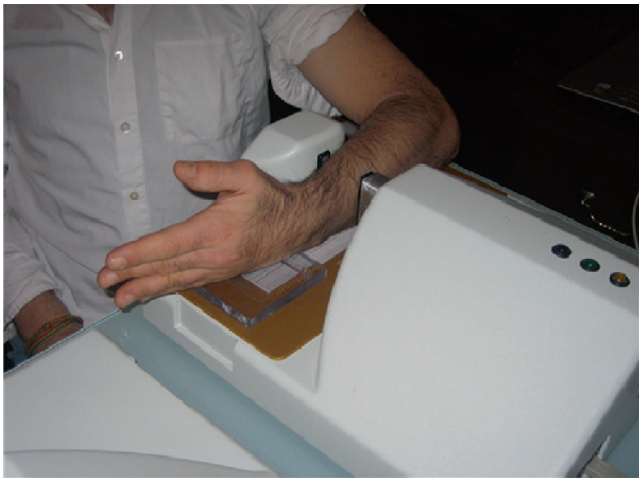
Aims: The long-term objective of this research is to establish ultrasound as a safe, effective, and non-invasive method for assessing osteoporotic fracture risk. The purpose of this study was to design and fabricate a novel device that can assess the forearm at the 1/3*rd* location.
Methods: Computer simulations and *in vitro* experiments were used to determine the specifications of a novel ultrasound device designed to assess the forearm at the 1/3*rd* location. Nineteen radii were used in a thru-transmission configuration in a water tank and analogously in computer simulations (*Wave2000*, CyberLogic, Inc.). Time delays associated with three distinct ultrasound propagation pathways were evaluated, and two net time delay (NTD) parameters were defined.
Results: Both *in vitro* and computer simulated data demonstrated a high correlation ($R>0.9$) between the NTDs and the cortical thickness and cortical cross-sectional area. Based on this data, a new ultrasound device was fabricated (*UltraScan 650*, CyberLogic, shown below). The device emits a 3.5 MHz broadband ultrasound signal from a single element rectangular source that propagates through the radius and soft tissue to a 64-element linear array rectangular receiver. The array signals are used to compute the two NTD parameters. Short term precision was also computed and found to be better than three (3) percent.



Conclusions: The data presented demonstrate that the *UltraScan 650* has the potential to become a simple, safe and effective screening tool for bone loss and fracture risk assessment. A study is currently underway that is examining the direct correlation of BMD as determined by DXA at the forearm with the NTD parameters as determined ultrasonically by the *UltraScan 650*.
Acknowledgement: The support of the National Institute of Arthritis and Musculoskeletal Diseases of the NIH, through the Small Business Innovative Research program, is gratefully acknowledged.

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P521 - IN-VIVO PRECISION OF THE LUNAR IDXA™ FOR THE MEASUREMENT OF TOTAL BODY, LUMBAR SPINE AND FEMORAL BONE MINERAL DENSITY IN ADULTS

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Aims: Knowledge of precision is integral to the monitoring of bone mineral density (BMD) changes using dual energy X-ray absorptiometry (DXA). The aim of this study was to evaluate the level of precision for bone measurements acquired using a Lunar iDXA™ in a heterogeneous sample of men and women, mean age 34.8 (8.4; 20.1-50.5) years**.** Subjects ranged in body mass index (mean 25.8 kg/m^2; range 16.7-42.7 kg/m^2).
Methods: Two consecutive iDXA scans (with re-positioning) of the total body, lumbar spine, and femur were conducted within one hour, for each subject. Precision error was calculated as the coefficient of variation (CV), the root-mean-square (RMS) averages of standard deviations of repeated measurements and the corresponding 95% least significant change (LSC). Regression parameters were also calculated.
Results: We found a high level of precision for BMD measurements, particularly for scans of the total body, lumbar spine and

total hip (RMS 0.007g/cm^2, 0.004-6g/cm^2 and 0.007g/cm^2; CV 0.63%, 0.41% and 0.53% respectively). Precision error for the femoral neck was higher but still represented good reproducibility (RMS 0.014g/cm2; CV 1.36%). Regression parameters showed a good level of agreement between consecutive measurements for all sites (r^2=0.98-0.99).
Conclusions: In a heterogeneous sample of 52 men and women, the Lunar iDXA had a high level of precision for BMD measurements of the total body, lumbar spine, femoral neck and total hip.

Disclosure of Interest: None Declared

P522 - STRESS FRACTURES OF THE FOOT IN THE GENERAL POPULATION

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Aims: Our study aimed to evaluate, in a general population, the incidence and risk factors of stress fractures, common overuse injuries affecting lower limbs in military personnel and athletes.
Methods: Our RHUMA 75 group of 13 rheumatologists had to fulfil a questionnaire on sociodemographic, clinical, radiological and biological parameters, for every ambulatory patient consulting in private office with a "fatigue" fracture of the lower limb.
Results: In 6 months, 45 stress fractures were registered, affecting metatarsal bones (n= 35), calcaneus (n=4), cuboid, scaphoid, cuneiform, sesamoid bone, external malleola and tibia (1, each). Patients were predominantly women (32 vs. 13 men), 56 (± 17) years old (range=16 – 83), with a mean BMI of 23 (± 6) kg/m^2. Mean delay between first pain and diagnosis was 33 (± 32) days. History and examination were critical for the diagnostic evaluation with X-rays in 30 patients (68.2%). MRI in 17 patients (38.6%) and bone scan in 5 (11.4%) were necessary when diagnosis was doubtful. If these stress fractures are not considered as osteoporotic, 14 patients had already been fractured (7 vertebral and 7 nonvertebral fractures), 10 (22.2%) were treated by an anti-osteoporotic drug and 14 (32.6%) by vitamin D and/or calcium. Factors that could have contributed to the stress fracture in our population were menopause (21 on 32 women), sedentary lifestyle (16 patients), > 6 months amenorrheic periods in 5 and eating disorders in 3 patients. A low BMI (< 19 kg/m2) was observed in 2 patients and static foot troubles in 23 patients (hollow foot in 16). DXA was asked in 25 patients (55.6%), showing osteoporosis in 25% and osteopenia in half of the cases. BMD was normal in the last 25%. Phosphocalcic tests showed hypocalcemia in 4, hypercalcemia in 1, hypercalciuria in 2 and vitamin D deficiency (< 30 ng/ml) in 25 of the 33 patients analyzed. A sick leave (mean=1 month) was necessary in one third of working patients, algodystrophia affected 6 patients (14%) and chronic pain, 10 (23.8%). 11.5% of patients had to stop their common activity.
Conclusions: In the general population, stress fractures seem to be associated with menopause, sedentary lifestyle, low bone mass, vitamin D deficiency and static foot troubles.

Disclosure of Interest: None Declared

P523 - THE CORRELATION OF BIOCHEMICAL MARKERS AND OSTEOPOROSIS RISK IN AN IRANIAN POPULATION

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Aims: The present study was designed to evaluate the relationship between BMD values assessed at different sites and biochemical markers in an Iranian population.
Methods: Using a random cluster sample of apparently healthy men and women, this multi-centric cross-sectional study was carried out among Iranian population of urban areas of five great cities. Bone mineral density (BMD) values at different sites along with the serum levels of 25(OH)D, PTH, Alk-Ph, Ca and P levels were analyzed. Analysis of variance (ANOVA) was used to estimate the main effects, through comparing the mean values of these markers based on bone mineral density status of the studied group in either sex. The predictive value of these markers in detecting osteoporosis was assessed by ROC curve analysis.
Results: Serum levels of the studied biochemical markers were relatively higher among osteoporotic cases. Except for 25(OH)D and Alk-ph, the difference was not statistically significant. While age and 25(OH)D levels were inversely correlated with BMD values at all the studies sites, a positive correlation was found between P and the BMD values. The correlation was only statistically significant for age and 25(OH)D. The areas under the ROC curves [95% confidence intervals (CI)] for predicting osteoporosis in the two genders are outlined in Table 1. Neither of the markers were accurate enough to predict osteoporosis either in the two genders, in menopausal and premenopausal women, and in men aged younger and older than 50.

Table 1- The areas under the ROC curves [95% confidence intervals (CI)] for predicting osteoporosis in the two genders

		Ca	P	25(OH)D	Alk-ph	PTH
Gender	**Male**	0.496 (0.394-0.599)	0.454 (0.369-0.540)	0.481 (0.376-0.587)	0.445 (0.341-0.550)	0.451 (0.356-0.546)
	Female	0.480 (0.428-0.532)	0.477 (0.414-0.541)	0.426 (0.367-0.485)	0.370 (0.307-0.432)	0.484 (0.427-0.540)

Conclusions: Neither of the studied biomarkers are accurate enough to detect cases suffering from osteoporosis in either gender.

Disclosure of Interest: None Declared

P524 - ASSESSMENT OF THE CORRELATION BETWEEN BODY MASS INDEX AND BONE QUALITY IN BRAZILIAN MALE AND FEMALE POPULATION

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Aims: The aim of this study was to investigate the correlation between body mass index with the mandibular bone quality (MBQ) in Brazilian male and female population, considering this signal as an index for the osteoporosis risk.
Methods: It was analyzed 507 panoramic radiographs of patients from both genders (over 18), and the calculation of body mass index was performed according to Achaet Alfaro *et al.* (2006) method. The panoramic images were evaluated considering the Klemetti (1997) classification, contrast degree of the oblique line (LO) in the mandible on both sides of the body / ramus and number of teeth in attendance, and the patients were separated by gender and divided by age range: 25 to 35 years for premenopausal women, 35 to 65 years to menopause and over 65 years for postmenopausal women. Individuals with body mass index<22.0 kg/m^2, and had less than 20 functional teeth, Class II and III Klemetti and LO sharp contrast, were considered high-risk patients with osteoporosis. After these analyses, it was assigned to each patient the degree of good or poor bone quality as good for MBQ 1 and MBQ 2 for poor.
Results: The data were subjected to statistical analysis by using Pearson correlation ($p<0.01$). It was obtained for the correlation MBQ X Body Mass Index in male (r=0.3886), while that for female (r=0.4108), and for different age groups: 25 to 35 years (r=0.5648), 35 to 65 years (r=0.5727) and over 65 years (r=0.5616).
Conclusions: It was observed in this study that not all patients at risk for osteoporosis have a low body mass index, but there are a significant portion of patients with low body mass index who are at risk for osteoporosis.
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Disclosure of Interest: J. P. Issa Grant / Research Support from: FAPESP, F. Nirchl: None Declared, M. B. Alonso: None Declared, S. Monteiro: None Declared, P. Watanabe: None Declared

P525 - INTRA- AND INTER-READER RELIABILITY OF SEMI-AUTOMATED VERTEBRAL MORPHOMETRY MEASUREMENTS USING LATERAL SCOUTVIEWS FROM COMPUTED TOMOGRAPHY

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Aims: The presence of vertebral fracture is among the strongest risks for future fracture. Despite this, underdiagnosis and undertreatment of vertebral fractures is a well-known problem worldwide. New methods are needed to improve the accuracy and efficiency of identifying vertebral fractures. Thus, the aim of this study was to determine intra- and inter-reader reliability of vertebral morphometry measurements performed using a new semi-automated algorithm that is based on shape-based statistical modeling (SpineAnalyzer, Optasia Medical, Cheadle, UK).
Methods: 25 subjects (13 men and 12 women, aged 50-87 years, mean 68.1±10.3 yrs) were selected from the Framingham Heart Study Offspring and Third Generation Multi-Detector Computed Tomography (MDCT) Study. Two non-radiologist readers independently assessed vertebral morphometry from the CT lateral scoutviews for T4 - L4 at 2 time points. Deformities were classified as mild (≥ 20%), moderate (≥ 25%) or severe (≥ 40%) based on Genant's criteria. Intraclass correlation coefficients and kappa (*k*) statistics were used for intra- and inter-reader reliability or agreements.
Results: Of 325 individual vertebrae from T4 - L4, 321 were analyzed. The average time needed to read one subject (i.e., 13 vertebrae) was 5 min 22 sec (range: 3:13 to 9:06 min:sec). Intra- and inter-reader ICCs for anterior, mid and posterior vertebral heights for all vertebral levels combined were excellent, ranging from 0.98 to 0.99. ICC at distinct spinal regions (T4-9, T10-12, and L1-4) ranged 0.92 to 0.99. Based on morphometry measurements alone, Reader A and B identified 10 and 15 subjects, respectively, with at least one prevalent fracture. We found good intra-reader (*k,* 0.71-0.72) and inter-reader agreement (*k*, 0.61-0.68) for fractures defined by a deformity of ≥ 20%.
Conclusions: This new semi-automated method for assessing vertebral morphometry has good intra- and inter-reader reliability for vertebral height measurements on lateral CT scoutviews, and requires less time compared to conventional 6-point morphometry. Reliability for fracture assessment was comparable to previous. Altogether, this semi-automated technique using CT lateral scoutviews is a convenient and reproducible technique to facilitate assessment of vertebral fractures.

Disclosure of Interest: None Declared

P526 - A TEN YEAR STUDY OF CLINICAL FRACTURES AND CHANGES IN DENSITY, RIK FACTORS AND FRAX® IN NORMAL AND OSTEOPENIC POSTMENOPAUSAL WOMEN

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Aims: It is well known that not only osteoporotic patients suffer fragility fractures but also normal and osteopenic. During a ten year follow-up period the density, risk of fractures, and FRAX® could change significantly. Our aim was to evaluate incident fractures, change in density, fracture risk, and FRAX® in normal and osteopenic postmenopausal women during a ten year observation period
Methods: At the outpatient clinic of National Institute of Rheumatology and Physiotherapy 151 normal and osteopenic postmenopausal women without medical therapy were followed for ten years. Mean age:65.6+7.4 years, period of time:9.3+2.1 years. The patients were measured by DXA at lumbar spine and femoral neck. In order to evaluate change in density the measurement

was repeated after ten years with the same equipment. In order to evaluate incident fractures, change in risk factors and FRAX® the patients filled out a life style questionnaire at the time of second DXA (retrospective)
Results: The number of incident fractures were 7. (normal T-score:0, osteopenic T-score:7) Region of fractures: (2 Colles' fracture, 1 vertebra, 4 rib, 3 others) mean age of fracture: 69.2+ 9.2. Lumbar and femoral density were significantly lower in the whole population during the ten years observation period. (p=0.001, p=0.03) Risk factors and FRAX® didn't change significantly in the whole population.
Conclusions: Incident fractures were found only in the osteopenic group. In the whole population the density was lower and FRAX® was higher. In the whole population the lower density and higher FRAX® were frequent but number of fracture and change in risks were rare. Osteopenic didn't differ from normal regarding the number of lower density and higher FRAX®.

Disclosure of Interest: None Declared

P527 - HIGH INDIVIDUAL VARIABILITY OF PERIPROSTHETIC BMD IN OSTEOPOROTIC PATIENTS

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Aims: To evaluate the dynamics of periprosthetic BMD in osteoporotic patients.
Methods: Total hip arthroplasty (THA) with tapered rectangular stem was made in 20 osteoporotic and 20 coxarthrosis women (54-79 years). The groups were not differed significantly by mean age and initial periprosthetic BMD. Bone density around prosthesis stem was measured in Gruen zones by DXA (Lunar Prodigy) in 3, 6, 9 and 12 months after surgery.
Results: All stems were stable in 12 months. Decrease in BMD was greatest in 6 months in all Gruen zones, and varied from -5,1% to -37,5% in individual patients, with tendency to be more pronounced in osteoporosis**.** Subsequent periprosthetic BMD recovery in coxarthrosis group in 12 months was more prominent. BMD restored to approximately baseline levels in all zones except of 7. The mean BMD levels in osteoporotic group remained decreased in 12 months (from -11,2% in 7 zone to -4,1% in 5 zone; -6,8% in total, p<0,05).

In some osteoporotic patients BMD decrease was intense (up to -37,5%) and delayed because of apparent "stress-shielding". Severe bone loss in 2 and 6 Gruen zones corresponded to more distal stem fixation. Even mild (3-4 degree) valgus or varus deviation of prosthesis stem led to predominant bone loss in 3 or 5 zones.
Conclusions: THA in osteoporotic patients was accompanied by delayed and incomplete BMD recovery around prosthesis stem. Enhanced "stress-shielding" may increase risk of periprosthetic fractures and could lead to difficulties during revision operations.

Disclosure of Interest: None Declared

P528 - SURGEON GENERAL'S BONE HEALTH PROJECT: BROADBAND ULTRASOUND ATTENUATION (BUA) OF THE CALCANEUM IN ROYAL MARINE RECRUITS

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Aims: This study is part of a 5-year programme to investigate the interaction of diet, physical training, bone health and stress fracture incidence during military training. This was a pilot study to determine profile ranges for calcaneum BUA in a population of new-entry Royal Marine (RM) recruits.
Methods: In this cross-sectional cohort study, BUA across the calcaneus of both feet was measured at the start of training in 202 new-entry male RM recruits of mean (SD) age 21 (3) years, height 1.78 (0.06) m, body mass 74.5 (8.0) kg and BMI 23.5 (2.0) $kg.m^{-2}$, using a McCue CUBA Clinical dry system osteodensitometer. Information on smoking history and previous physical activity (training volume) were also obtained.
Results: The mean BUA measurements (SD) were 97.6 (18.2) $dB.MHz^{-1}$ (range 54 – 148 $dB.MHz^{-1}$) in the right (dominant) foot and 98.3 (18.2) $dB.MHz^{-1}$ (range 56 – 150 $dB.MHz^{-1}$) in the left (non-dominant) foot. The profiles were normally distributed and generally fell within the range observed in other male populations of a similar age. Recruits who undertook a high volume of physical activity (>1000 $min.wk^{-1}$) prior to starting training had higher BUA than those who undertook a low volume of physical activity (<1000 $min.wk^{-1}$). Mean BUA (SD) values were 98.8 vs. 87.4 $dB.MHz^{-1}$ ($p<0.05$) in the high and low exercise groups, respectively, in the left (non-dominant) foot only. There was no association of BUA with smoking history.
Conclusions: The mean BUA values for new-entry RM recruits fell within the ranges observed in previous studies in age-matched young men and were normally distributed. A positive relationship was observed between pre-training exercise volume and BUA. Recruits with lower BUA may be at increased risk of sustaining stress fracture injuries during training, such that BUA assessment might provide a useful screening tool early in training. It is important to clarify the environmental influences presented by military training on bone mass during this crucial period during where recruit peak bone mass may not have been attained. These results contribute to the establishment of reference data on which further studies can be based.

Disclosure of Interest: None Declared

P529 - MICROSTRUCTURAL AND MECHANICAL ABNORMALITIES OF CENTRAL AND PERIPHERAL SKELETON IN PREMENOPAUSAL WOMEN WITH IDIOPATHIC OSTEOPOROSIS (IOP)

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Aims: Idiopathic osteoporosis (IOP) in premenopausal (PrM) women is a poorly understood entity in which otherwise healthy women have low trauma fracture(s) or very low bone mineral density (BMD). High-resolution peripheral quantitative computed tomography (HR-pQCT), central QCT (cQCT), finite element analysis (FEA), and individual trabeculae segmentation (ITS)-based morphological analyses were utilized to gain more insight into microstructural and mechanical abnormalities at peripheral and central skeletal sites in PrM women with IOP.
Methods: Among 80 PrM women (aged 20-49, 40 control and 40 IOP) enrolled in the study, HR-pQCT (XtremeCT, Scanco Medical) scans of distal radius (DR) and distal tibia (DT) were performed for 57 women (26 control and 31 IOP), and cQCT (GE Medical System) scans of proximal femur (PF) and lumbar spine (LS) were performed for 66 women (30 control and 36 IOP). IOP subjects had either low-trauma fractures or low BMD (T-score <-2.5 or Z score <-2.0). ITS-based analyses were applied to trabecular bone compartment of HR-pQCT images of DR and DT to calculate plate and rod bone volume fraction (pBV/TV and rBV/TV), plate and rod number (pTb.N and rTb.N, 1/mm), and rod-rod, plate-rod and plate-plate junction densities (R-R, P-R and P-P Junc.D, 1/mm^3). Integral and trabecular volumetric BMD (vBMD) were calculated based on cQCT images of PF and LS. Stiffness of DR, DT, PF, and LS L1 were calculated by FEA.
Results: At DR, pBV/TV and rBV/TV were 42% and 23% lower in IOP, and pTb.N and rTb.N 20% and 10% lower in IOP. R-R, R-P, and P-P Junc.D were 26%, 42%, and 45% lower in IOP. Similar results were found at DT: pBV/TV was 27% lower in IOP but not statistically significant (p=0.07) and rBV/TV was 33% lower in IOP; pTb.N and rTb.N were 17% and 16% lower in IOP; R-R, R-P, and P-P Junc.D were 38%, 40%, and 37% lower in IOP. cQCT analyses showed that integral and trabecular vBMD were 19% and 28% lower in IOP at LS, and 17% and 38% lower in IOP at PF. FEA results showed that whole bone stiffness were 26%, 26%, 22%, and 20% lower in IOP at DR, DT, LS, and PF.
Conclusions: At DR and DT, loss of trabeculae leads to a less connected trabecular network and reduced bone mass and bone stiffness in IOP. At LS and PF, loss of trabecular and total bone mass leads to reduced bone stiffness in IOP. In conclusion, PrM women with IOP have abnormal bone microstructure and reduced mechanical strength at both peripheral and central skeletal sites.

Disclosure of Interest: None Declared

P530 - BONE MINERAL DENSITY AT THE RECONSTRUCTION OF BONE DEFECTS IN CHILDREN WITH INNOCENT TUMOURS AND TUMOUR-LIKE DISEASES OF BONES IN DIFFERENT SITE

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Aims: Investigate bone mineral density (BMD) in children with tumour-like diseases of bones and to prove possibilities of correction of the exposed abnormality of «Ostein».
Methods: 36 children were divided into 4 groups: 1st group are the children with the defeat of upper limb (11,44±1,14 years) which carried out the resection of focus with substituting the defect by ceramic osteopatite (OC-015); 2nd group - with the defeat of upper limb were carrying out the analogical manoeuvre and subsequent application of «Ostein» in therapeutic dosage (12,00±1,26 years); 3rd group - with pathology of lower limb with the analogical manoeuvre like in the 1st group (12,67±1,15 years); in the 4th group of children with the defeat of lower limb after the operation «Ostein» was appointed (12,78±1,31 years). Issues were compared to average normative information of the state of skeleton of the Ukrainian children and teenagers.
Results: In all children the BMD before an operation was a few below than average of population indexes. The carrying out of resection of focus with substituting the defect by OK-015 was accompanied deceleration of BMD growth rates. Application of «Ostein» for certain improved the indexes of BMD: in the children with the defeat of upper limb an index of Z (SD) in 12 months was on 22,57% that less than in the 1st group; value Z% and ICI through 6 and 12 months after an operation exceed the indexes of 1st group accordingly on 23,70% and 31,90% and on 18,75% and 23,91%. Application of «Ostein» in the 4th group in 12 months a value Z (SD) was on 23,19% below than values of the 1st group, and value Z% and ICI exceed the same indexes on 20,84% and 18,34%.
Conclusions: The carrying out the reconstruction of bone defects by material of OK-015 is accompanied by lag of growth of BMD rates from average age-dependent indexes. Application of «Ostein» smooths out the exposed deviations, thus more meaningfully at upper limb pathology. Probably, the quantitative difference of BMD for patients with pathology of upper and lower limb is related to their anatomic and biomechanics features, and also with earlier stopping of immobilization at patients with the defeats of upper limb.

Disclosure of Interest: None Declared

P531 - EFFECTS OF AGE, MENOPAUSE AND BODY COMPOSITION MEASURES ON ARTERIAL STIFFNESS AND BONE MINERAL DENSITY IN MIDDLE-AGED POPULATION

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Aims: Osteoporosis and arterial stiffness, the main clinical manifestations of bone and arterial aging, respectively, share common

risk factors. Fat and lean mass have been reported to have different effects on bone and arterial health. The aim of the present study was to evaluate effects of age, fat and lean mass and menopausal status in women on both aortic stiffness assessed by pulse wave velocity (PWV) and BMD assessed by DXA.
Methods: Study subjects were healthy middle age men and women recruited as part of the Northern Sydney Twin Study. After excluding one of the twins from each identical pair and subjects taking medications affecting bone, 61 men (age 64±8) and 294 (age 61±8) women were included in the analysis. BMD and body composition results were obtained from whole body, lumbar spine; hip and distal forearm DXA scans performed on a HOLOGIC QDR 4500 W. Clinical arterial stiffness was assessed by carotid-femoral pulse wave velocity (PWV) obtained with applanation tonometry.
Results: Age was the strongest predictor for the higher PWV and lower BMD measures in men and women. In men PWV was not associated with any of the BMD or fat mass measurements. Fat mass was associated with whole body and hip BMD. Higher lean mass was a significant predictor for lower PWV and higher BMD in male population. Menopausal status was also associated with both PWV and BMD measures in women. In women arterial stiffness was associated with the whole body and forearm BMD even after adjustment for age, menopausal status and body composition measures and lifestyle factors. Higher fat mass measures were significant predictors for higher PWV and BMD readings. Lean mass was not associated with PWV in women, but was a strong predictor for BMD measures.
Conclusions: Age in men and women and menopausal status in women were the strongest predictors of higher PWV and lower BMD measures. Associations between body composition and arterial stiffness and BMD differ between genders. Men with higher lean mass exhibit the best arterial and bone profile with lower arterial stiffness and higher BMD measures. In women fat mass, but not lean mass was a stronger predictor of PWV and both lean and fat mass of BMD. Women with higher fat mass have significantly higher arterial stiffness and BMD measures.

Disclosure of Interest: None Declared

P532 - RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND VASCULAR CALCIFICATION

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Aims: Osteoporosis and atherosclerosis often occur in the same individuals and may share similar pathogenic mechanisms. This study examined the relationship between bone mineral density and severity of aortic calcification (AC).
Methods: Study subjects were 154 women and 49 men (age 67±6) recruited as part of the Northern Sydney Twin Study at the Department of Rheumatology of the Royal North Shore Hospital, Australia. BMD and body composition results were obtained from whole body, lumbar spine; hip and distal forearm DXA scans performed on a Hologic QDR 4500 W. Severity of calcification in the abdominal aorta adjacent to each lumbar vertebra (L1–L4) was assessed separately for the posterior and anterior wall of the aorta using lateral lumbar spine radiographs. Each vertebral segment was graded according to a four-point severity scale (0-3). A separate score was determined for the anterior and posterior aorta, and the values were summed across the 4 vertebrae, resulting in a total score ranged from 0 to 24.
Results: Aortic calcification was present in 87 women (57%) and 35 men (71%). Total AC score was significantly higher in men compared to women (4.9±0.8 to 3.3±0.4, respectively). Age and gender were the strongest predictors for both presence of AC and lower BMD (P<0.001). Smoking was also a significant predictor for the presence of the AC. Only Hip BMD measurements (total hip BMD and FN BMD) were significantly associated with AC after adjustment for sex, BMI, fat mass, lean mass and lifestyle factors. When age was included in the regression analysis, the associations between AC and hip BMDs became not significant. Associations between AC and hip BMD was found only in men, when men and women were analysed separately. Peripheral but not central fat was weakly associated with AC and BMD. Lean mass was strongly associated with BMD in men and women, but was not related to AC.
Conclusions: Older men with the higher severity vascular calcification have lower hip BMD measures. Smoking predicts the presence of aortic calcification in men and women.

Disclosure of Interest: None Declared

P533 - DXA FOREARM IN SELECTED GROUPS: AN USEFULL TOOL TO IMPROVE OSTEPOROSIS DIAGNOSIS?

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Aims: To describe the BMD results of two selected groups submitted to DXA examinations, analyzing all skeletal sites, and classify osteoporosis according to the OMS criteria. To compare the results to evaluate if forearm study was of more value in a selected group, considering osteoporosis classification.
Methods: We studied 233 menopausal women that came for routine DXA clinical investigation, November 2008 to March 2009, all submitted to forearm additional studies, with lumbar spine and hip sites qualified for diagnosis. The BMD was measured using GE Lunar DPX NT (pencil beam) at lumbar spine, hip and forearm for all the patients. A control phantom was scanned everyday and all DXA measurements were performed by the same experienced operator. All patients agreed with the complimentary DXA forearm study. We share the patients in two groups, one without vertebral exclusion (n =189) and the other (n=44) with exclusion ofone or more vertebra - standard BMD deviation superior to 1SD. We excluded one patient with surgical menopause.
Results: The mean age was 67 years (SD 9,4) . The means BMD were 1,008g/cm² (lumbar spine), 0,820g/ cm² (neck), 0,869g/ cm² (total hip) and 0,733g/ cm² (distal forearm). The differences between means BMD respectively for age groups from 40 years to 80 years achieved statistically significance (p<0,001) for neck and forearm skeletal sites. Considering age groups between 70 years to 80 years, the distal forearm classified osteoporosis in 26 cases

and lumbar spine in 17 cases, with agreement in 11 cases. In age groups over 80 years the distal forearm diagnosed osteoporosis in 13 cases and lumbar spine in 4 cases, with agreement in 4 cases. Considering the groups with vertebral exclusion, the distal forearm diagnosed osteoporosis in 12 cases and lumbar spine in 10 cases, with agreement in 6 cases. The group with no vertebral exclusion had 50 cases of osteoporosis diagnosed by forearm studies and 52 by lumbar spine analysis, with agreement in 20 cases.
Conclusions: The forearm study appeared to be more significant among patients over 80 years considering osteoporosis diagnosis, and a slight advantage was noticed in the group with vertebral exclusion. Further studies with more patients are necessary to provide evidence that the forearm studies can benefit a selected group in osteoporosis diagnosis, and to justify cost-effectiveness.

Disclosure of Interest: None Declared

P534 - MAXIMIZING THE PEAK BONE MASS ACCRETION DURING ADOLESCENCE AS A STRATEGY TO PREVENT OSTEOPOROSIS IN LATE LIFE: PREBIOTIC SUPPLEMENTATION VS CALCIUM FORTIFICATION

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Aims: Clinical studies have shown that increasing calcium intake during growing period promoted an increase in bone mass. In recent years accumulating knowledge prompted the scientific community to consider that other technologies, including prebiotics, may influence bone mass accretion during growth period. The aim of this study was to compare the effectiveness of calcium fortification *vs.* prebiotic supplementation in growing rats as a nutritional approach to maximizing and consolidate the peak bone accretion and architecture during adolescence and to prevent or delay the onset of osteoporosis in later life
Methods: Weaned Sprague-Dawley rats were divided into 3 groups: Control group (CC group) was fed with a standard semipurified diet until the end of the adolescence period. Ca group and Syn-1 group were fed with the same diet fortified with 0.5% calcium carbonate (total calcium content 1%) or supplemented with an inulin-type fructans (7.5% of the total carbohydrate), respectively. At the end of the study period, bone mineral density (BMD) was determined by dual-energy X-ray absorptiometry; bone volume fraction as well as 3-D parameters of trabecular architecture (trabecular number, thickness and separation, connectivity density and structure model index) were analyzed by micro-computed tomography (μCT). To evaluate differences attributable to the diet we performed a one-way ANOVA with a Dunnet posttest
Results: There were not statistically significant differences in the BMD due to nutritional intervention in appendicular bones. In axial bones, prebiotic consumption induced a significant increased in BMD with respect to CC group, while calcium fortification did not show significant effects. Considering the effect of both nutritional approaches in bone microarchitecture, μCT data showed that in appendicular bones prebiotic supplementation but not calcium fortification promoted an increase in bone volume/tissue volume, trabecular thickness, trabecular number and connectivity density value, with a concomitant reduction in the trabecular separation. However, in vertebra both nutritional approaches promoted a higher trabecular consolidation by increasing endocortical bone surface
Conclusions: Based on our data, prebiotic supplementation represents a superior technology than calcium fortification for maximizing and for consolidating the peak of bone mass and architecture in the adolescence.

Disclosure of Interest: M. Manzano Employee of: Abbott Nutrition, P. Bueno-Vargas Employee of: Abbott Nutrition, M. Jimenez Employee of: Abbott Nutrition, R. Rueda Employee of: Abbott Nutrition, J. López-Pedrosa Employee of: Abbott Nutrition

P535 - SEX SPECIFIC REFERENCE DATA FOR BONE DENSITY PARAMETERS MEASURED WITH DUAL ENERGY X-RAY ABSORPTIOMETRY IN A LARGE COHORT OF HEALTHY INDIAN CHILDREN AND ADOLESCENTS

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Aims: Background: The correct interpretation of BMD in children requires appropriate reference data matched for sex, age, height, weight, pubertal development and ethnicity.
Aims: The primary aim of our study was to provide sex-specific reference centile curves of bone densitometric parameters measured by DXA, for Indian children, by using the LMS technique and to evaluate the determinants of BMC in this population.
Methods: Methods: The study population consisted of 1905 healthy children (835 male, 1050 female) aged 5–17 years. Anthropometric, biochemical and hormonal parameters were measured in all study subjects. Bone mineral content and BMD was measured using a LUNAR Prodigy Oracle DXA machine. Bone mineral apparent density (BMAD) was calculated for the lumbar spine and femoral neck. Sex-specific centile curves for BMAD (spine and femoral neck) and BMC (total body and spine) were generated using LMS method. For further interpretation of results, sex specific centile curves were derived for bone area for height, and BMC for bone area at spine and total body, using the approach suggested by Mølgaard.
Results: Results: Height of the study population was comparable to the reference population from Delhi. Biochemical evidence of vitamin D deficiency was highly prevalent in the study group. 95% of boys and 98% of girls had 25(OH)D levels less than 50nmol/L. On multivariate regression, age, weight and height were the most consistent contributors to the variance in BMC at different sites. Anthropometric parameters were able to explain 50 -70% of BMC variance in boys at different sites, whereas in females they could explain only 5-10% of BMC variance. Centiles for each year of age will be presented. Data are provided for clinical interpretation of the spine and femoral neck scans based on BMAD (g/cm3), which reduces the size dependence of DXA areal BMD (g/cm2).

The spine and total-body data are also presented for interpretation of results using the three step approach suggested by Mølgaard.
Conclusions: Conclusions: This paper provides the first sex-specific and ethnicity-specific reference databases for Indian children, thereby allowing clinicians to assess and interpret bone mineral density in pediatric patients.
References: Mølgaard C et al, Acta Paediatr 1998;87:494.

Disclosure of Interest: None Declared

P536 - EVALUATION OF BONE MASS AND STRUCTURE BY QUS OF PROXIMAL PHALANGES, PQCT OF ULTRADISTAL RADIUS AND DXA OF LUMBAR SPINE IN JUVENILE IDIOPATHIC ARTHRITIS

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Aims: Juvenile Idiopathic Arthritis (JIA) is the most common pediatric rheumatic disease. Risk factors for low bone mass in JIA include chronic inflammation, delayed pubertal maturation, malnutrition muscle weakness, physical inactivity, and glucocorticoid therapy.
Methods: Assessment of bone status by DXA, pQCT and Quantitative Ultrasound (QUS) in a group of 131 subjects (36 male and 85 female; mean age 13.5±4.09SD) affected by JIA. 80 age and sex matched healthy children acted as controls. All patients with JIA were diagnosed according to the revised criteria of the International League of Associations for Rheumatology (ILAR). Age- and sex-specific Z-scores for height and body mass index (BMI: Kg/m2) were calculated using year 2000 growth chart data from the Centers for Disease Control and Prevention. Pubertal stage was assessed according to the method of Tanner. We measured BMD at lumbar spine (BMD-LS) by DXA (Delphi, Hologic) and QUS parameters at phalanges: amplitude dependent speed of sound (AD-SoS) and bone transmission time (BTT) (Bone Profiler, Igea). Total, trabecular and cortical mineral density (totBMD, cortBMD, trabBMD), and the geometrical (total area, trabecular area, cortical area) and biomechanical properties of bone (strength-strain index (SSI), was also assessed by pQCT at the ultradistal radius (Stratec, XCT3000).
Results: Sample linear regression analysis by Pearson's formula was performed to determinate the correlation between the parameters evaluated with the 3 methods. Compared to the control group, all DXA, pQCT and QUS parameters were significantly ($p<0.001$) reduced in children with JIA. As expected, considering the skeletal site mainly composed of cortical bone, AD-SoS and BTT showed the best significant ($r=0.70$ and $r=0.90$ respectively, $p<0.001$) correlation with cortBMD. Interestingly, a significant ($r=0.6$, $p<0.01$) correlation was also found between BTT which is particularly influenced by cortical width, and SSI, which has been shown to provide a good estimate of the mechanical strength of human radii. Correlations of BMD-LS with pQCT or QUS parameters ranging from r= 0.26 to r=71.
Conclusions: In conclusion, QUS at phalanges and pQCT are valuable tools to assess bone status by measuring the true volumetric mineral density and the geometrical and biomechanical indexes of bone, which could be proposed in current clinical practice for the assessment of osteoporosis in children with JIA.

Disclosure of Interest: None Declared

P537 - LEAST SIGNIFICANT CHANGES (LSC) FOR HIGH RESOLUTION QUANTITATIVE COMPUTED TOMOGRAPHY (HR-PQCT)

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Aims: In the last few years HR-pQCT has become an interesting option for in vivo three-dimensional quantification of trabecular bone structure and volumetric bone mineral density (BMD) at the distal radius and tibia, but there are still some issues that should be revealed. Once the precision of a diagnostic technique is defined, the LSC can also be calculated. This is a parameter which shows the real biologic change in a repeated study procedure over time and is a very useful information for the every day clinical therapeutic decisions.
Methods: For the calculations we use the precision data of peripheral sites measurements with HR-Pqct (Extreme C T, Scanco Medical™) in our population, expressed as± coefficient of variation (%CV) previously presented by our group. Using the validated formula for determining the LSC: **LSC= Z (Pr) √ 1/n1 + 1/n2**
Z: value chosen based on desired level of statistical confidence from statistical tables
(Pr): precision value= root mean square percent coefficient of variation (RMS
Results: Ideally a 95± statistically confidence is chosen, but 80± and a Z value of 1.28. are generally more than adequate and well accepted for clinical diagnostic decisions.

BMD	LSC	Architectural	LSC
BMD Total Radio / Tibia	2.22% / 1.5%	Trab Number R / T	6.44% / 6.13±
BMD Cort. Radio / Tibia	1.03% / 0.52%	Trab. Thick R /T	5.99% / 5.39%
BMD Trab Radio / Tibia	2.98± / 2.73%	Ct .Thick R /T	4.81± / 1.48%
		BVTV R / T	2.99± / 2.73%

Conclusions: There is still not defined which density or architectural value of the HR-pQCT could be considerer as a clinical follow up parameter, but if we compare the density results, with the LSC of BMD measured by DXA scan, (Lumbar spine AP: 4.72±, Femoral neck: 5.6±) the magnitude of changes are within a similar range. There is not a gold standard technique to compare the LSC of the architectural parameters.

Disclosure of Interest: None Declared

P538 - THE COMPARISONS OF BONE TURNOVER MARKERS AMONG CHILDREN WITH NORMAL OR LOW BONE MASS

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Aims: The aim of the study was to examine is there any difference of bone turnover markers among children with normal or low bone mineral density.
Methods: The study involved 347 healthy children aged 4.5-18.5 years, including 179 girls and 168 boys. Total body and spinal (L2-4) DXA densitometry (DPX-L Lunar) of the skeleton was carried out in all children and reported as Z-score. Osteoblast (osteocalcin) and osteoblast (serum B-crosslaps) activity markers were measured. Low lumbar spine Z-score values (<-1.0) were detected in 58 cases of girls, and 71 cases of boys; and low total body Z-score (<-1.0) values were measured among 17 girls and 21 boys. The bone turnover markers were matched to bone densities considering chronological and biological age and stadium of puberty.
Results: The rate of bone formation was slower among girls between age 10 to 12 years according to the bone turnover markers, whose bone mineral density were lower at the lumbar spine region. Girls at the age of 14 to 16 ys had increased bone resorption, which exceeded the rate of bone formation. Because of the later puberty among boys the above mentioned observation was proved two years later, at the age of 16 to 18 years. Beside this results, the low lumbar spine Z-score at the late puberty among boys were accompanied by low osteocalcin levels, showing decreased bone formation. The rate of bone resorption was significantly higher among girls of 3-7 years of bone age, before puberty with low lumbar spine Z-score in comparison to higher lumbar spine Z-score. The same observations were found according to the total body Z-score values, but significant differences were not approved.
Conclusions: Chronological and biological age and stadium of puberty are important factors in the analysis of bone mass and bone turnover markers.

Disclosure of Interest: None Declared

P539 - CORRELATION BETWEEN BONE MINERAL DENSITY, FERRITIN AND CARDIOVASCULAR RISK IN POSTMENOPAUSAL WOMEN

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Aims: There is increasing evidence regarding the relationship between the iron levels and cardiovascular disease probably due to increased oxidative stress and insulin resistance. Additionally, the increased cardiovascular risk after menopause may be due to an increased deposition of iron as a result of the cessation of blood loss. The aim of the study was to evaluate the relationship between the bone mineral density in postmenopausal women, the ferritin levels – marker for iron deposition and insulin resistance (IR) as a cardiovascular risk marker.
Methods: 186 female patients (94 postmenopausal women, 92 premenopausal) with no apparent cardiovascular disease were assessed for bone mineral density (BMD) in lumbar spine, serum ferritin levels, lipid profile and IR and differences were searched between premenopausal and menopausal women.
Results: Significant differences were found between the two groups, as postmenopausal women (mean age 63.2±2.4 years, mean BMD 0.438±0.092g/m^2) express positive correlations between serum ferritin levels (68.6±24.8ng/l) and age, systolic blood pressure, total cholesterol, triglycerides, LDL-cholesterol, and IR and a negative correlation with BMD and HDL-cholesterol. ($p<0.001$).
Conclusions: The results of the study suggest that iron metabolism in postmenopausal women with low BMD may play an important role in the changing pattern of cardiovascular disease.

Disclosure of Interest: None Declared

P540 - COULD THE NUMBER OF SUNNY DAYS BE A USEFUL PREDICTOR OF THE PRESENCE OF OSTEOPOROSIS IN THE REAL PRACTICE?

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Aims: To evaluate people with osteoporosis risk factors, from various country geographical areas in order to establish correlation between the degree of sun brightness in different regions and the bone mineral density (BMD).
Methods: We selected all patients with risk factors for osteoporosis (704) from the total hospitalised persons (13996) at The Techirghiol Balneal and Rehabilitation Sanatorium (TBRS), between 03.'08-02.'09. We have divided Romania's territory in 9 regions, based on the sun brightness: 1st zone (Black See' coast) exceeds 2300 h yearly and the 9th (mountainous regions) doesn't overcome 1900 h/year. We used Dual X -Ray Absorptiometry (DXA) to evaluate BMD by T-score on lumbar/femoral level.
Results: We identified 676 women (96, 03%) and 28 men (3, 97%) with age between 38-79 years, most of them (81%) from urban areas. We see thus that the ratio Women/Men=24/1. 21% from the women were diagnosed with osteoporosis and 43, 63% with osteopenia. Of the 142 women with osteoporosis, 33, 1% were newly diagnosed, the remaining 66, 9%, being known with this disease at the time of evaluation. Note, that 17, 52% of newly diagnosed patients already had disease complications such as vertebral, femoral or distal radius fracture. Also 35, 29% of women with known osteoporosis were not any treatment, and 14, 7% had medication with calcium & Vitamin D. Of the 28 men in the lot, 4 (14, 3%) had osteoporosis, all 4 have been newly diagnosed. The degree of sunlight isn't correlated with lumbar and femoral T-

score value (Person test). In rural areas there is little direct correlation between the degree of sunlight and lumbar T-score ("r"=0, 23466) but missing in urban patients.
Conclusions: In our group, 20, 7± had osteoporosis and 26% osteopenia, more than half, requiring further treatment (curative/preventive). There is a greater proportion of women in our lot, perhaps due to the fact that women frequently have more risk factors for osteoporosis than men, but also by greater availability to investigate. Often, patients didn't consider important the investigation or can't afford the financial terms. As a result of the statistic analysis of these data, we concluded that the degree of sun brightness in various regions of our country doesn't match correlated with the vertebral/femoral T-score. Whatever level the sun-bright on the area where they live, Romanian patients are equally exposed to osteoporosis and the only way to help, is to prevent risk factors and an appropriate treatment of disease.

Disclosure of Interest: None Declared

P541 - TRABECULAR BONE DENSITY AND MICROARCHITECTURE AT THE DISTAL RADIUS ARE PREDICTORS OF FRAGILITY FRACTURES IN POSTMENOPAUSAL WOMEN AS MEASURED BY HR-PQCT

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Aims: In this HR-pQCT study we aimed to determine which combination of bone microarchitecture and finite element parameters are most relevant to characterize bone quality at the distal radius and determine if these parameter combinations are associated with fragility fractures in postmenopausal women.
Methods: Participants were postmenopausal women from the Calgary, AB cohort of the Canadian Multicentre Osteoporosis Study (CaMos) for whom we had 10-year follow-up data and who then had high resolution peripheral quantitative computed tomography (HR-pQCT; XtremeCT, Scanco Medical AG) scans (N=252, average age 69.5 yrs). During the 10 years of CaMos follow-up prior to HR-pQCT scanning, low trauma fractures (excluding finger, face and toes) were reported by 41 women, who were then matched to randomly selected control subjects by age (± 1 year). Standard HR-pQCT measurements were calculated[1] in addition to direct cortical thickness (Ct.Th) and porosity (Ct.Po)[2], finite element ultimate stress, and the portion of the load carried by the cortical and trabecular regions[3]. Principal component (PC) analysis determined the relevant parameters and logistic regression was used to determine if the PCs were able to predict fracture.
Results: The PC analysis resulted in four independent components that accounted for 82.4% of the variance. The first PC was mainly represented by Ct.Th and Ct.Po, bone mineral density, and ultimate stress accounting for 30.9% of the variance. The odds ratio (OR) for low-trauma fracture associated with PC1 was 1.41 (95% CI, 0.83-2.41) for a standard deviation increase. The second PC included trabecular architecture, trabecular density and load distribution, accounted for 25.5% of the variance and was significantly associated with fracture (OR=2.26 (95% CI, 1.36-3.78)). The third component represented cross-sectional areas and height while trabecular thickness was the main variable in the fourth PC. The OR's for PC3 and PC4 were 1.27 (95% CI, 0.82-1.98) and 1.35 (95% CI, 0.81-2.25) respectively.
Conclusions: Variables from HR-pQCT analysis can be reduced into PCs with practical meaning, representing cortical bone and estimated bone strength, trabecular bone, and bone size. Trabecular microarchitectural parameters measured at the distal radius may provide important information about low-trauma fragility fractures in postmenopausal women.
References: 1. Boutroy S et al, J Clin Endocrinol Metab 2005; 2. Nishiyama KK et al, J Bone Miner Res 2009; 3. MacNeil JA, Boyd SK, Bone 2007

Disclosure of Interest: None Declared

P542 - ASSESSMENT OF RISK FACTORS GIVEN IN GP REFERRAL LETTERS FOR DXA IMAGING

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Aims: Osteoporosis poses a significant public health issue, causing significant morbidity and mortality. It leads to an increased fracture risk through a reduction in the bone mineral density(BMD), disruption of bone microarchitecture, and alteration of the amount and variety of non-collagenous proteins in bone. Treatment aims are to prevent fractures and maintain the quality of life of the aging adult. The advent of the WHO assessment tool "Fracture Risk Assessment Tool" (FRAX®) has been revolutionary in GP assessment of patients regarding need for treatment, need for further evaluation by DXA imaging and those not requiring any treatment. This study examines GP requests for DXA imaging and if they contain sufficient details to justify imaging.
Methods: 200 randomly chosen GP request letters were analysed using the FRAX® tool. All letters were from April 2007 to July 2008. Resulting data was analysed using the statistical package SPSS
Results: Of the 200 letters, 4% (n=8) were male and 96% (n=192) were female, with a mean age of 64.3 years. One GP service provided a preformed referral letter with the remaining letters being individually composed. Table 1 shows the percentage of letters containing each of the FRAX® criteria. Of importance only 1 request (not a preformed letter) contained all the details allowing for FRAX® assessment ($p<0.005$) despite the use of a preformed by one GP service.

Table 1: FRAX® details contained in GP DXA imaging request letters.

Criteria	Percentage (n-value)
Age	100% (n=200)
Sex	100% (n=200)
Weight	<1% (n=1)
Height	<1% (n=1)
Previous Fracture	7% (n=14)
Parental Hip Fracture	5% (n=10)
Current smoker	6% (n=12)
Glucocorticoids	8% (n=16)
Rheumatoid arthritis	3% (n=6)
Secondary osteoporosis	9% (n=18)
Alcohol 3 or more units/day	2% (n=4)

Conclusions: The majority of GP referral letters for DXA imaging do not contain adequate data to make recommendations using the FRAX® tool. Incorporating this data is likely to improve requesting systems for DXA scanning to GPs.

Disclosure of Interest: None Declared

P543 - THE RELATIONSHIP OF CALCIURIA WITH THE FACTORS AFFECTING OSTEOPOROSIS

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Aims: It is important to identify the presence of hypocalciuria which can reflect vitamin D deficiency, hypoparathyroidism or malabsorption. The aim of the study was to investigate the relationship of hypocalciuria with BMD and biochemical bone markers in postmenopausal women referred to osteoporosis unit.
Methods: Seventy five subjects, with a mean age of 64.5±7.8 years were reviewed. Demographic characteristics including age, sex, body mass index (BMI), comorbid diseases and medication were recorded. The levels of 24 hour urinary Ca, deoxpyridinoline, serum calcium, osteocalcin, serum intact PTH, 25(OH) vitamin D, BMD at hip and lumbar spine, benefiting from ultraviolet index (BFUI) and mini nutritional assessment test (MNA) of subjects were determined. Student t- test and Pearson's correlation analyses were performed by using the Statistical Package for Social Sciences (SPSS 15.0) and $p<0.05$ was considered statistically significant.
Results: Seventy five female subjects with a mean BMI of 26.5± 4.1 were included to the study. The most common comorbid diseases were hypertension and diabetes mellitus. The patients were taking medication according to their comorbid diseases . The mean levels of 24 hour urinary Ca, deoxpyridinoline, serum calcium, osteocalcin, serum intact PTH, 25(OH) vitamin D were 153.7±128.1 mg/day, 47.9±18.9 pmol/µmolc, 9.6±0.5 mg/dl, 5.2±4.4 ng/ml, 59.7±32.1 pg/ml, 69.4± 50.1 ng/ml respectively. Total BMD at hip and lumbar spine, MNA and BFUI of subjects were determined as 0.819±0.1, 0.872±0.1, 25.9±3.8 and 0.4±0.3 respectively. 25.3% of subjects had hypocalciuria. There was significant difference between osteocalcin, deoxpyridinoline, femoral total and lumbar BMD, MNA tesT-scores and BFUI level, of the subjects with hypocalciuria and without hypocalciuria ($p<0.05$). Statistically significant correlation was found between urinary calcium and the levels of vitamin D and osteocalcin ($r=0.388$, $p=0.001$; $r=0.286$, $p=0.016$ respectively).
Conclusions: Hypocalciuria may be a risk factor for osteoporosis mainly related with vitamin D, BFUI and MNA. The levels of calcium in the urine can be improved by sufficient supplementation of vitamin D, appropriate diet and sun exposure.

Disclosure of Interest: None Declared

P544 - BONE MASS AND BONE STRENGTH IN OLDER MEN AND WOMEN WITH HIP FRACTURES

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Aims: Hip fracture is typically considered to be a health problem of older women; however, one-third of all hip fractures in the United States occur in men. Relatively little is known about the consequences of hip fracture in men.
Methods: Baltimore Hip Study (BHS)-7 is a prospective observational cohort study designed to enrol 200 men and 200 women aged 65+ admitted to 1 of 8 community hospitals for surgical repair of a hip fracture. Patients are excluded if they are not community-dwelling at the time of the fracture, were bedbound 6 months prior to the fracture, had a previous hip fracture or hardware in the contralateral hip, or had a pathologic fracture. All subjects complete a set of questionnaires, undergo a comprehensive assessment of function, have measurement of BMD of the contralateral hip (femoral neck [FN] and total hip [TH]) using dual energy x-ray absorptiometry (DXA) and have blood drawn. Data are collected at baseline (within 15 days of admission) and at 2, 6 and 12 months post admission. Subjects who are still participating in BHS-7 at the 2-month follow-up visit are eligible to have quantitative computed tomography (QCT) of L1 performed at the 2- and 12-month visits as part of an ancillary study. Finite element analysis is used to estimate bone strength of L1 (ON Diagnostics LLC, Berkeley, CA).
Results: 113 participants (51 men, 62 women) had baseline BMD measures of the contralateral hip. The average BMD T-scores for men were higher than women (-2.08 vs. -2.46 and -1.72 vs. -2.27 for FN and TH, respectively) at time of fracture. Fewer men than women qualified for a diagnosis of osteoporosis based on BMD alone. Of these subjects, 24 men and 17 women had QCT scans of L1 that could be analyzed for bone strength and BMD. Age-adjusted bone strength of L1 was higher in men than women. BMD of L1, however, was similar in both genders despite BMD at the FN and TH being higher in men than women. There was a statistically significant correlation between L1 strength and BMD (FN and TH) for women ($R=0.67$ and 0.71) but not for men ($R=0.07$ and 0.16).
Conclusions: These data suggest that there are site-specific differences in bone mass and bone strength between men and women with hip fracture.
Acknowledgement: This research supported by grants from the National Institute on Aging (R37 AG09901 MERIT Award, R01 AG029315, T32 AG00262, P30 AG028747).

Disclosure of Interest: D. Orwig: None Declared, M. Hochberg: None Declared, J. Chan: None Declared, W. Hawkes: None Declared, C. Resnik: None Declared, D. Kopperdahl Employee of: O.N. Diagnostics, T. Keaveny Employee of: O.N. Diagnostics, J. Magaziner: None Declared

P545 - RELATIONSHIP BETWEEN SOME PLASMA ANTIOXIDANT ENZYME ACTIVITY AND OSTEOPOROSIS

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Aims: Osteoporosis is related to plasma antioxidant enzyme activity. Superoxide Dismutase (SOD) and Glutathione Reductase (GR) are the antioxidant enzyme. The aim of this study is investigation of the relationship between plasma SOD and GR activities with Osteoporosis.
Methods: SOD and GR activities were determined spectrophotometrically at 540 and 339 nm, respectively. Femur and Lumbar T-Score value were measured for bone density evaluation in Jami clinic, Tehran, Iran. Standard questionnaire and sophistical statistic methods were used in this study. Patient group (n=76) classified as sever and mild against control group (n=76).
Results: In sever osteoporotic group (T-core<-2.5) SOD activity value is 2.31±0.91μg protein and GR activity value is 90.01±58.57 U/L. In mild osteoporotic group (-1.7<T-score<-1.0) SOD activity value is 1.50±0.40 μg Protein and GR activity value is 66.72±19.80 U/L. In total osteoporotic group (-1.0>T-score) SOD activity value is 2.05±0.87 μg protein and GR activity value is 82.35±50.33 U/L. In control group (Femoral and Lumber T-score≥-1) SOD activity value is 1.72±0.76 μg protein and GR activity value is 64.71±31.26 U/L.
Conclusions: SOD and GR activity values have reverse relationship with T-score in total participants ($r=-0.216$; $p<0.001$, $r=-0.278$; $p<0.001$, respectively). Control group SOD and GR activity values are significantly less than patient group ($p<0.01$). Mild SOD and GR activity values are significantly less than sever group ($p<0.001$). Control group SOD and GR activity values are significantly less than sever patient group ($p<0.001$). Control group SOD and GR activity values have not significantly difference with mild patient group. It seems SOD and GR activities are increased as compensatory respond to osteoporotic severity and T-score value reduction.
Acknowledgement: This research has been supported by Tehran University of medical Sciences (TUMS) and Toxicology and food chemistry Center of Excellent.

Disclosure of Interest: None Declared

P546 - SUNSHINE, VITAMIN D AND BONE MINERAL DENSITY ASSOCIATION IN OSTEOPOROTIC WOMEN

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Aims: The aim of this study was to investigate the factors that affect the vitamin D3 level and their association with bone mineral density (BMD) in osteoporotic women.
Methods: Two-hundreds and sixteen female patients who were diagnosed with osteoporosis according to the World Health Organization (WHO) osteoporosis criteria (T-scores of the femur neck or femur total or lumbar 1-4 below -2.5) were analyzed retrospectively. The relationship between vitamin D3 level and BMD, age of menopause, type of menopause, history of hormone replacement therapy (HRT), exposure to sunlight, dressing style, osteoporosis treatment and seasons were evaluated.
Results: 55 patients, ages 43 to 82 (mean age 66.36) whose Vit D3 level were either close to the lower limit were included in our study. The mean vitamin D3 level was 25.28U/l±18.35 (5.4U/l to 100U/l). 87.3% of patients had a dressing style of modern or traditional. There was a significant association between blood vitamin D3 level and dual energy x-ray absorptiometry (DXA) femur neck Z-scores ($p=0.001$, Spearman Correlation Coefficient). There was not any significant relationship between the T-scores of patients and vitamin D. The absence or presence of osteoporosis treatment were not significantly correlated with vitamin D3 level ($p=0.064$, Mann Whitney U and Kruskal Wallis Tests). Vitamin D3 level was significantly associated with exposure to sun light, dressing style of traditional and modern and season of summer ($p=0.001$, Mann Whitney U Test). Seasons did not significantly affect the BMD results (mean 0.614±0.081, 0.573±0.078 in summer and winter respectively [$p=0.631$]).

Table 1: Mean Values of Laboratory and Characteristics of Patients

	Mean	Standard deviation (±)
Age of menopause	47,44	2,291
Age	66,36	7,901
L1-L4 T-score	-2,948	0,953
L1-L4 Z-score	-1,18	0,723
Femur neck T-score	-2,963	0,656
Femur-neck Z-score	-1,116	0,747
TSH	2,684	1,143
Intact PTH	54,727	22,731
Bone Spec ALP	31,796	8,852
Vitamin D3	25,284	18,35

Conclusions: The results of this study showed that exposure to sunlight significantly affected the blood vitamin D3 level. The Z-scores of femur neck DXA measurement was affected by vitamin D3 level toward positive side and exposure to sunlight is recommended for the osteoporotic women.

Disclosure of Interest: None Declared

P547 - TREATMENT OF THE POSTMENOPAUSAL OSTEOPOROSIS BY STRONTIUM RANELATE IN EVERY-DAY PRACTICE – DUAL STUDY

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Aims: Strontium ranelate (SR) is a new innovative treatment of postmenopausal osteoporosis and it starts to be widely used. Its effectiveness and acceptability was proved in large phase III. trials SOTI and TROPOS but its evaluation in real every-day practice is still missing. The objective of the presented study was to evaluate the adoption of SR treatment by both patients and doctors, and to assess the effect and the compliance with SR in every-day practice.
Methods: DUAL study was a 1 year prospective open multicentric study performed in 39 rheumatology, endocrinology and orthopaedic practices in Slovakia. In total 190 out patients were included in 39 centers. Questionnaire concerning with satisfaction with treatment, acceptability of treatment, compliance and quality of life was applied at M0, M0, M3, M6 and M12. At M12 the control BMD measurement was performed.
Results: From 190 included patients in total, 85% of them finish the study. Overall satisfaction with treatment as well as with daily intake in form of suspension form was around 90% and stable during whole time period. According to the set of questions regarding the quality of life there is a visible trend towards the improvement of the overall physical condition and mobility. A strong positive effect on back pain was detected throughout the whole period of study. From patients with paired BMD measurements from M0 and M12, the mean increase of BMD at each location was calculated. In 92 patients BMD at hip level increased by 3,5% ($p \leq 0,05$). And among 108 patients BMD at vertebral level increased by 6,1% ($p \leq 0,01$).
Conclusions: This study confirms that the treatment with SR in every-day practice is in accordance with results from phase III. trials. The treatment is well accepted and tolerated by patients. Benefits such as the effect on the quality of life and a significant increase of BMD even after one year could be used as unique opportunities to increase of persistence of patients treated with SR to gain full therapeutic effect of the treatment.

Disclosure of Interest: None Declared

P548 - BONE MINERAL DENSITY AND BONE METABOLISM IN A PORTUGUESE POPULATION OF ADULTS WITH MARFAN SYNDROME

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Aims: Marfan syndrome (MFS) is an autosomal dominant disorder characterized by musculoskeletal, ocular and cardiac abnormalities. Reduced bone mineral density (BMD) has been reported in adults with MFS. The objective of this study was to determine the BMD and bone turnover of adult men and women with MFS.
Methods: Thirty-seven adult patients (19 men, 18 women) with a mean age of 39±13 years with MFS according to the Gand Criteria had their BMD evaluated by dual-energy X-ray absorptiometry (DXA) at the lumbar spine (L1-L4) and total hip. BMD was expressed as a Z-score and compared with the reference population of the LUNAR Expert 1320® database. β-C-telopeptide of collagen 1 crosslinks (β-CTX1), osteocalcin (OC), 25(OH) vitamin D3, ionized calcium and PTHi were measured.
Results: Overall, BMD was significantly reduced in the lumbar spine: Z-score=- 1.51± 1.44 (men: z=- 1.21± 1.06; women: z=-1.81±1.73) and total hip: Z-score=-1.55± 1.11 (men: z=- 1.24± 1.22; women: z=- 1.87±0.95). OC and β-CTX1 values showed an accelerated bone turnover: OC was elevated in 32± (men: 40%; women: 23%) and β-CTX1 in 70± (men: 79%; women: 62%). PTHi was increased in 25± and only in men. We found deficiency of 25(OH) vitamin D3 in the majority of patients (85±). All patients were normocalcemic and only one patient was hypophosphatemic.
Conclusions: The BMD was decreased in both sexes, in equal manners at the lumbar spine and total hip. In our population bone turnover was increased with a predominance of the resorption markers without any associated changes in calcium or phosphorus. These findings probably reflect the existence of other unknown mechanisms not totally explained by vitamin D deficiency, highly prevalent in our population.

Disclosure of Interest: None Declared

P549 - WHY SOME WOMEN MAINTAIN HIGH BONE MINERAL DENSITY EVEN AFTER MENOPAUSE?

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Aims: Lean mass has been associated with higher values of bone mineral density (BMD) and menopause status has been associated with loss of bone mass. High BMD (HBMD) concept has been controversial and different values of BMD have been considered as threshold in that classification. Our aim was to analyze clinical and laboratory factors associated to HBMD in postmenopausal women

Methods: We studied 337 postmenopausal women (180 with HBMD and 157 control group). DXA was used to measure total body BMD (TBBMD), lumbar spine (LSBMD), femoral neck (FNBMD), total femur (TFBMD) and body composition compartments (fat and lean mass) . HBMD group had to present areal BMD absolute value ≥ 1,228 g/cm2 (L1-L4), and ≥ 1,006 g/cm2 (FN). They also had to present T-score > 0,1 SD (WHO classification), and T index percent > 100% in all sites. Subjects who did not present those criteria were included in control group (CG). The same database was used to study variables in women with HBMD, but a different cutoff was included: > 1 SD (n=86) and > 1,5 SD (n= 53). All subjects performed lab tests, Baecke questionnaire and nutritional evaluation. Correlation between variables was estimated (Pearson coefficient, Deviance and Hosmer–Lemeshow). Multiple regression models were used in order to verify independent predictors factors of HBMD.
Results: HBMD group mean age was 60y (SD=8,3); weight 77,0 Kg (SD=11,7); height 1,57cm (SD= 0,05) and BMI 31,1Kg/m^2 (SD=4,9). This group was younger than CG (p<0,001); BMI, weight, height were higher (p<0,001); lean mass and fat mass were higher as well (p<0,05). Non smoking women, breastfeeding, higher BMI, higher values of estradiol, diabetes and low values of CTX were associated with HBMD (p<0,05). For each increase of 1 kg of lean mass, the chance to present HBMD increased by 15%. Still, the habit of not smoking, increased by 4.21 times the chance of having HBMD. Total lean mass maintained its positive influence in BMD, even when using a cutoff value ≥ 1.5 SD in FN and total femur as a criterion for selection in HBMD group
Conclusions: No smoking and high lean mass are important in maintaining HBMD in pos menopausal women. Healthy habits and practice of physical exercise should be encouraged in postmenopausal women, in order to preserve and protect the bone mass.

Disclosure of Interest: None Declared

P550 - QUANTITATIVE MORPHOMETRY ON SPINAL X-RAYS: INITIAL EVALUATION OF A NEW WORKFLOW TOOL FOR POINT PLACEMENT

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Aims: Vertebral height assessed by 6-point quantitative morphometry (QM) provides useful information for the diagnosis of both prevalent and incident vertebral fractures. However, reliable QM requires specially trained technicians and is tedious, making it impractical in clinical routine. The aim of this study was the initial evaluation of a new QM tool developed for clinical use (SpineAnalyzer, Optasia Medical Ltd, Cheadle, UK).
Methods: Using SpineAnalyzer on lateral spine x-rays, a reader initiates analysis by placing a point in the approximate center of each vertebra between T4 and L4. Using a model-based vision engine based on active shape and appearance models, SpineAnalyzer suggests default placements of the 6 points needed to measure posterior, mid and anterior heights of the vertebrae. The reader then makes adjustments if necessary and adds the fracture and differential diagnosis which are captured independently to the QM results in a report. In this study a standard manual 6-point placement was compared with the default placement provided by SpineAnalyzer. To test the performance of the model and in contrast to clinical routine, default placements were not corrected by the reader even if they were obviously incorrect. Lateral lumbar and thoracic x-rays from 100 postmenopausal women (73.7±5 y) with femoral neck T-score<-2.5 and without spinal fractures were used. For each patient T4 to L4 were analyzed except for 8 vertebrae judged unreadable due to low image quality. Anterior, mid and posterior (p) heights were calculated from the 6 points using standard algorithms.
Results: Results: Per vertebral level the root mean square coefficient of variation (rmsCV) of the 3 heights of the automated analysis relative to the manual analysis that was taken as gold standard were derived. The table shows for which vertebrae differences were highest and lowest.

rmsCV [%] of automatic compared to manual analysis		
Height	Minimum	Maximum
Anterior	3.47 / L3	6.67 / T6
Mid	2.82 / T11	5.53 / T6
Posterior	3.81 / L3	5.71 / T6

Conclusions: The performance of the automatic point placement algorithm compared very well with manual QM analysis, which has rmsCV values about 3-4% among readers and 2-3% within readers. The results from SpineAnalyzer were slightly higher but we expect further improvements with operator adjustment.

Disclosure of Interest: None Declared

P551 - QCT OF THE KNEE FOR THE QUANTIFICATION OF SUBCHONDRAL BONE MINERAL DENSITY AND STRUCT

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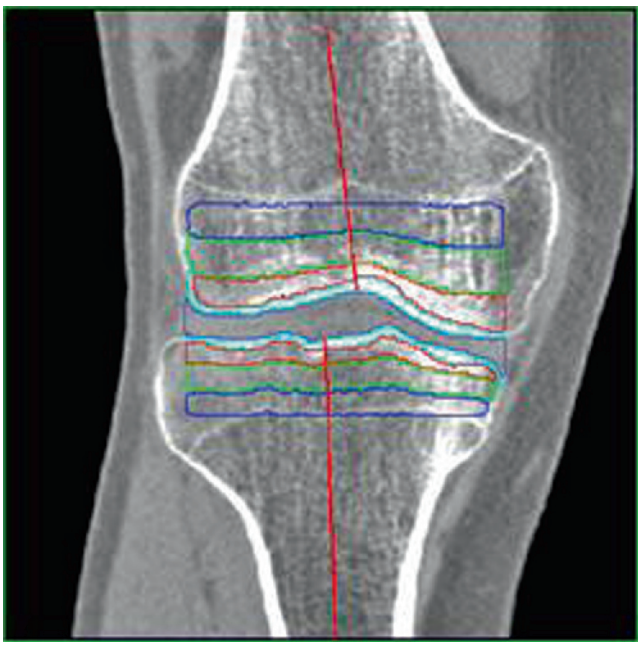
Aims: X-rays and MRI are standard methods in osteoarthritis (OA) to quantify joint space and cartilage properties. However, methods to quantify the deterioration of subchondral bone density and structure are rarely used.
Methods: We developed quantitative computed tomography (QCT) of the knee. The patient is scanned in decubitus position with the target knee as straight as possible. A calibration phantom is positioned below the knee. A high resolution (Siemens UHR protocol, 120 kV, 170 mAs 0.5 mm collimation 13cm FOV) with two reconstructions (medium U40 and high resolution U70 kernel) is used. The U40 reconstruction is used for the segmentation and the determination of BMD, the U70 reconstruction for quantification of structural parameters. An automatic 3D segmentation yields periosteal and endosteal bone surfaces and the growth plates of femur and tibia. In conjunction with anatomical coordinate systems (ACS) of the tibia and the femur this allows for

the reproducible positioning of three volumes of interest (VOIs) in each epiphysis that automatically follow the bone cartilage surface (see Figure). These VOIs are further divided in medial and lateral sub VOIs. The joint space and the small subcortical VOI are also segmented. For each VOI, BMD and several structural parameters, such as homogeneity, structural anisotropy and structural divergence are derived. In addition joint gap width and volume are quantified.

Results: Inter- (4 operators) and intra-operator (3 analyses each) analysis precision has been evaluated using CT scans from 10 subjects. The origin of the ACS varied by less than 1mm and the direction of the shaft axis by less than 2.6°. Reanalysis RMS precision errors for subchondral regions of the tibia (femur) were smaller than 5,3% (3%) for volume, 5% (4%) for BMD, 1,3% (1.1%) for entropy, and less than 2,1% (0.8%) for fractal analysis using a differential box counting.



Conclusions: QCT of the knee may be a promising method to quantify subchondral BMD and bone structure to improve the diagnosis of and treatment monitoring of OA. Due to the advanced 3D segmentation approach excellent inter-operator precision errors were achieved that are important to detect small changes of BMD or bone structure

Acknowledgement: This project was in part supported by Servier France

Disclosure of Interest: None Declared

P552 - EFFECT OF ZOLEDRONIC ACID ON DXA AND QUANTITATIVE ULTRASOUND IN PATIENTS WITH PAGET'S DISEASE OF BONE: ASSOCIATION WITH SERUM BONE MARKERS AND DICKKOPF-1

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Aims: The main aim of this study was to determine the effect of zoledronic acid (ZOL) on parameters of Dual-energy X-ray Absorptiometry (DXA) and quantitative ultrasound (QUS) in unaffected bones of patients with Paget's disease of bone (PDB). Secondary aim was to investigate the association of bone markers and dickkopf (DKK)-1 with parameters of DXA and QUS during the study.

Methods: This was a prospective open-label cohort study. Ten consecutive patients (median age 63 years) with active (documented by both scintigraphy and serum bone markers) polyostotic PDB received a single 5mg ZOL infusion. The patients were subjected to calcaneal QUS before, and 3 and 12 months after ZOL. Two parameters of QUS were measured: broadband ultrasound attenuation (BUA) and speed of sound (SOS). DXA of both lumbar spine (LS) and femoral neck (FN) were performed before and 12 months after ZOL. Blood samples for bone markers [total serum alkaline phosphatase (TSAP), bone-specific serum alkaline phosphatase (BSAP), serum C-terminal cross-linking telopeptide of type I collagen (CTX)] and DKK-1 were serially obtained.

Results: There was a significant increase in LS [median percent increase 24.5 (11.0-27.6), p=0.005] and FN [median percent increase 12.9 (2.3-17.8), p=0.021] bone mineral density (BMD) 12 months after ZOL infusion. Although not statistically significant, BUA decreased in all but one patients at 3 months [median percent decrease 13.6 (2.2-24.2)] and returned to approximately baseline values at 12 months [median percent decrease 2.2 (0.1-5.3)]. SOS remained unaffected throughout the study. A significant correlation between BUA and DKK-1 (r_s= -0.90, $p<0.001$) and between SOS and DKK-1 (r_s= -0.67, p=0.033) at baseline was found, which remained significant in multivariate linear regression analysis after adjustment for gender, age and BMI. However, in multivariate linear regression analysis at 12 months, DKK-1 could not independently predict either BUA or SOS, after adjustment for gender, age and BMI. No correlation was observed between DKK-1 and LS or FN BMD at baseline or between their changes during the study. No correlation between serum bone markers and LS, FN, BUA or SOS was observed at baseline or during the study.

Conclusions: Our data suggest that a single ZOL infusion significantly increases non-pagetic BMD 12 months after treatment but has no effect on QUS parameters or DKK-1. Significant correlations were observed between QUS parameters and DKK-1 at baseline.

Disclosure of Interest: None Declared

P553 - FEASIBILITY OF MEASURING ACUTE CHANGES IN OS CALCIS STIFFNESS INDEX FOLLOWING WHOLE-BODY VIBRATION WITH RESISTANCE AND JUMP TRAINING IN YOUNG WOMEN

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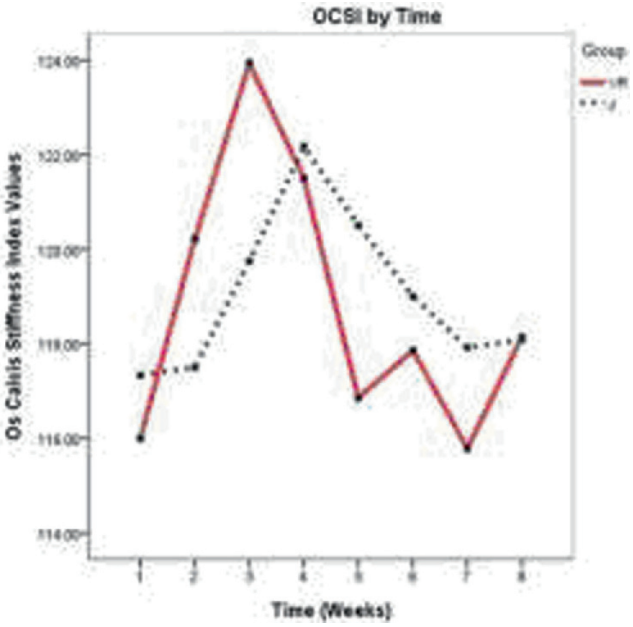
Aims: This study assessed the feasibility of measuring bone strength changes in women following either vibration training plus resistance exercise (VR) or jumping (J).
Methods: Fifty women age 18-45 years with normal 21-40 day menstrual cycles were recruited for this study. Participants were excluded if they reported diseases known to affect bone, orthopedic problems or eating disorders. Os Calcis Stiffness Index (OCSI) was measured to determine bone strength using quantitative ultrasound (Achilles Insight, GE Lunar, Madison, WI). Subjects were matched by OCSI value and randomized into VR (n=24) or J (n=24). Subjects trained 3 d/wk for 6 weeks. VR performed 7 whole-body exercises while standing barefoot on a large vibration platform (Pneu-Vibe Pro, Pneumex, Sandpoint, ID). Resistance was added by having subjects hold weighted bars (Body Bar, Inc., Boulder, CO). J jumped for 1-2 min/d, 2 days at home and 1 day in the lab. OCSI was measured weekly. Pre-post measures of body mass (BM), fat mass (FM), fat free mass (FFM), percent fat (FP), and total bone mineral density (BMD) were measured by Dual Energy X-ray absorptiometry (DXA, GE Lunar, Madison, WI). Group differences by time were assessed by repeated measures ANOVA (SPSS, V17).
Results: 19 VR and 16 J completed the study. No significant between group differences existed at baseline for age, height, weight, body composition variables or bone indices. All demographic and outcome variables were normal at baseline. As seen in Figure 1, significant increases in right OCSI values were found between weeks 1 and 4 (p=0.03) whereas, decreases were shown between weeks 4 and 7 (p=0.02), and between 4 and 8 (p=0.03) in the combined groups. Tests of within subject contrasts show a significant difference between week 3 and 4 with 8 (p=0.02, p<0.01 respectively). Significant differences from pre to post intervention existed between groups for percent fat measured by DXA (p<0.01). No significant time effects were found for left OCSI, or BMD.



Conclusions: Bone strength changed over 8 weeks of VR and J training. This study indicated that using ultrasound to assess acute changes in bone strength was feasible. However, the pattern of OCSI changes over time was variable. It remains unknown if this variability in OCSI reflects an exercise response of biochemical bone turnover.
Acknowledgement: We acknowledge the Graduate and Professional Students Association at Arizona State University as funding sources.

Disclosure of Interest: None Declared

P554 - BONE MINERAL DENSITY IN PATIENTS WITH EARLY ANKYLOSING SPONDYLITIS

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Aims: To determine total body and regional bone mineral density (BMD) in a cohort of patients with early AS.
Methods: Thirty-three patients (26 males and 7 premenopausal women) with early AS, mean age 33,62±10,5 years were evaluated regarding lumbar spine and total hip BMD by dual energy X-ray absorptiometry (DXA). Total body measurements were done with the same device and the results were compared with 33 sex and age-matched controls.
Results: In patients with early AS, BMD was reduced in both lumbar spine (T-score -1.15±1.52) and total hip (T-score -0.71±0.95) as compared with controls (T-score 0.13±1.12, respectively 1.33±0.41, all p<0.05). Total body BMD was also significantly lower in AS patients (p<0.05) and it was correlated with spine BMD (r=0.70; p=0.00523) but not with total hip BMD. Lumbar spine BMD was also correlated with disease duration; no significant correlation was found between BMD at any site and biological markers of disease activity (erythrocyte sedimentation rate and C-reactive protein serum levels).

Conclusions: We found spine osteopenia or osteoporosis in 51.43% patients, while 32% had hip osteopenia and none had hip osteoporosis. AS is associated with generalized bone loss that occurs early in the disease course.

Disclosure of Interest: None Declared

P555 - CORRELATION OF BONE MINERAL DENSITY AND FRACTURES IN POSTMENOPAUSAL FEMALE PATIENTES

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Aims: The aim of this paper was to explore the correlation of bone density measured by DXA method, on the lumbar spine and femur, expressed by T-score with the presence of crash fractures in postmenopausal women.
Methods: Testing was conducted on postmenopausal female patients divided into two groups: with and without crash fractures. In all patients the bone mineral density was measured by DXA method on lumbar spine (L1-L4) and femoral neck. Than we made statistical analysis of data obtained for these two groups.
Results: The study was preformed on a sample of 181 patients. In the first group were 64 women with fractures and in the second group were 125 patients without fractures. The average age of patients in the first group was 64.98 years, and in the second group it was 58.91 years. After DXA measuring in the group with fractures 28 (43.7%) patients were in the group with osteoporosis, 27 (42.2%) with osteopenia and 9 (14.1%) of them had normal findings. In the second group without fractures we found 34 (27.2%) patients with DXA on the level of osteoporosis, 59 (47.2%) at the level of osteopenia and 32 (25.6%) with normal findings. Mean value of T-score on lumbar spine (L1-L4) in first group was -1.53, and in the second group it was -1.19. At the level of femoral neck T-score average value in the first group was -1.69, and in the second group it was -1.00. By comparison of the obtained values we got that T-score at L1-L4 as well as T-score at the femoral neck is highly statistically significant different ($p < 0.001$) between groups.
Conclusions: We can conclude that there was ratified a statistically highly significant difference in values obtained by DXA method, measured at the L1-L4 and femoral neck for subjects with and without fractures, but in the same time the majority of patients with fractures was diagnosed on DXA as osteopenia, so it has to be one, but not the only factor to decide about treating of osteoporosis.

Disclosure of Interest: None Declared

P556 - OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN IN KOSOVA

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Aims: Osteoporosis is metabolic bone disease which is characterized with progressive bone loss, increasing of bone fragility and possibility of spontaneous fracture. This silently progressing metabolic bone disease, as public and health-world widely problem, is present also in Kosova. Rapid bone loss occurs in postmenopausal women due to hormonal factors which lead to increased risk factors. DXA osteodensitometry and biochemical markers of bone metabolism are used to assess skeletal turnover. In the study were investigated 180 pre-and postmenopausal women in Clinic "Rheuma" in Prishtina, in period from June to December of 2009.
Methods: This study suggests that measurement of BMD with DXA osteodensitometry, risk factors and biochemical markers (serum calcium, phosphorus and alkaline phosphatase) could be used as indicators of bone turnover.
Results: The study group consisted of 95 postmenopausal women in the age group of 60.53% years and 85 premenopausal women in the age group of 38.51% years. In pre and post menopausal women were investigated risk factors, BMD with DXA osteodensitometry STRATOS 800 and bone formation markers (Calcium (Ca), phosphorus(Ph) and alkaline phosphatase (ALP)). Calcium and phosphorus were significantly decreased ($p<0/001$) and Alkaline phosphatase was significantly increased ($p<0.001$) in postmenopausal women compared to premenopausal women.
Conclusions: Results of the study, measured with DXA osteodensitometry and biochemical markers may help to identify women at greatest risk for bone loss who would benefit most from therapeutic interventions and to minimize fracture due to osteoporotic changes.

Disclosure of Interest: None Declared

P557 - STUDY OF BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN IN CENTRAL TUNISIA

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Aims: Osteoporosis is characterized by low bone mass with a consequent increase in bone fragility and susceptibility to fracture. The aim of our work is to analyze the requirements and conditions of the results of bone mineral density (BMD) in postmenopausal women admitted to our service.
Methods: This is a retrospective study including 1000 postmenopausal women, explored in the center of BMD Farhat Hached Hospital Sousse (Tunisia) by DXA method over a period ranging from December 2006 to October 2009.

Results: It is 1000 postmenopausal women, divided into 2 groups, group A (osteoporotic women n=480) and group B (non-osteoporotic women n=520). The mean age is 66.46 years and 59.83 years respectively in group A and B. The mean age of menopause was 47.15 years and 47.36 years (p=0.56) with an average duration of menopause was 18.99 years and 12.73 years (p <0, 0001) respectively in group A and B. The average BMI in group A was 29.31 versus 31.86 in group B (p <0.0001). The number of obese postmenopausal women was 186 in group A (38.75%) and 319 in group B (61.34%). Personal history of fractures were noted in 202 and 94 patients respectively in group A and B (p <0.0001). The history of health system and taking glucocorticoid are present in 7.91% and 15.4% women in group A versus 7.11% and 14.4% of group B (p> 0.05). A negative correlation between T-score with age and duration of menopause and a positive correlation with BMI are objectified. **Conclusions:** Osteoporosis is the leading cause of fractures in postmenopausal women, the risk increases with age, history of fracture and duration of menopause. 42.08% of our postmenopausal osteoporotic patients are seen at the stage of fracture, indicate early BMD in postmenopausal women before the onset of fracture.

Disclosure of Interest: None Declared

P558 - CORRELATION BETWEEN OSTEOPOROTIC FRACTURE AND BONE MINERAL DENSITY IN CENTRAL TUNISIA

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Aims: Osteoporotic fractures are associated with reduced quality of life and excess mortality. These fractures can occur without osteoporosis densitometry. The aim of our work is to study the correlation between different types of osteoporotic fractures and bone mineral density (BMD).
Methods: Retrospective study of 1000 postmenopausal women, explored in the center of BMD Farhat Hached Hospital Sousse by DXA method over a period ranging from December 2006 to October 2009.
Results: It is 1000 postmenopausal women, divided into 2 groups, group 1 (women with a history of fracture, n=297) and group 2 (women without history of fracture, n=703). Family history of fractures were observed respectively in 30 and 76 patients (p=0, 89). A history of taking glucocorticoid and disease system were found respectively in 19 and 3 patients in group 1 and 131 and 72 patients in group 2 ($p < 10^{-3}$). The mean age of our patients was 65.4 years and 61.9 years respectively in groups 1 and 2 ($p < 10^{-3}$). The mean age of menopause was 47,19 years and 47,28 years respectively in group 1 and 2 (p=0,81) and the average duration of menopause was 18,22 years and 14,22 years respectively in group 1 and 2 ($p < 10^{-3}$). The mean weight of patients was 68.53 kg and 72.96 kg ($p < 10^{-3}$) and mean BMI was 29.76 kg/m^2et 31 kg/m^2 ($p=10^{-3}$) in both groups 1 and 2. Osteoporosis was noted in 68.01% in group 1 and 39.68% in group 2 ($p < 10^{-3}$). The osteopenia and normal BMD were found respectively in 22,6% and 9,1% in group 1 and 44,2% and 16,2% in group 2($p < 10^{-3}$). The fractures were classified into osteoporotic vertebrae fracture in 104 cases (35%), hip fracture in 33 cases (11.1%), wrist fracture in 98 cases (32.9%) and other peripheral fractures in 80 cases (26.9%). Osteoporosis has been observed in the group of patients with vertebra fracture in 83 cases (79, 8%), 65 patients (66.3%) with wrist fractures and 26 patients (78.7%) with hip fracture. A measure of BMD was normal in 8 patients (8.1%) with wrist fractures, 6 patients (5.7%) with vertebral fractures and in 13 (16.25%) patients with other peripheral fractures. However we did not note the normal BMD in patients with hip fracture.
Conclusions: Osteoporotic fractures worsen the functional and vital prognosis of postmenopausal women. Osteopenia in contrast to osteoporosis was more frequent in group 2 and fractures can occur without osteoporosis densitometry hence the importance of prevention.

Disclosure of Interest: None Declared

P559 - THE CHANGE OF BONE MASS IN PATIENTS WITH TOTAL HIP REPLACMENT TREATED WITH ORAL BISPHOSPHONATES (BONVIVA) ONCE MONTHLY

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Aims: The purpose of the following study was to evaluate the possible positive effect of Bonviva treatment on hip bone mass in patients operated with total hip replacement.
Methods: The study involved 76 patients treated surgically with Total Hip Replacement from 2005-2009. There were 49 women and 27 men, mean age 59,5 years, (ranging from 39- 74). The main cause of intervention was secondary hip osteoarthrosis due to Developmental Dysplasia of the Hip, Perthes Disease, Head Osteonecrosis. 46 patients (60±) had a cementless hip prosthesis and 30 patients (40±) had a cemented prosthesis. The mean hospitalization time was 11 days. The patients were divided in two groups. In the first group of 39 patients the treatment with Bonviva (ibandronate) 150 mg monthly was started two months prior to surgery and was continued for six more months after the surgery. The medication was supplemented with 600 mg Ca + 400 UI Vit D3 . The second group of 37 patients received in the same period of time the treatment with 600 mg Ca + 400 UI Vit D3 .Prior to medical treatment the patients had a BMD measurement of the opposite hip using the Lunar (GE) DXA-machine. The second BMD measurement was made in all patients 8 months after surgery.
Results: From the first bone mass measurement we received the following data . In the Ibandronate treated group women had a T-score: -2.2 SD, men had a T-score: -1.8 SD. The same group of patients were tested again after 10 months and resulted as follows: women had a T-score: -1.8 SD, men had a T-score: - 1.5 SD. The second group (no Bonviva treatment) were found from the first measurement prior to surgery: women had a T-score: -2.0 SD, men had a T-score: -1.9 SD. The same group of patients were tested again after 10 months and resulted as follows: women had

a T-score: -2.8 SD, men had a T-score: - 2.2 SD. (p<0.05) .(Fisher statistical testing was used).
Conclusions: The results analyzed in our study revealed a significant statistical difference between two groups emphasizing the protective effect of Bonviva 150 mg once-monthly on bone metabolism during the first months after total hip replacement surgery.

Disclosure of Interest: None Declared

P560 - EVALUATION OF THE CONTENT OF CALCIUM IN THE SPECIMENS OF HAIRS AND ITS CONNECTION WITH THE DATA OF QUANTITATIVE ULTRASOUND IN CHILDREN OF BELARUS

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Aims: to determine the content of calcium (Ca) in the specimens of hairs and evaluate its connection with the data of quantitative ultrasound (QUS) in children of Belarus.
Methods: 190 pupils (102 girls (mean age 13,29±2,17 years) and 88 boys (mean age 13,49±1,98 years)) of schools of Gomel and Vitebsk regions of Belarus were examined. The evaluation of bone tissue was performed by two different methods of quantitative ultrasound (QUS): QUS of the heel (Achilles InSight, GE, Lunar, USA) and proximal phalanges of II – V fingers of non dominant hand (DMB Sonic 1200 (IGEA, Capri, Italy). The content of Ca in hairs was measured by nuclear emission spectrometry (spectrometer «VISTA-PRO», Varian, USA).
Results: Obtained results are presented in the table 1.

Table 1 – data of QUS and content of Ca in specimens of hairs.

Meaning (M±δ)	girls	boys
Age, years	13,29±2,17	13,49±1,98
SoS, m/sec	1574,67±28,13	1571,52±29,84
BUA,	103,84±12,56	106,30±13,34
stf	89,86±14,75	90,78±15,93
AD-SoS, m/sec	1975,87±74,18	1944,20±83,83
UBPI	0,67±0,16	0,56±0,18
Ca, mcg/kg	1772,39±1079,22	572,84±509,96

The individual level of the content of Ca in hairs of the examined persons of both sexes was characterized by significant variations. Thus, median of the content of Ca in female subjects was 1433,92 mcg/kg (min 233,0 mcg/kg, max – 5748,0 mcg/kg), in male – 365,0 mcg/kg (min 168,0 mcg/kg and max– 2538,8 mcg/kg). The comparison of QUS data in persons with high and low content of Ca in specimens of hairs revealed that in those with high level of Ca higher meanings of QUS of phalanges were observed: AD-SoS 1991,80±81,11 m/sec and 1941,12±85,58 m/sec respectively (p<0,01), UBPI 0,66±0,18 and 0,57±0,17 (p<0,05).
Conclusions: The analysis of the content of calcium in the specimens of hairs showed gender differences with the marked increasing of calcium content in female subjects. There are statistically significant correlations between the QUS of the phalanges and the level of calcium in hairs in persons with the increased level of calcium in specimens of hairs.

Disclosure of Interest: None Declared

P561 - CALCIUM INTAKE AND BONE TISSUE STATUS IN CHILDREN OF BELARUS

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Aims: To reveal the content of calcium (Ca) in daily nutrition and its influence on the parameters of quantitative ultrasound of the heel and phalanges.
Methods: 109 girls (mean age 14,19±2,0 years) and 63 boys (mean age 13,35±2,20 years) were examined. The evaluation of Ca intake with daily nutrition was performed by the method of questioning for a three days period. The status of bone health was measured by quantitative ultrasound (QUS) of the heel (Achilles InSight, GE, Lunar, USA; showings: speed of sound – SoS, broadband ultrasound attenuation – BUA and stiffness - stf) and phalanges (DMB Sonic 1200 (IGEA, Capri, Italy; showings: amplitude dependent speed of sound – AD-SoS, ultrasound bone profile index - UBPI).
Results: The level of the mean daily Ca intake was 479 mg: 465,71±186,65 in girls and 470,31±191,25 in boys. To reveal the differences in QUS data in persons with different level of the content of Ca in daily meal all the examined persons were divided in two groups: at the group I daily Ca intake consisted 400 – 1200 mg /day, at the group II – less than 400 mg/day. The number of examined at the first group was 108 persons, at the group II – 72. The comparative characteristic of the groups with the use of Student's t-criterion didn't reveal statistically significant differences of QUS data in persons with different level of Ca intake.
Conclusions: Correlative analyses between the content of Ca in daily nutrition and showings of QUS failed to establish significant correlations between examined parameters: the meanings of the Pirson's coefficient varied from -0,20 to 0,11, but there were no observed statistical significance of the data.

Disclosure of Interest: None Declared

P562 - THE RELATIONSHIP BETWEEN BONE MINERAL DENSITY AND HOMOCYSTEINE AND FOLATE LEVELS IN CROATIAN PERI- AND POSTMENOPAUSAL WOMEN

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Aims: Confusing data exist regarding the relation between homocysteine (Hcy) and bone loss in peri- and postmenopausal women. The aim of this study was to investigate relationship between bone mineral density and Hcy and folate levels in a group of Croatian peri- and postmenopausal women.

Methods: Participants were 130 women with mean age 53.8±4.8 years (age range 45-64 years). BMD was measured using dual-energy X-ray absorptiometry (DXA; Lunar-Prodigy, Madison, WI). Measurements were made at the left femoral neck and lumbar spine (L1-L4). Overnight fasting blood samples were drawn in order to measure serum and erythrocyte (RBC) folate and plasma Hcy. Subjects were divided into 2 categories based on their T-score: T-score > -1.5 (normal bone mineral density (BMD)) and T-score ≤ -1.5 (lower BMD – osteopenia or osteoporosis) on either femur or lumbar spine.
Results: The mean age of normal BMD group was 53.4 years, and for lower BMD group was 55.1 years. Normal bone mineral density had 75% of participants and T-score ≤ -1.5 had 25% of 130 women. Only 1 participant had an osteoporosis (T-score ≤ -2.5) on both femur and lumbar spine. The mean body mass index (BMI) of the normal BMD group was statistically higher than mean BMI of lower BMD group ($p<0.05$). There was no statistically significant difference between groups for the mean plasma Hcy and serum and RBC folate.
Conclusions: Our results showed that Hcy and folate levels were not related with BMD in the group of peri- and postmenopausal women. In the context of other similar studies and based on this preliminary results we incline to the opinion that BMD mainly reflects bone mineralization and provides only an integral measure of bone metabolism over time but not the current status of bone metabolism. However, future studies including intervention studies are necessary to establish the association between Hcy level, folate level and osteoporosis.

Disclosure of Interest: None Declared

P563 - MISCLASSIFICATION OF PATIENTS WITH OSTEOPOROSIS ACCORDING TO THE USED REFERENCE CURVE

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Aims: Differences between populations in bone mineral density reference curve are widely reported. The use of a reference other than its own may lead to an excessive osteoporosis diagnosis. The purpose of this study is to determine the prevalence of misclassified postmenopausal women regarding their bone density status according to different reference peak bone masses.
Methods: This is a population-based study, carried out in Douera city (50 000 inhabitants town near Algiers). One thousand two hundred and fifty five (1255) postmenopausal women were randomly selected. For all of them a bone mineral density was obtained using a Hologic QDR 2000 apparatus. Both hip and spine sites were measured. Patients were classified (normal, osteopenia or osteoporosis) according to the world health organization osteoporosis classification. For the calculation of the T-score we used the peak bone mass of a local study and the OFELY (**o**steoporose **fe**mme de **Ly**on) one. The percentage of misclassified subjects for different bone status stages is calculated.
Results: The mean study population age is: 61.7 years. The number of misclassified women was nearly the same at both the hip and the spine sites. When classifying the subjects by taking in account the lowest site (international society for clinical densitometry recommendation) **9±** of women are misclassified. These results are summarized in the following table.

OFELY DOUERA	normal	**Osteopenia**	**Osteoporosis**	**Total Douera**
normal	292	40	0	**332**
Osteopenia	0	378	73	**451**
Osteopenia	0	0	472	**472**
Total OFELY	**292**	418	545	1255

Conclusions: This study showed that there are a great number of misclassified women. This leads to prescribe an unnecessary expensive treatment for women who have osteoporosis but who have actually osteopenia.

Disclosure of Interest: N. Hammoumraoui Grant / Research Support from: sanofi-aventis, H. Djoudi: None Declared

P564 - LONG TERM AGREEMENT BETWEEN TWO DIFFERENT CENTRES REGARDING JOINT SPACE NARROWING MEASUREMENT IN KNEE OSTEOARTHRITIS

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Aims: To compare the long term agreement between two reading centers for the radiological assessment of joint space narrowing (JSN) over time in osteoarthritic patients.
Methods: 70 females from the OFELY[1] cohort with radiological osteoarthritis (Altman scoring >2) performed at baseline and 48 months later knee x-rays using a standardised semi-flexed with positioning frame protocol.

Two different and independent centres, both with an initial common training were involved in this study, the first one located in Lyon (France) and the other one in Liege (Belgium) with one reader by centre.

Each knee X ray was read twice by each centre with knowledge of the time sequence[2], using a semi automated method (fixed location) with landmark at baseline. The long term agreement between the two centres was assessed for joint space width (JSW) and JSN between baseline and M048, using an intra class correlation coefficient (ICC) and a Bland Altman graph.
Results: The table shows ICC for JSW and JSN, Bland Altman results for JSN. The agreement is good for ICC over 0.8. For the Bland Altman method, narrowed limits of agreement confirm a good accuracy and a mean difference close to 0 eliminates a systematic difference between centres.

Reproducibility	**JSW (ICC/ 95% CI) Baseline**	**JSW (ICC/ 95% CI) M048**	**JSN (ICC/ 95% CI)**	**JSN (mean difference; mm± SD/ 95% CI, limits of agreement) Bland Altman**
Inter centre	**0.939** [0.791;0.974]	**0.969** [0.922;0.985]	**0.854** [0.775;0.906]	**-0.056** ±0.32 [-0.133;0.021]

Conclusions: We observed that with two different and independent readings, the long term agreement is high with the same reading method. This finding will be helpful in the assessment of cartilage loss over large intervals of time in knee osteoarthritis clinical trials.
References: 1.Delmas P. Apparent pre- and postmenopausal bone loss evaluated by DX A at different skeletal sites in women: the OFELY cohort. JBMR 1997; 2.Gensburger D. Influence of blinding sequence of radiographs on the reproducibility of knee joint space width measurement in osteoarthritis Oral Communication ECCEO 2009

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P565 - COMPARISON OF STANDARD RADIOGRAPHY (SR) AND INSTANT VERTEBRAL ASSESSMENT (IVA) AT DENSITOMETRY FOR VERTABRAE FRACTURES DIAGNOSTICS

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Aims: Presence of a vertebral fracture significantly increases the risk of future fracture and play important role in verification of the diagnosis of osteoporosis. However, majority of vertebral fractures are silent and lateral X-rays (the standard method for identification) are not routinely obtained due to additional exposure to radiation and higher cost. The aim of study to compare using SR diagnostic capabilities in lateral projection and IVA, a technology that utilized dual-energy X-ray absorptiometry (DXA).
Methods: SR and IVA have been performed in 210 postmenopausal women in the age range of 60-75 years, with osteoporosis diagnosed using DXA ("Delphy" Hologic), having T-score (L1-L4) ≥ -2,5. The results obtained from X-ray morphometry were compared to IVA results.
Results: The frequency of vertebrae fractures detected by SR method in examined group was equal 49%. Contrary to SR, the vertebrae Th5-Th8 at IVA in 12% cases were unavailable for investigation because of poor visualization. The IVA sensitivity was 81%, and specificity was 55%. Computer automatic calculation of the indexes is a clear advantage of IVA, against X-ray morphometry which is more labour and time consuming. In both cases the borders of vertebrae are set by researcher, resulting in the values of backboned indexes of difference between the two methods being uncertain.
Conclusions: The IVA method is rather high sensitive and can be used for vertebrae fractures diagnostics at osteoporosis. The limitations of method application are caused by poor visualization.

Disclosure of Interest: None Declared

P566 - THE RELATION BETWEEN OSTEOPOROTIC VERTEBRAL FRACTURES AND BONE MINERAL DENSITY AND 25OHVITAMIN D LEVELS IN TURKISH GERIATRIC PATIENTS

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Aims: To determine the relationship between bone mineral density, osteoporotic vertebra fractures and vitamin D levels.
Methods: Two hundred patients (65 years and older) were included this study. All patients were questioned for osteoporosis risk factors. L1-4 vertebrae and femur bone mineral densities (BMD) were measured by DXA. Vertebral fractures were evaluated by Genant methodology and spinal deformity indices (SDI) was calculated. Patients were divided 3 group according to SDI (normal=group 1, mild deformity= group 2, moderate deformity=group 3). 25 OH vitamin D levels and bone turnover markers were measured all patients.
Results: While SDI was normal (grade 0)in 21 patients, mild (grade 1) and moderate deformities were found in 155 patients (77.5%) and in 24 patients (12%), respectively. None of the patients had severe (grade 3) deformity. Femoral neck BMD values of moderate deformity groups was lower than mild deformity group (p=0.034). There was no relation between SDI and lumbar spine BMD values (p=0.0670). When the SDI groups were compared, we found no statistically significant difference in 25OHvitamin D levels and bone turnover markers (p>0.05). The 25OHvitamin D levels of patients covered up with clothes and not exposed to sun were significantly lower 25OHVitamin D levels (p=0.008).
Conclusions: According to our results, the majority of geriatric patients have osteoporotic vertebral fractures. It seems to be that vertebral fractures does not exactly correlate with vertebral DXA measurements. Because age is related with fractures irrespective of BMD, patients who has osteoporotic fracture should be evaluated with BMD along with clinical and radiological findings.

Disclosure of Interest: None Declared

P567 - VALIDITY OF DIGITAL DENTAL PANORAMIC RADIOGRAPHS FOR IDENTIFYING POSTMENOPAUSAL WOMEN WITH REDUCED SKELETAL BONE MINERAL DENSITIES

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Aims: to determine whether two different radiological indices of the mandibular cortical layer is useful for identifying women with low skeletal bone mineral density.
Methods: In the study were included 131 postmenopausal women aged 49-89 years (average age 64.97 years), attending for routine dental treatment. Digital dental panoramic radiographs (DPRs) (*Pantomograph Trophypan C, Trophy Windows 6. 04)* and bone mineral density measurements (BMD) of lumbar spine and both hips by dual energy X-ray absorptiometry (DXA) (*Lunar DXA DPX-NT, GE Medical Systems*) were carried out for each patient. Based on DXA results patients were divided into 3 groups: normal bone density (*T-score ≥ -1.0*), osteopenia (*T-score from -1.0 till -2. 5*) and osteoporosis (*T-score ≤ -2. 5*). DPRs were used to determine mental index (MI)(Ledgerton,1999) and cortical index (C) (Klemetti, 1994). Measurements were made by 3 independent observers. Each observer made 2 measures with a period of at least 2 weeks between observations. To test differences between proportions *Pearson chi²* test was used. Difference between groups was evaluated by *T-test*. The sensitivity and specificity were calculated in dichotomous 2 x 2 tables.
Results: There was statically significant difference between the groups according MI (p= 0.0001) and C (p< 0.0001). The mean sensitivity and specificity identifying women with low bone mineral density by cortical index were 94.1% and 38.8%. Overall mean sensitivity and specificity differentiating women with low bone mineral density by mental index were 64.4± and 52.7±, but identifying women with osteoporosis were 78.3% and 47.8%.
Conclusions: Cortical index and mental index detected from digital panoramic radiographs might be useful for identifying postmenopausal women who have undetected low BMD and should undergo further testing with bone densitometry.
References: Ledgerton D et al, Dentomaxillofac Radiol 1999;28:173; Klemetti E, Kolmakov S, Kroger H, Scand J Dent Res 1994;102:68
Acknowledgement: Supported by European Social Fund

Disclosure of Interest: None Declared

P568 - EARLY MENOPAUSE INCREASES RISK FOR OSTEOPOROSIS AND FRAGILITY FRACTURES

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Aims: This prospective population-based study aimed to characterize the association between age at MP and the risk of sustaining osteoporosis or fracture.
Methods: Included were 390 women, all aged 48 at study start. Menopausal status was registered and bone mineral density (BMD) of the distal forearm was evaluated by single-photon absorptiometry. During the 29-year follow-up period, age at MP was determined prospectively by repeated hormone assessments in women still menstruating at age 48 (n=285). Fractures were continuously recorded by radiographic archives, questionnaires and phone interviews. At study end, prevalence of osteoporosis in the 198 remaining women was determined by dual energy X-ray absorptiometry measurements. Osteoporosis was noted if T-score was lower than -2.5 SD in lumbar or hip BMD.
Results: In the women that were postmenopausal at study start (n=105), forearm BMD was 0.31 SD (95% CI 0.08, 0.54) lower at age 48 and 0.32 SD (95% CI 0.05, 0.66) lower at age 77 compared to the women who were still menstruating at study start (n=285). Forearm BMD at age 48 correlated with lumbar spine BMD (r=0.36, p<0.001) and hip BMD (r=0.24, p<0.001) at age 77. At age 48 years, being postmenopausal compared to still menstruating, was associated with a risk ratio of 1.7 (95% CI 1.15, 2.51) for having osteoporosis at age 77. For each SD lower BMD found at age 48 years, the associated risk ratio was 1.42 (95% CI 1.19, 1.68) for sustaining a fragility fracture during the follow-up period. For each five year younger age at menopause, the associated risk ratio was 1.19 (95% CI 1.00, 1.41) for sustaining a fragility fracture.
Conclusions: This prospective study infers that young age at MP is a risk factor for osteoporosis at age 77 and low BMD and low age at MP are both risk factors for fragility fracture. In this cohort, a 5years earlier MP was associated with a 19% increased risk for fragility fracture.

Disclosure of Interest: None Declared

P569 - ESTIMATION OF STRUCTURE MODEL INDEX FROM GRAY-LEVEL IMAGES

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Aims: The aim of the presented study was to develop a method of estimating structure model index from gray-level images.
Methods: An important non-metric characteristic of trabecular network is the structure model index (SMI) defined as follows $SMI=6(dS_V/dr)V_V/(S_V^2)$, where S_V and V_V are the surface and the volume of a structure of interest and the derivative of S_V is taken with respect to the shift of the structure surface in the direction perpendicular to that surface. In order to calculate SMI, basing

on an image of trabecular bone, the image is binarized and then the trabecular surface is triangulated, before computing the derivative of S_V. However, when analyzing clinical data, image binarization should be skipped. In order to derive a gray-level image based estimate of SMI the following notation is introduced. Let Im(**x**) denotes intensity of an image Im at point **x**. An erosion of Im by a structuring element e is denoted eIm. Here it is shown that the definition of SMI is equivalent to the following formulae: SMI=6(1-eS/S)/(1-eV/V), where V (S) and eV (eS) denote structure volume (surface) in Im and eIm. Estimates of volume V and surface S can be derived from Im (and eIm) for both binary and gray-level images and thus SMI can be derived from gray-level images. SMI value can be possibly influenced, especially for thin elements, by the finite size of an eroding element e. A technique is proposed to reduce the finite size errors.

Results: The performance of the method was tested for structures for which SMI can be calculated analytically and for microCT images of distal radius trabecular bone. In particular, it was tested how blurring, down-sampling and noise influence the proposed estimate of SMI. The original microCT images (pixel size equal to 34 microns) were blurred (the size of blurring kernel up to 5 pixels), down-sampled to pixel size up to 170 microns and corrupted with noise of varying intensity (ratio of an image mean to standard deviation of noise even of the order of 1). Even in the worst conditions, the correlation coefficient of the estimates of SMI with the gold-standard microCT values is of the order of 0.90.

Conclusions: In the study it is shown that SMI can be derived from gray-level images. The study demonstrated the next, besides anisotropy [1], example of a mathematically sound replacement of a binary-image-based architectural parameter by a gray-level image-based equivalent.

References: [1] Z Tabor, Med Eng Phys 2009;31:1313

Acknowledgement: The study was supported by government grant NN518423536.

Disclosure of Interest: None Declared

P570 - EARLY SMOKING IS ASSOCIATED WITH PEAK BONE MASS AND PREVALENT FRACTURES IN YOUNG HEALTHY MEN

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Aims: Smoking is associated with lower bone mass and increased fracture risk, though most evidence has been derived from studies in elderly subjects using DXA. This study investigates smoking habits in relation to areal, volumetric bone parameters and fracture prevalence in young healthy males at peak bone mass. Possible interactions with sex steroid action were investigated.

Methods: We recruited 677 healthy male siblings at the age of peak bone mass (25-45 yrs) in a cross-sectional, population-based study. Trabecular and cortical bone parameters of the radius and cortical bone parameters of the tibia were assessed using peripheral quantitative computed tomography. Areal bone mass was determined using DXA. Sex steroids, bone markers were determined using immunoassays. Prevalent fractures and smoking habits were assessed using questionnaires

Results: Self-reported fractures were more prevalent in the actual smokers, compared to non-smokers (p=0.004) with a fracture prevalence odds ratio of 1.75 (1.20-2.57), unaffected by adjustment for age, weight, physical activity or alcohol use. Actual smoking was associated with a larger endosteal circumference at both radius and tibia ($p<0.05$) and a decreased cortical thickness (p=0.01) at the tibia. Particularly, early smokers (<16y) had lower areal BMD (p=0.002), together with lower cortical bone area at the tibia and lower trabecular and cortical bone density at the radius. An interaction between free estradiol and actual smoking was observed in statistical models predicting cortical area and thickness ($b=0.23\pm0.09$; $p=0.01$), with apparent protective effects of increasing estradiol concentrations.

Conclusions: Smoking at a young age is associated with unfavourable bone density and geometry and is associated with an increased fracture prevalence, providing arguments for a disturbed acquisition of peak bone mass during puberty by smoking, possibly due to an interaction with sex steroid action.

Disclosure of Interest: None Declared

P571 - CORRELATION BETWEEN BMD MEASURED BY PERIPHERAL AND CENTRAL DXA IN HEALTHY INDIAN CHILDREN AND ADOLESCENTS AGED 10-18 YEARS

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Aims: Use of central DXA (cDXA) for epidemiological studies is logistically difficult. Peripheral DXA (pDXA) has been used to measure BMD in distal forearm and calcaneus in community to decide need for detailed BMD assessment. Aims were to assess the correlation between pDXA and cDXA BMD measures in children and adolescents and to determine the optimal Z score thresholds of pDXA for predicting three predefined Z score cutoffs (≤-1, ≤-1.5 and ≤-2) of cDXA.

Methods: A total of 844 (441 boys, 403 girls) subjects between 10-18 yrs of age were recruited from Delhi schools. BMD of the antero-posterior lumbar spine (L1-L4), left proximal femur and left forearm was measured by cDXA (Prodigy Oracle, GE Lunar). Peripheral BMD of left radius and left calcaneus was estimated using pDXA (Osteosys EXA 3000, Osteosys Corporation). Pearson's correlation was used to estimate the correlation between pDXA and cDXA BMD measures. Receiver operating characteristic (ROC) curve analysis was used to determine optimal Z score thresholds of peripheral DXA for predicting Z score cutoffs (≤-1, ≤-1.5 and ≤-2) of central DXA.

Results: Correlation was statistically significant at all sites (p value <0.01). Gender difference was observed in the extent of correlation between peripheral and central BMD. Correlation coefficients in boys ranged from 0.56 to 0.79 whereas in girls they varied from 0.17 to 0.32. The highest correlation for LF BMD was with

radius total BMD in both boys and girls (0.79 and 0.31 respectively). The highest correlation for LC BMD was with femur total BMD in boys and with femur trochanter BMD in girls (0.68 and 0.32 respectively). Optimal Z scores, sensitivity and specificity of LF BMD and LC BMD in predicting three predefined Z score cutoffs (≤-1, ≤-1.5 and ≤-2) of central DXA were determined using ROC curve analysis. Area under curves of LCBMD and LFBMD Z scores were significantly smaller in girls as compared to boys at all the 3 Z score cut offs. Area under curves in boys ranged from 0.67 to 0.79 and in girls from 0.57 to 0.7 between different sites.
Conclusions: Significant positive correlation was found between BMD measurements of pDXA and cDXA in healthy Indian children. A strong gender difference was observed in both the extent of correlation and in the ability of peripheral BMD to predict central BMD. Peripheral BMD in girls had significantly lower correlation and lesser predictability of central BMD as compared to males.

Disclosure of Interest: None Declared

P572 - THE INVESTIGATIGATION OF THE FACTORS INFLUENCING BONE MINERAL DENSITY OF POSTMENOPAUSAL WOMEN

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Aims: The aim of this study was to determine the risk factors influencing bone mineral density of postmenopausal women. There fore it may play a role as a guide in planning and implementation of health services for postmenopausal women.
Methods: The sample of the descriptive study is composed of 234 women who attended to the Menopause clinic of Ministry of Health Hospital in Ankara and whose femur neck and lumbar$_{2-4}$ vertebra bone mineral density measurements were made. Data were collected by face to face interview using a data collection form. Results of bone mineral density measurements of femur neck and Lumbar$_{2-4}$ vertebrae are listed and classified into normal, osteopenia and osteoporosis categories. Bone mineral density measurements of women were done by using DXA technique by a specialized expert.

In the analysis of the data, SPSS (Statistical Package for Social Science) 10.0 programme was used. In the evaluation of the data, percentages, chi square and Pearson chi square statistical methods were used. Statistical significance was defined as $p<0.05$.
Results: In the study, statistically significant differences have been identified between the duration of menopause, prolongation of the lactation period, receive of hormone replacement therapy, current health problems and having a first degree relative diagnosed with osteoporosis and bone mineral density in femur neck and lumbar vertebrae$_{2-4}$ ($p<0.05$). There was no significant relationship between education status, place of residence, natural skin and hair colour, body mass index, the habit of smoking, coffee and tea drinking and alcohol use, age at menarche, number of live birth, use of birth control pill, having a relative with hip fracture after menopause and FN and LV2-4 bone mineral densities ($P>0.05$).
Conclusions: This research contributes to the literature relevant to the risk factors of osteoporosis by indicating the adverse affect of prolonged lactation period, early cessation of hormone replacement treatment and having relatives with osteoporosis after menopause on bone mineral density of women during the postmenopausal period.
Acknowledgement: We would like to thank to Visiting Professor Rich Zeller in the Kent State University for his excellent comments and helpful suggestion of our manuscript.

Disclosure of Interest: None Declared

P573 - ASSESSMENT OF BONE BIOCHEMICAL INDICATORS IN THALASSAEMIA AND SICKLE CELL ANEMIA

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Aims: Patients with thalassaemia present progressive damage of bone early from childhood. Skeletal disorders and complications such as automatic fractures, osteopenia and severe osteoporosis are frequent findings. In bone damage of thalassaemia the etiology is multifactorial since acquired and genetic factors are involved .Some patients with sickle cell anemia have deficiency of vit.D and low bone mass. So the understanding of the existent mechanisms in bone damage in thalasaemia and in sickle cell anemia is of prime importance. We evaluated the abnormalities of calcium, phosphorus, parathormone and osteocalcin in these patients.
Methods: We studied 65 patients, 25 men and 40 women, aged from 18 to 75 years, divided in three groups.30 patients with homozygous β- thalassaemia, 20 with intermedia and 15 with sickle cell anemia. We also used a control group of 35 healthy subjects. Calcium (Ca) and phosphorus (Pi) serum levels were determined using photometric method. Parathormone (i-PTH) and osteocalcin (BGP) were measured with electrochemiluminescence immunoassay.
Results: Serum level of BGP was significantly lower both in patients with homozygous β-thalassaemia and in patients with sickle cell anemia, $p<0,05$) compared to the healthy group, ($p<0,05$). All bone marker levels in patients with intermedia thalassaemia were normal. There was no statistically significant difference compared to the healthy group in the serum levels of Ca, Pi and i-PTH. Positive statistic correlation was found in subjects with homozygous β-thalassaemia between BGP and Pi ($r=0,534$,$p<0,01$)and in subjects with sickle cell disease between BGP and i-PTH ($r=0,723$,$p<0,01$).
Conclusions: 1.The patients with homozygous β-thalassaemia, intermedia-thalassaemia and sickle cell anemia have lower bone anabolism compared to the healthy group. 2. Osteocalcin (BGP) consists a very useful marker in the biochemical assessment of bone metabolism in patients with thalassaemia and with sickle cell anemia. It is observed that, even after the correction of the haemoglobin levels, the satisfactory hormone therapy and the efficient iron chelation, the patients continue to have abnormal bone metabolism. As a result they present severe decrease of bone density probably because of the elevated bone absorption.

References: 1. Voskaridou E, Haema Nov 2008:65.

Disclosure of Interest: None Declared

P574 - CALCIUM-PHOSPHORUS METABOLISM AND PARATHYROID FUNCTION IN PATIENTS WITH END STAGE CHRONIC KIDNEY DISEASE

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Aims: Patients with chronic kidney disease undergoing haemodialysis present increased secretion of parathyroid hormone, resulting to secondary hyperparathyroidism. Hypocalcemia, hyperphosphatemia and reduced activity of calcitriol characterise this disorder which leads to high bone turn over. The therapeutic treatment with vitamin D analogues limit the secretion of PTH and improve the secondary hyperparathyroidism. The aim was to study of calcium,(Ca) inorganic phosphorus (Pi) and intact parathyroid hormone (i-PTH) serum disturbances in end stage renal disease patients who were on haemodialysis (eGFR<15ml/min/1,73m^2).
Methods: In 54 individuals undergoing haemodialysis (HD), the serum levels of calcium, phosphorus were determined using photometric method by the Roche biochemical analyser Modular P 800 and the PTH levels were measured by electrochemiluminescence method in Modular Analytics E 170 immunoassay analyser. The same parameters were determined in a control group(C.G) consisting of 44 normal subjects.
Results: The results are presented in table 1.

Table I. Mean values and standard deviation of serum levels of Ca, Pi and i-PTH in the group of patients with chronic kidney disease and in the group of normal subjects as well.

Group	N	Ca mg/dl	Pi mg/dl	i-PTH pmol/l
C.G	44	9,44±0,47	3,78±0,51	4,90±1,43
HD	54	*8,35±1,07	*5,62±1,29	*33,92±24,98

*p<0,001

The i-PTH concentration is considerably elevated in chronic renal patients. The mean value of the i-PTH of the patients (33,92±24,98pmol/l) gave a statistically significant difference (p<0,001) to the average value of the i-PTH in normal subjects (4,90±1,43 pmol/l).Statistically significant difference (p<0,001) is also reflected in the levels of inorganic phosphorous between the patients (5,62±1,29 mg/dl) and the control group (3,78±0,51 mg/dl). Statistically significant difference (p<0,001) present the level of Ca (p<0,001) with the control group baring a significantly higher concentration of Ca (9,44±0,47 mg/dl) than that of the people undergoing haemodialysis ((8,35±1,07 mg/dl).
Conclusions: Even after the use of the new calcitriol analogues the secondary hyperparathyroidism continues to exist in chronically undergoing haemodialysis patients. Nevertheless the disturbances in Calcium and Phosphorus concentrations are milder. Serum i-PTH is a biochemical parameter most often used for the diagnosis and observation of bone disease in patients with chronic uremia.

Disclosure of Interest: None Declared

P575 - MICRO-STRUCTURAL ALTERATION OF CKD-MBD: A NON-INVASIVE ASSESSMENT BY HIGH-RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY

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Aims: Bone disease and fragility fractures are common in patients on dialysis. Alterations of bone micro-structure contribute to skeletal fragility independently of bone mineral mass as assessed by areal BMD (aBMD). The invasiveness of iliac crest biopsy limits the consistent evaluation of bone micro-structure. We non-invasively studied micro-structure and volumetric BMD (vBMD) of weight bearing and non weight bearing bones in patients with end-stage renal disease (ESRD), using peripheral high-resolution computerized tomography (HR-pQCT).
Methods: In a case-control study, we compared micro-structure (cortical thickness and density, trabecular density, number and separation) using HR-pQCT (XTremeCT, Scanco Medical AG, Bruettisellen, Switzerland) and aBMD in ESRD patients on dialysis (n=37, 21 men and 16 women, 10 being postmenopausal, aged 55±16) and in healthy young individuals (25 men and 61 women aged 22.6±3.8). We also compared 21 ESRD patients and 42 age-, gender- and BMI-matched healthy controls. We evaluated calcium and protein intakes, bone turnover, IGF-I and parathyroid hormone levels in ESRD patients. Correlations between micro-structure data, and clinical and biochemical variables were analyzed by multiple regression, adjusting for age, gender, weight and height.
Results: As compared with young healthy individuals, ESRD women had significantly lower lumbar spine and hip aBMD, distal radius and distal tibia cortical thickness, trabecular number and density. In ERSD men, distal tibia but not distal radius microstructure values were significantly lower than in healthy young controls. As compared with 42 age-, gender- and BMI-matched healthy controls, 21 ERSD patients (14 women and 7 men) had significantly lower hip aBMD, but not LS aBMD. At the distal radius and distal tibia, both cortical and trabecular values were significantly decreased, except for trabecular thickness at the distal radius and trabecular number at the distal tibia. In all patients, tibia cortical bone density negatively correlated with time on dialysis (p<0.0001, R^2=0.56) and bone specific alkaline phosphatase (p<0.03, R^2=0.50). There were no correlations with PTH, IGF-1, calcium and protein intake, and vascular calcifications.
Conclusions: Both trabecular and cortical bone are altered in ESRD patient, as assessed by HR-pQCT, with some difference according to weight- versus non weight bearing bones and gender. The cortical compartment appears to be influenced by dialysis duration and the level of bone turnover.

Disclosure of Interest: None Declared

P576 - CORRELATION BETWEEN QUS AND DXA MEASUREMENTS BY 40-59-YEAR-OLD WOMEN

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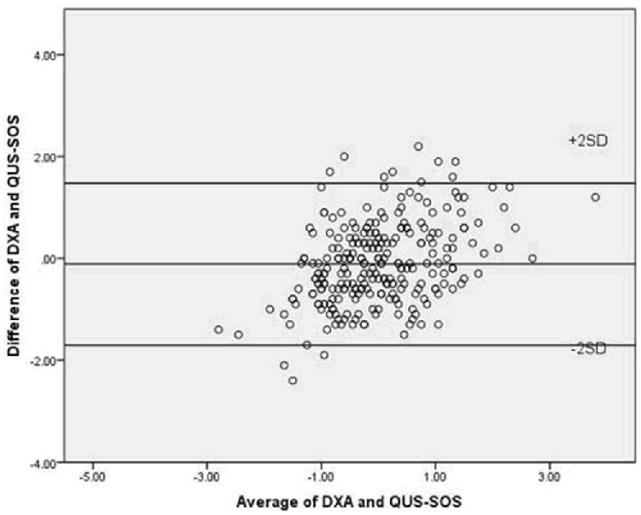
Aims: The aim of this retrospective study was to evaluate the correlations between quantitative ultrasound measurements (QUS) and bone mineral density (BMD) using dual energy X-ray absorptiometry (DXA) in a women population aged 40-59 years.
Methods: Two hundred fifty-seven women (53±4 yrs) were measured at the heel by both DXA (GE Lunar PIXI ™) and QUS (DTU-1 Osteometer MediTech A/S ™). Both broadband ultrasound attenuation (BUA) and speed of sound (SOS) were used to test the correlation with DXA Z-Score.
Results: We found that QUS-SOS was statistically significantly correlated (r=0.718-p< 0.001) with DXA Z-Score at the calcaneus and QUS-BUA (r=0.681-p<0.001) as well. Bland-Altman plots showed that most of the points are located within the 95% limits of agreement (LoA). The 95% limits of agreement (LoA) showed very small systematic error between both QUS-SOS/DXA and QUS-BUA/DXA measurements.



Conclusions: The assessment of bone mineral density and/or quality using both QUS and DXA at the heel site provided very comparable results in this cohort of women aged 40-59 years. This interesting finding might help pave the way for a larger use of the QUS non invasive technique in pre-menopausal or peri-menopausal women.

Disclosure of Interest: None Declared

P577 - BONE MICROARCHITECTURE AND BIOMECHANICAL PROPERTIES OF THE DISTAL RADIUS AND TIBIA ARE ASSOCIATED WITH FRAGILITY FRACTURES IN MEN: THE STRAMBO STUDY

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Aims: Few studies have investigated either the bone microarchitecture or the bone biomechanical properties in men. This study assessed in vivo both aspects in a population of 168 men (71±10yrs) with prevalent fragility fractures (fx), compared to 168 controls matched for age, height and weight; all from the STRAMBO cohort.
Methods: In this case-control study, we measured areal BMD by DXA, bone microarchitecture was assessed by HR-pQCT (XtremeCT, Scanco Medical AG), and finite element (FE) analysis was based on HR-pQCT images of the distal radius and tibia. The dataset was analysed by a principal component (PC) analysis (PCA) to study the association of synthetic variables with fx, by computing their odds ratio (OR) per SD change [95%CI]. Specific associations with vertebral fx (n=78), and non-vertebral fx were computed as odd ratios (OR) per SD change [95%CI], adjusted for age, height and weight.
Results: At both sites, areal and volumetric BMD, cortical (Ct) thickness and trabecular (Tb) number, separation and distribution were significantly worse in cases than controls, with differences ranging from -6% to 15%. FE-derived stiffness and failure load were 8 to 9% lower in fx (p<0.001). In both groups the load was mostly carried by the cortex at the proximal end of the bone, and mostly by Tb bone at the distal end, but no difference in load distribution was found between the two groups. After adjustment for aBMD of the ultradistal radius or the total hip (for distal tibia), only differences of FE-derived stresses, stiffness and failure load at the tibia remained significant (p<0.05).

The PCA conducted in the 336 men resulted in defining 3 synthetic and independent PCs, for which the association to fx were computed (Table 1). In addition, non-vertebral fx were associated with PC1 at the radius and the tibia (OR=1.52 [1.12-2.06] and OR=1.88 [1.35-2.61], respectively), and with PC2 at the radius (OR=1.47 [1.08-1.99]). On the other hand, vertebral fx were associated with PC1 at the radius and the tibia (OR=1.58 [1.17-2.15] and OR=2.13 [1.51-2.99], respectively), and with PC2 not only at the radius (OR=1.52 [1.13-2.06]) but also at the tibia (OR=1.53 [1.10-2.13]). PC3 did not show association with fx.

Table 1 : Principal Component Analysis at both radius and tibia in the 336 men.

Principal Component	Major Variables within component	Radius		Tibia	
		% Variance	Odds Ratio [95% CI]	% Variance	Odds Ratio [95% CI]
PC1 Bone Resistance and Quantity	Areal and volumetric BMD, Cortical thickness, Stiffness, Failure load	51	1.64 [1.25 - 2.15]	51	2.16 [1.54 – 3.02]
PC2 Trabecular microarchitecture	Trabecular number, separation and heterogeneity	16	1.35 [1.02 – 1.76]	17	1.16 [0.90 - 1.49]
PC3 Load distribution: Cortical vs. Trabecular	% load on distal face % load on proximal face	10	1.11 [0.81 – 1.51]	8	1.08 [0.84 - 1.39]

PCA resulted in defining 3 principal components. Association to fracture risk expressed as odds ratio per SD change is presented for each component.

Conclusions: In conclusion, our PCA suggest that bone microarchitecture and biomechanics assessed by HR-pQCT might add information to that of DXA for the understanding of fragility in men. Most of the association with fx is driver by bone density, cortical thickness, stiffness and failure load.

Disclosure of Interest: N. Vilayphiou: None Declared, S. BOUTROY: None Declared, P. Szulc: None Declared, B. van Rietbergen Consultant / Speaker's bureau / Advisory activities with: Scanco Medical AG, F. Munoz: None Declared, P. Delmas: None Declared, R. Chapurlat: None Declared

P578 - INTRACELLULAR OXIDATIVE STATUS AND GLUTATHIONE ROLE ON OSTEOGENIC ACTIVITY OF OSTEOBLASTIC CELLS

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Aims: Glutathione (GSH) is the main intracellular antioxidant and the ratio GSH/oxidized GSH (GSSG) is used to measure cellular redox status. Recently, bone loss and osteoporosis have been related to oxidative stress and lowered antioxidant defences; however, involved mechanisms are little known and controversial. The aim of this study is to evaluate the role of GSH and changes in intracellular oxidative status on the osteogenic activity of osteoblastic cells. P38 MAPKs involvement related to bone metabolism has been also studied. The continuous line *osteoblast-like* SaOS-2, as cell model, was used.
Methods: Changes in GSH levels have been obtained by treatments of the cells with buthionine sulfoximine, specific inhibitor of GSH synthesis or N-acetyl cysteine, a GSH precursor, or GSH. GSH and GSSG levels were measured by HPLC method. Viability and osteogenic differentiation, measured by alkaline phosphatase (ALP) activity and mineralization levels, have been determined in the presence of an altered or not oxidative status. Western blot analysis was also performed to evaluate MAPKs activity and RUNX2 expression.
Results: The levels of GSH/GSSG ratio were high during the early times of differentiation and decreased subsequently. Variations of intracellular oxidative status, obtained by the modulation of the GSH/GSSG ratio, showed that the osteogenic differentiation was affected by GSH depletion, mainly during the early phases of this process. A significant increase of osteogenic activity was measured when, in the presence of oxidative stress, cells were treated with GSH, and enhances of the GSH/GSSG ratio were obtained. A decrease of early markers of osteogenic activity (ALP activity and RUNX2 expression) in the presence of an increased oxidative status was measured. Moreover, P38 activation increased during osteogenic differentiation and this effect was further amplified in GSH depleted cells or treated with H_2O_2
Conclusions: These results suggest that GSH directly affects osteogenic differentiation of osteoblastic SaOS-2 cells, and this is related to changes in intracellular redox state. A relationship among GSH, redox regulated kinases, related to bone metabolism, and osteogenic activity is also showed. These first data can be useful to clarify metabolic processes of bone regeneration related to abnormal changes of intracellular oxidative status. Novel therapeutical approaches in the treatment of osteoporosis and osteoarticular diseases can be suggested.

Disclosure of Interest: None Declared

P579 - ANGLE A, THETA AND HIP AXIS LENGTH IN SLOVAK FEMALE POPULATION

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Aims: To determine the expected frequency of biomechanically adverse values of variables *α angle, theta angle, and HAL* in the population of Slovak women, increasing the risk of a femoral neck fracture by fall. To determine from the logistic regression how many times raises the odds of femoral neck fracture by fall, if the value of variables *α angle, theta angle, and HAL* raises by one unit.
Methods: DXA (dual energy X-ray absorptiometry) measurements of the left proximal femur were obtained and analysed from sample 3,151 Slovak women aged 20 – 89 years,=58.9 years, 95% C. I. (55.15; 60.35) with risk factors for the development of osteoporosis, with osteopenia and osteoporosis using bone densitometer (Prodigy – Primo, GE, USA). Determined variables: 1. geometric variables: *α angle, theta angle, HAL (hip axis length)* and 2. biomechanical variable: *FSI (femur strength index).*
Results: It can be expected with the probability of 0.95 (95%) that a mean value (μ) in the female population will be: for *α angle* from the interval (0.932; 1.291); for *θ angle* from the interval (124.929; 125.323); and for *HAL* from the interval (104.642; 105.102). Biomechanically adverse value of *angle* $\alpha > 6.869^o$ can be expected in 10%; extremely adverse value of angle $\alpha > 12.3^o$ in 1%; biomechanically adverse value of *angle* $\theta > 129.405^o$ in 20%; extremely adverse value of *angle* $\theta > 132.290^o$ in 10%; biomechanically adverse length of *HAL > 109.930 mm* in 20%; extremely adverse length of *HAL > 113.015 mm* in 10%.
Conclusions: Conclusion. 1. Geometric variables of the proximal femur should be also measured in all patients with osteopenia and osteoporosis. 2. The patients at high risk of femoral neck fractures by fall could be diagnosed also according to the finding of biomechanically adverse configuration of the proximal femur. 3. These patients should be treated, except the drug therapy, with special car: wearing a hip protector, kinesitherapy to remove the muscular dysbalance in the mm. coxae area. 4. As the geometric variables, including α *angle, θ angle, and HAL,* are given by an anatomical shape of proximal femur, genetically conditioned in each individual, osteoporosis cannot influence these parameters. Therefore, we consider our random sample of Slovak women with osteopenia, osteoporosis and women with risk factors to be a representative sample from the Slovak population, suitable for determination the expected frequency of geometric variables of proximal femur in the Slovak female population.

Disclosure of Interest: None Declared

P580 - VOLUMETRIC DXA (VXA) IMPROVES PREDICTION OF FEMORAL STRENGTH BY DXA BMD

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Aims: Whereas measurement of areal BMD (aBMD) by DXA is the current gold standard for diagnosis of osteoporosis, it has limitations with regard to fracture risk prediction, as up to half of fractures occur in individuals who are not osteoporotic by DXA-based criteria. Volumetric DXA (VXA) is a new technique that uses DXA at four angles to reconstruct the three dimensional shape and density of the proximal femur. We investigated whether parameters of femoral structure as assessed by VXA, would improve the prediction of femoral strength provided by aBMD.
Methods: We obtained 55 human cadaveric femurs (31 F and 24 M, aged 74.5±8.3 yr, range 51 to 95 yrs) with no evidence of prior fracture or metastatic lesions. We measured femoral neck (FN), trochanteric (TR) and total aBMD, plus indices of femoral structure by VXA at the narrowest region of the femoral neck (NN) and at the trochanteric region (as defined by the IT region of HSA). VXA-derived structural parameters included cross sectional area, cross sectional area of bone (CSA_b), the minimum, maximum, and polar cross sectional moments of inertia (CSMI), the section modulus (Z), and volumetric BMD (vBMD). Femora were mechanically tested to failure in a sideways fall configuration. We used bivariate and stepwise regression analyses to determine predictors of femoral failure load.
Results: Femoral aBMD and VXA-derived FN CSA_b, IT CSA_b, IT $CSMI_{polar}$, IT $CSMI_{min}$ and IT Z were all strongly correlated with femoral strength (r=0.82 to 0.86). When VXA parameters were added to FN aBMD in stepwise regression, VXA IT Z and VXA IT $CSMI_{polar}$ significantly increased the correlation from r=0.83 to r=0.90. Similar results were observed with the combination of TR aBMD or total aBMD and VXA parameters.
Conclusions: These data demonstrate that VXA structural parameters increase the prediction of femoral strength over aBMD alone, and provide strong rationale for exploring these and other three dimensional structural parameters derived from VXA analyses.

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P581 - MECHANICAL LOADING MODULATES THE RELATIONSHIP BETWEEN AREAL BMD AND BONE STRUCTURE

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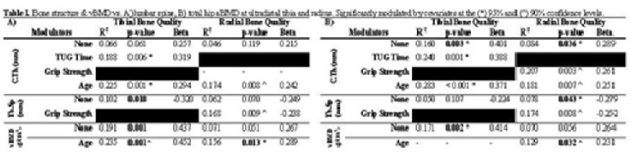
Aims: 1) To examine proportion of bone structure & volumetric density at peripheral sites explained by variation in axial areal (a) bone mineral density (BMD); 2) to examine how weight-bearing, functional capacity and anthropometric measurements contribute to these relationships.
Methods: Women aged ≥50 years from the Hamilton Canadian Multicentre Osteoporosis Study (CaMos) had scans of the total hip and lumbar spine on dual-energy X-ray absorptiometry scanner, and scans of the ultradistal tibia and radius on high-resolution peripheral quantitative computed tomography to provide measures: cortical thickness (Ct.Th), trabecular separation (Tb.Sp) and volumetric BMD (vBMD). Fragility fracture data was collected during visit. Timed up-and-go (TUG) and grip strength tests were run. A multivariate linear regression analysis examined the influence of functional capacity measures, age, and body mass index (BMI) on how aBMD related to bone structure and vBMD. Paired Student's t-test evaluated differences in correlation strength between peripheral sites and between axial aBMD sites. Statistics were evaluated at 95% confidence level.
Results: 54 women mean age: 71.5±8.5 years, BMI: 28.2±6.1 kg/m^2 were studied. Of these, 33.3% sustained a fragility fracture during 10-year follow-up. Mean aBMD T-scores: -1.27±0.75 at the total hip, -0.61±1.12 at the lumbar spine; vBMD: 284.8±56.2 HA/cm^3, Tb.Sp: 0.508±0.187 mm, and C.Th: 0.682±0.187 mm. The ultradistal tibia had a higher C.Th, but lower vBMD than the radius. No differences in anthropometrics, bone density or structure were identified between fracture and non-fractured groups. Bone structure correlated weakly with anthropometrics and functional capacity scores. Small correlations between aBMD and peripheral bone structural measures were modulated by grip strength, TUG times, and age (Table I). Correlations between aBMD and bone measures at the weight-bearing tibia were larger than at the non-weight-bearing radius (p=0.010). aBMD-bone structure relationships differed between the total hip and lumbar spine (p=0.003).



Conclusions: Anthropometrics and functional capacity measures may provide more information regarding bone health reflective of bone structure. How well aBMD relates to bone structure and vBMD depends on loading at the site in question as well as the amount of trabecular versus cortical bone.

Acknowledgement: *The CaMos Research Group is acknowledged for implementing and overseeing the project. CaMos participants are thanked for their volunteerism.*

Disclosure of Interest: None Declared

P582 - THE CORRELATION BETWEEN HEEL STIFFNESS INDEX CALCULATED BY QUS AND TOTAL BODY BMD ASSESSED BY DXA IN CHINESE CHILDREN AND ADOLESCENTS

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Aims: Few studies have shown comparison data between quantitative ultrasound (QUS) and dual-energy X-ray absorptiometry (DXA) in children and adolescents. This study was aimed to assess the correlations between heel stiffness index (SI) calculated by QUS and total body bone mineral density (BMD) and bone mineral content (BMC) measured by DXA in Chinese children and adolescents.
Methods: We measured the total body BMD and BMC using DXA (GE Lunar Prodigy), and speed of sound (SOS), broadband ultrasound attenuation (BUA), and a calculated SI of the left os calcis using QUS (GE Lunar Achilles Express) in 389 healthy Chinese school children and adolescents aged 5 –19 years. The short-term precision for DXA was 0.5% for total body BMD. The precision for QUS was 1.8% for SI, 2.9% for BUA and 0.4% for SOS. Pearson's correlation coefficients (r) were calculated to assess the possible correlations between the SI calculated by QUS and total body BMD and BMC by DXA.
Results: There are significantly positive correlations between SI of the left os calcis and total body BMD(r=0.736, $p<0.0001$, n=389), BMC (r=0.731, $p<0.0001$, n=389). For female group, SI of the left os calcis significantly correlated with total body BMD (r=0.729, $p<0.0001$, n=234) and BMC(r=0.715, $p<0.0001$, n=234). For male group, SI of the left os calcis significantly correlated with total body BMD (r=0.731, $p<0.0001$, n=155) and BMC(r=0.712, $p<0.0001$, n=155).
Conclusions: QUS bone densitometry is a useful measuring method showing the physiological bone development in childhood and adolescence.

Disclosure of Interest: None Declared

P583 - THE CORRELATION BETWEEN SERUM GHRELIN LEVELS AND BODY COMPOSITION IN PREMENOPAUSAL WOMEN WITH DIFFERENT THYROID FUNCTIONAL STATUS

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Aims: To investigate the relationship between serum ghrelin levels and body composition including bone mineral content (BMC), fat mass(FM) and lean mass(LM) measured by dual-energy X-ray absorptiometry (DXA) in premenopausal women with different thyroid functional status.
Methods: We measured the serum ghrelin levels by radioimmunoassay (RIA), the serum levels of free triiodothyronine (FT_3), free thyroxine (FT_4) and thyroid-stimulating hormone (sTSH) by chemiluminescence immune assay, and total body composition including total BMC, total FM and LM was measured by DXA (GE LUNAR Prodigy) in 71 premenopausal women with different thyroid functional status (33 hyperthyroidism, 18 hypothyroidism and 20 normal subjects).
Results: (1) The levels of serum ghrelin in patients with hyperthyroidism were significantly lower than those in patients with hypothyroidism ($p<0.001$) and normal subjects ($p<0.001$), but the serum ghrelin levels in patients with hypothyroidism patients were similar to those in normal subjects ($p>0.05$). The serum ghrelin levels were negatively correlated with FT_3 (r=-0.318, $p<0.01$, n=71) and FT_4 (r=-0.350, $p<0.01$, n=71), positively correlated with serum sTSH (r=0.281, $p<0.05$, n=71). (2) The serum ghrelin levels in 71 premenopausal women with different thyroid functional status positively correlate with the total BMC (r=0. 284, $p<0.05$, n=71), the total LM(r=0.259, $p<0.05$, n=71), and did not correlate with total FM ($p>0.05$). (3) The levels serum ghrelin in 71 premenopausal women with different thyroid functional status positively correlate with trunk BMC (r=0.263, $p<0.05$, n=71) and trunk LM (r=0.334, $p<0.05$, n=71), not with the trunk FM($p>0.05$), and did not correlate with the BMC, LM and FM in the upper limb and lower limb ($p>0.05$).
Conclusions: The serum ghrelin levels in the premenopausal women with different thyroid functional status correlate with the total BMC and LM. The mechanism among them is still for further study.

Disclosure of Interest: None Declared

P584 - STANDARDIZATION OF QUS IN JAPAN

K. Yoh [1,*], T. Miki [2], H. Kishimoto [3], T. Ootani [4], K. Yamazaki [5], M. Matsukawa [4], M. Fukunaga [6] and The QUS standardization committee of Japan Osteoporosis Association
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Aims: QUS (Quantitative Ultrasound) is one of the bone density measuring method which spread widely in Japan as a noninvasive bone density measurement Since the value of QUS was not standardized, depending on each model, big variation arose in diagnostic criteria. The QUS standardization committee by the Japanese osteoporosis society was started at in 2007. The aim of the committee was examined whether unification and standardization of QUS would be possible. This study was aimed at making the formula to calculate the value of standardized QUS by measuring many objects simultaneously under the same conditions using 6 different kinds of popular QUS machine .

Methods: SOS (Speed of Sound) and BUA(Broadband Ultrasound attenuation) are used as a primary parameter. There is no phantom common to each model till the present. The measurement accuracy and reproducibility of each model were examined using the phantom of CM200 (Furuno Co. Ltd. Japan). 6 models of QUS machines were used to measure simultaneously to the volunteer subjects (142 men and 139 women). It asked for the relationship among these measurements for seeking the conversion formula to have the standardized SOS (s-SOS)and standardized BUA(s-BUA).
Results: From phantom study, %CV were 0.035% to 0.338% .This showed each machine had good reproducibility . The correlation between each model was 0.88 from 0.75. In subject age distribution, man and woman were able to get the almost equal object from 20 years-old to 80 years-old. 20 years-old to 30 years old is the peak of the bone density also with man and woman, and the value of SOS fell with aging. From 50 years old, the grade of the fall rose in woman. Inclination of a fall in each machine to aging was similar. The average value showed that it was possible to calculate s-SOS and s-BUA.

AOS100s-SOS=1.18xSOS-307.95AOS-100 s-BUA=0.6666BUA + 34.682

CM200 s-SOS=0.86xSOS+220.24

A1000 s-SOS=0.79xSOS+298.00 A-1000 s-BUA=0.8906 BUA-19.469

UBIS5000.s-SOS=1.03xSOS+3.64 UBIS5000 s-BUA=2.2778 BUA-63.666

Benus s-SOS=1.40xSOS-636.67

Mineriser s-SOS=2.00xSOS-1504.74 Minerisers-BUA=0.7472 BUA+24.230

Conclusions: s-SOS and s-BUA were able to be calculated. Even if it measures from which model by using these conversion types, the value of standardized QUS can be acquired.

Disclosure of Interest: None Declared

P585 - BONE DENSITY CONSEQUENCES OF THE DECISION TO INITIATE AND COMPLY WITH THERAPY FOR OSTEOPOROSIS

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Aims: There are many effective osteoporosis (OP) medications with a variety of dosing intervals and delivery options, but even when diagnosed, osteoporosis is often undertreated. We sought to evaluate the bone density consequences of the decision to initiate therapy and the number of days on therapy in the first year after diagnosis.
Methods: We identified 243 women who received a dual energy x-ray absorptiometry (DXA) evaluation and fulfilled WHO criteria for OP. Patients were excluded if they received OP prescription medications in the prior 6 months. One year later, patients were asked to return for follow-up DXA. Administrative electronic health records were used to identify prescription drug use and health care utilization.
Results: 138 of the 243 women (57%) initiated pharmacologic therapy for OP during the year after the initial DXA. 144 returned for a follow-up DXA after 1 year. For those women with ≥ 66% days on therapy, the mean annual change in spine BMD was 4.5% compared with 1.9% for those with<66% and 1.0% for those not receiving OP therapy ($p<0.001$). For those women with ≥ 66% days on therapy, the mean change in hip BMD was 2.3% compared with 0.2% for those with<66% and -0.7% for those not receiving OP therapy ($p<0.001$).
Conclusions: We found significant bone density consequences of the decision to initiate and comply with therapy in the first year after diagnosis of osteoporosis. Improvement in both initiation rates of treatment as well as compliance are needed in order to reduce the frequency of osteoporotic fractures.

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P586 - HOW WELL DO RHEUMALOTOGISTS MEET PATIENTS' EXPECTATIONS?

X. Grapton [1,*], D. Leclere [2], L. Poulain [3], P. Lemesle [4], P. Renard [5] on behalf of Rhuma Creer 92
[1]Private practice, Colombes, [2]Private practice, Suresnes, [3]Private practice, La Garenne Colombes, [4]Private practice, Asnieres sur Seine, [5]Private practice, Courbevoie, France

Aims: To determine whether patients' assessment of pain matches that of their rheumatologists in private practice.
Methods: Two studies were conducted in parallel, one in patients with pain and one in rheumatologists. Patients anonymously completed a questionnaire on expression of pain, its psychological repercussions, and expectations regarding rheumatologists. Rheumatologists answered a questionnaire designed to assess the patient's representation of his or her pain.
Results: A total of 208 patients took part (mean age 61; 75% women). The average visual analog scale score was 5.3 and all rheumatological illnesses were represented. Fifteen rheumatologists (mean age 51; 8 women) participated. Patients considered their descriptions of the pain (site, intensity, duration, type) to be precise, but the rheumatologists did not. Physical handicap was deemed more important than pain (by 55% of patients and 57% of rheumatologists). Physical pain was considered worse than mental suffering (by 55% of patients versus 83% of rheumatologists), and rheumatologists considered they were sufficiently aware of physical pain in 60% of cases, although it was only expressed in 58% of cases. Underestimation of pain were noted in 45% of patients. Withdrawal and distress were noted in nearly one third of patients; rheumatologists were aware of this in 90% of cases. One third of patients managed their pain by self-medication, which the rheumatologists considered legitimate; one third of patients delayed seeking medical advice, which the rheumatologists deemed regrettable. Patients expected from their rheumatologist, in order of importance, relief, a sympathetic ear, diagnosis, complementary examinations, comfort,

compassion, advice, prevention. Faced with these expectations, rheumatologists provided in order of importance: relief, diagnosis, a sympathetic ear, advice, complementary examinations, comfort, prevention, compassion.
Conclusions: Rheumatologists respond perfectly to their patients' priorities and take note of their requests, whence the patient satisfaction index of 67%.

Disclosure of Interest: None Declared

P587 - PATIENT SELF-ASSESSMENT OF PAIN IN RHEUMATOLOGY

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[1]Private practice, Colombes, [2]Private practice, Suresnes, [3]Private practice, La Garenne Colombes, [4]Private practice, Asnieres sur Seine, [5]Private practice, Courbevoie, France

Aims: As pain is the main reason patients consult a rheumatologist, this survey investigated the patient's behavior in the face of suffering (expression, psychological and social repercussions, what is expected of the rheumatologist).
Methods: An anonymous questionnaire for patients was made available in the waiting rooms of rheumatologists in private practice.
Results: Of the 208 patients (mean age 61) who completed the questionnaire, 75% were women. Average visual analog scale score was 5.3 (range 2 to 10) and all diseases seen in rheumatology practice were represented. 90% of patients raised the problem of pain straight away and most (62%) sought to attract the rheumatologist's attention through their comments or attitude, in expectation of a response. Most patients considered they were sufficiently precise in describing the site, type, duration, and intensity of pain. Pain was described as exhausting in 91% of cases, agonizing in 36%, and depressing in 33%. Over half (53%) of patients considered that the limitation of their activities was more important than the pain itself, and this was psychologically disruptive in 58% of cases. Pain modified character (60% of cases), especially before age 50, and had social and familial repercussions in 50% of cases. In reacting to pain, 64% of patients practiced self-control (more significant among men), 45% played it down, 45% denied it, and 30% rebelled against it. In managing pain, 58% of patients quickly sought medical advice, 30% self-medicated, 30% waited for spontaneous improvement, and 13% sought alternative medicine solutions. Patients' perception of pain was influenced by age in nearly half of cases, and in one quarter of cases by a history of pain, social context, or character, but not by sex. Patients expected their rheumatologists to listen and to provide relief, but not to show compassion, to comfort, or to provide preventive measures. Patients generally regarded the rheumatologist's willingness to listen to their descriptions of physical and psychological suffering as satisfactory, but when this was not so patients considered that the rheumatologist lacked time or was overworked.
Conclusions: Patients consult a rheumatologist because of pain, which is tiring and distressing, but the accompanying handicap has an even greater impact, whence the psychological repercussions. Patients expect rheumatologists to listen and to provide relief, and expressed satisfaction with their management of pain.

Disclosure of Interest: None Declared

P588 - HIP BONE MASS AT 4 YEARS IS PREDICTED BY CALCIUM INTAKE AND PHYSICAL ACTIVITY

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Aims: To investigate the cross sectional relationships between childhood physical activity (PA), dietary calcium intake and bone mineral.
Methods: Children were recruited at 4 years old from the Southampton Women's Survey. They underwent measurement of bone mass by DXA (Hologic). Physical activity was assessed by accelerometry (Actiheart, Cambridge Neurotechnology Ltd, Cambridge, UK) for 7 continuous days.
Results: 422 children (212 boys) took part. After adjusting for gender, daily mean time (min/day) spent in moderate to very vigorous activity (MVPA) was positively related to hip bone area (R^2=3%,p<0.001), mineral content (R^2=4%,p<0.001), mineral density (R^2=3%,p=0.001) and estimated volumetric density (R^2=2%,p=0.01). Mean daily calcium intake positively predicted bone indices (R^2=9%,p=0.002 with BMC) in those with a low calcium intake (<800 mg/day), but there was a much attenuated relationship in those above this threshold (R^2=0.6%,p=0.229 with BMC). The relationships between MVPA and bone indices were stronger when calcium intake was above compared with below 800mg/day (For BMC and MVPA, R^2=2%,p=0.121 below and R^2=5%,p<0.001 above).
Conclusions: These results suggest that adequate calcium intake may be required for optimal action of physical activity on bone development and that improving levels of physical activity and calcium intake in childhood may help to optimise accrual of bone mass.

Disclosure of Interest: None Declared

P589 - CHILDHOOD PHYSICAL ACTIVITY IS PREDICTED BY MATERNAL PHYSICAL ACTIVITY AND IS INVERSELY ASSOCIATED WITH FAT MASS AT 4 YEARS OLD

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Aims: To use an ongoing birth cohort to examine the cross sectional relationships between maternal and childhood physical activity (PA) and childhood body composition.

Methods: Children were recruited at 4 years old from the Southampton Women's Survey. They underwent measurement of bone mass by DXA (Hologic Discovery). Physical activity was assessed in mother and child simultaneously by accelerometry (Actiheart, Cambridge Neurotechnology Ltd, Cambridge, UK) for 7 continuous days.
Results: 352 children (173 boys) took part. PA (counts per minute) was categorised according to cut-offs defined from pilot data. After adjusting for gender, daily mean time in very vigorous activity (VVPA) was negatively related to total (r=-0.15,p=0.004) and percentage fat (r=-0.18,p=0.001) and positively to percentage lean (r=0.18,p=0.001). Maternal mean daily time spent inactive positively predicted sedentary time in male offspring (r=0.18,p=0.02); in contrast maternal vigorous activity predicted vigorous activity in the female offspring (r=0.16,p=0.027).
Conclusions: Mean daily time spent in VVA was associated with lower total and percentage fat at age 4 years. It appeared that girls tended to take high levels of PA with their mothers; in contrast vigorous activity in boys seemed less dependent on maternal PA. These findings suggest that increasing levels of PA may help to reduce childhood obesity, and that maternal behavioural patterns may be important.

Disclosure of Interest: None Declared

P590 - VITAMIN D DEFICIENCY IS ASSOCIATED WITH A LOWER PEAK EXPIRATORY FLOW RATE

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Aims: To examine whether serum 25-hydroxyvitamin D (25(OH)D) is associated with peak expiratory flow rate (PEFR). A low PEFR could predispose to respiratory infection.
Methods: Data from the Longitudinal Aging Study Amsterdam were used, including men and women of 65 years and older (n=1287). Serum 25(OH)D was assessed by a protein binding assay (Nichols) in 1995/6. Pulmonary function was measured by PEFR in 1995/6 and 1998/9. PEFR is the maximum rate of flow of air expelled during a forced expiration (l/min). The maximum score of three tests was taken in the analyses.
Results: Serum 25(OH)D was lower than 25 nmol/l in 11.3% of the population, between 25 and 50 nmol/l in 37.1%, and between 50 and 75 nmol/l in 34.0% of the subjects. An interaction effect with sex was found. In the cross-sectional analyses, men having serum 25(OH)D levels below 25 nmol/l had significantly lower PEFR (β=-59.9 l/min; p=0.001) as compared with men having serum 25(OH)D≥75 nmol/l after adjustment for age, season of blood collection, education, body mass index, smoking and chronic obstructive pulmonary disease. Women having serum 25(OH)D levels below 25 nmol/l had significantly lower PEFR as compared to women having serum 25(OH)D≥75 nmol/l (β=-31.9; p=0.022). In the longitudinal analyses, after adjustment for baseline peak flow and other confounders, a significantly lower expiratory peak flow rate was observed in men having serum 25(OH)D levels below 25 nmol/l (β=-39.9; p=0.006) and between 25-50 nmol/l (β=-20.6; p=0.024) as compared with serum 25(OH)D≥75 nmol/l. No significant associations were found in women in the multivariable longitudinal analyses.
Conclusions: Serum 25(OH)D levels below 25 nmol/l are associated with lower PEFR, especially in men. In this way vitamin D deficiency may increase the risk for respiratory infections.

Disclosure of Interest: None Declared

P591 - OSTEOPOROSIS TREATMENT IN IMMOVILIZATED PATIENTS IN PRIMARY CARE OF SPAIN

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Aims: 1. - To know the epidemiologic characteristics of the patients immobilized in Primary Care.
2. - To know the pharmacological treatment for the osteoporosis in patients immobilized.
Methods: All the patients were included that consisted in the program of having immobilized of 5 consultations of primary attention of Lugo (Spain) and that they accepted to participate in the study, during the period understood among the months of September from the 2009 to January of the 2010. To all the participants they were applied a questionnaire of collection of data designed to such an effect that included so much pharmacological aspects as of (to put something).
Results: It is a sample of 95 people, with a mean age of 84.7 (+ / - 17.9) years, being 75.8% females and 24.2% males. Las main immobilization causes are, the dementia (54.7% of the cases), stroke (27.4%) and Parkinson disease (% 16.8%). The mean of the drugs used by the total of the sample was of 10.7 (+ / - 5.0) and the unit/dose/day of 8.1 (+ / - 3.4). They were scheduled for osteoporosis treatment the 23.2% of the cases, being the therapeutic group more used in these patients the calcium associated to vitamin D (95.5%), followed by the drugs builds healthy bone (31.8%). Of the total of the patients treated for the osteoporosis the 72.7% received it in monotherapy (68.2% calcium associated to vitamin D and 4.6% drugs builds healthy bone) and 27.2% together.
Conclusions: 1. The main immobilization cause is the dementia, followed for stroke and Parkinson disease.
2. 1 of each 4 immobilized persons receive treatment for the osteoporosis.
3. The drug more used to treat the osteoporosis in the immobilized patients it is the calcium associated to vitamin D.

Disclosure of Interest: None Declared

P592 - OSTEOARTHRITIS-QUALITY OF LIFE ISSUE

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Aims: Osteoarthritis (OA) is the most common arthritis in adults, typically involved hands, knees, hips and spine. The risk of OA increases with age. Osteoarthritis cause pain, limitations of daily living activities and impact health- related quality of life (HRQoL).
Methods: Measuring quality of life is important for clinicians to determine the efficacy of treatment. Numerous instruments are currently available for measuring different aspects of HRQoL. The World Health Organization QOL group has identified and recommended five broad dimensions – physical and psychological health, social relationship perception, functional and well-being – which should be included in a generic quality of life instrument. Generic instruments cover a broad range of dimensions and allow comparisons between different groups of patients. Disease-specific instruments are specially designed for a particular disease. The most commonly used instruments for patients with OA are: Short Form 36-item Health Status Questionnaire- SF-36, Western Ontario and McMaster Universities Osteoarthritis Index –WOMAC, Stanford Health Assessment Questionnaire –HAQ, Arthritis Impact Measurement scales 2 –AIMS2, Nottingham Health Profile – NHP, Groningen Activity Restriction Scale – GARS and Visual Analog Scale-VAS.
Results: WOMAC has been widely used in clinical trials, can measure patient quality of life, response to treatment, prediction and treatment outcomes. SF-36 provides an 8-scale evaluation of physical and mental quality of life based on 36 questions. Although SF-36 is not specific to OA is widely used to guide OA treatment in clinical trials. HAQ tends to be applied more to rheumatoid arthritis then OA. The advantage of WOMAC and HAQ is that as self-administered instruments are simple to complete. The SF-36 requires administration by clinician, therefore is more frequently used in clinical trials.
Conclusions: WOMAC, the SF-36 and HAQ represent integrated instruments aimed at bringing together multiple quality of life-related domains in patients with osteoarthritis.

Disclosure of Interest: None Declared

P593 - ASSOCIATION BETWEEN PARITY AND BONE MINERAL DENSITY IN A POPULATION STUDY

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Aims: The scientific literature is inconclusive related to a potential relationship between parity and bone mineral density (BMD). The aim of the current study is to explore the association between parity and BMD in a multi-ethnic sample of U.S. women.
Methods: NHANES III data from 5,662 Black, Hispanic, and White women were analyzed. Multiple linear & logistic regression models examined the parity-BMD association while controlling for the effects of potential confounding factors.
Results: Simple linear regression showed a statistically significant association between parity and BMD ($p<0.0001$). A test of the crude relationship between parity and total hip BMD indicated that nulliparous women and women with 1-2 live births had a higher BMD than women with 5-10 live births. However, after controlling for the effects of other risk factors, two statistically significant interactions emerged; one between parity and education ($p=0.001$) and a second between current cigarette smoking and menopausal status ($p=0.02$). The interaction between menopausal status and current smoking suggested that a relationship between smoking and BMD exists only among postmenopausal women. Multiple linear regression analysis results suggested that highly parous, well-educated women had lower levels of BMD. Slightly more than 50% of the variation in total hip BMD values was attributable to the risk factors and interaction terms included in the multiple linear regression model. In multiple logistic regression analyses, parity did not distinguish between low and normal BMD regardless of menopausal status.
Conclusions: The association between BMD and parity was valuated while considering the influences of several traditional risk factors for low BMD as well as other reproductive, menstrual, and menopausal factors likely to influence level of BMD. An interaction between parity and education in the multiple linear regression results did suggest that well-educated, highly parous women have a lower BMD than less educated women with fewer live births. Any connection between parity and BMD may be due to their interconnectedness with other highly relevant risk factors. The current study provides additional evidence of no association between parity and BMD.

Disclosure of Interest: None Declared

P594 - BONE MINERAL DENSITY AND SELF-REPORTED RHEUMATOID ARTHRITIS IN A MULTIETHNIC ADULT POPULATION

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Aims: Patients with Rheumatoid Arthritis (RA) often have debilitating osteoporosis. In the general population self-report of RA is frequent. The aim of the current study was to see if subjects self-reporting RA have low bone mineral density (BMD) when adjusting for relevant risk factors.
Methods: Chi square tests and analysis of variance procedures were used to compare those self-reporting RA with the rest of the sample. Predictive models for BMD were developed using multiple logistic regression analysis, backward regression procedure, for the full sample and gender stratified, in SAS version 9.1.
Results: Among the 10,045 in the study sample, the 689 subjects self-reporting RA were significantly more likely to be female, older, have lower BMD, less education, higher BMI, higher CRP, self-report stroke and self-report fracture. Using backward regression analysis significant predictors of BMD in females were alcohol, BMI, race, education level, self-reported fracture, age, and marital status. The model explained 69.0% variability in BMD ($F=1099.72$, $p<.0001$). Significant predictors of BMD in males are BMI, CRP, race, education level, self- reported fracture, age, mari-

tal status, and physical activity. The model explained 58.3% variability in BMD (F=616.93, p<.0001).
Conclusions: In a large multiethnic population self-reporting RA was not associated with low BMD. This information is of relevance to providers, in particular primary care practitioners. A self-reported diagnosis of RA would need to be verified prior to using this information when assessing who to screen for low BMD.

Disclosure of Interest: None Declared

P595 - DEFINING FRACTURE RISK IN WOMEN USING THE RECOMMENDATIONS FOR BONE MINERAL DENSITY (BMD) REPORTING IN CANADA

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Aims: Using the guidelines for BMD reporting in Canada, we examined the fracture risk level of Canadians.
Methods: Canadian BMD reporting guidelines recommend BMD T-scores be combined with age and other risk factors for fracture to predict an individual's 10-year absolute fracture risk. These risk factors include prior fragility fracture (FFX) and systemic glucocorticoid (GC) therapy of > 3 months. Using these risk factors, an individual's 10 year absolute fracture risk may be classified into three risk zones; low (less than 10%), moderate (10 to 20%) and high risk (over 20%). Age and T-scores provide the foundation for the three risk zones and the presence of FFX or GC use increases risk to the next risk zone. With both additional factors, individuals should be classified in the high risk zone. Utilizing data from the Canadian Multicentre Osteoporosis Study (CaMos), an ongoing prospective population-based cohort study representing a stratified (age and sex) random sample of the Canadian population and consisting of non-institutionalized individuals, we examined the actual distribution of Canadian women, 50 years of age and older, in the three fracture risk zones. Analyses classified individuals to each zone base on age and BMD alone; age, BMD and prior FFX; and age, BMD, prior FFX and GC use.
Results: A total of 4826 women with BMD scores were evaluated. 27.7% (1265/4564) and 3.4% (154/4574) of individuals had a prior FFX or were taking GC, respectively. Based on age and BMD alone, 36.9% (1780/4826), 41.9% (2021/4826), and 21.2%, (1025/4826) of participants are at low, moderate and high risk for future fractures, respectively. The number of women at low, moderate and high risk changed to 31.2% (1426/4574), 35.0 (1599/4574) and 33.9% (1549/4574) once the prior FFX risk factor was included and changed to 30.5% (1396/4574), 34.6% (1582/4574) and 34.9% (1597/4574) once both prior FFX and GC risk factors were included. For participants less than 60 years and for those 80 years of age and older, with all risk factors considered, 4.6% (56/1207) and 76.1% (236/310) of women were at high fracture risk, respectively.
Conclusions: A simple and accurate ascertainment of an individual's fracture risk should facilitate appropriate osteoporosis management. In the Canadian population, approximately 1 in 3 women 50 years of age and older are at 20% or higher risk for developing fragility fractures over the next 10 years. Therapy should be considered for these women.

Disclosure of Interest: G. Ioannidis: None Declared, A. Papaioannou Grant / Research Support from: Amgen, Eli Lilly, Merck Frosst, Novartis, Procter and Gamble, Consultant / Speaker's bureau / Advisory activities with: Amgen, Eli Lily, Merck Frosst, Novartis, Procter and Gamble, sanofi-aventis, Servier, C. Kennedy: None Declared, L. Pickard: None Declared, K. Davison Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck Frosst, Procter and Gamble, Servier, sanofi-aventis, Novartis, J. Brown Grant / Research Support from: Abbott, Arx, Amgen, Arthrolab, sanofi-aventis, Boehringer-Ingelheim/Roche, Bristol-Myers Squibb, Celltech, Eli Lilly, Genizon, Glaxosmithkline, Merck Frosst, Nicox, Novartis, NPS Pharma, Pfizer, Procter and Gamble, Quintiles, Rhone-Poulenc Rorer, Servier, Wyeth, Zelos, Consultant / Speaker's bureau / Advisory activities with: Abbott, Arx, Amgen, Arthrolab, sanofi-aventis, Boehringer-Ingelheim/Roche, Bristol-Myers Squibb, Celltech, Eli Lilly, Genizon, Glaxosmithkline, Merck Frosst, Nicox, Novartis, NPS Pharma, Pfizer, Procter and Gamble, Quintiles, Rhone-Poulenc Rorer, Servier, Wyeth, Zelos, W. Olszynski Consultant / Speaker's bureau / Advisory activities with: Abbott, Amgen, sanofi-aventis, Boehringer-Ingelheim, Eli Lilly, Glaxosmithkline, Merck Frosst, Novartis, Pfizer, Procter and Gamble, Servier, Wyeth, Genzyme, Schering, Hoffmann-LaRoche, Solvay Janssen-Ortho, Ortho-Biotech, D. Hanley Grant / Research Support from: Amgen, sanofi-aventis, Eli Lilly, Merck Frosst, Novartis, NPS Pharma, Pfizer, Procter and Gamble, Roche, Wyeth-Ayerst, Consultant / Speaker's bureau / Advisory activities with: Amgen, sanofi-aventis, Eli Lilly, Merck Frosst, Novartis, NPS Pharma, Nycomed, Pfizer, Procter and Gamble, Paladin,Roch, Wyeth-Ayerst, R. Josse Grant / Research Support from: Glaxosmithkline, Amgen, Novonordisk, sanofi aventis, Novartis, Consultant / Speaker's bureau / Advisory activities with: Glaxosmithkline, Amgen, sanofi aventis, Novartis, Eli Lilly, Merck Frosst, T. Anastassiades: None Declared, J. Prior: None Declared, D. Goltzman Consultant / Speaker's bureau / Advisory activities with: Eli Lilly, Novartis, sanofi-aventis, Procter and Gamble, Servier, J. Adachi Grant / Research Support from: Amgen, sanofi-aventis, Bristol-Myers Squibb, Eli Lilly, Glaxosmithkline, Merck Frosst, Novartis, Pfizer, Procter and Gamble, Roche, Wyeth, Consultant / Speaker's bureau / Advisory activities with: Amgen, Astra Zeneca, sanofi-aventis, Bristol-Myers Squibb, Eli Lilly, Glaxosmithkline, Merck Frosst, Novartis, Nycomed, Pfizer, Procter and Gamble, Roche, Servier, Wyeth

P596 - PRESCRIBING PATTERNS OF ANTI-OSTEOPOROTIC MEDICATIONS PRE AND POST ADMISSION FOR OSTEOPOROTIC TYPE FRACTURE TO A LARGE TEACHING HOSPITAL BETWEEN 2005-2008

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Aims: To examine the prescribing of anti-osteoporotic medications pre and post hospital admission in patients with an osteoporotic type fracture. We also examined patient factors influencing the prescribing of these therapies.
Methods: We identified all patients aged 55 years and over admitted to one of the largest teaching hospitals in Ireland between 2005 and 2008 with a fragility type fracture using the Hospital In-patient Enquiry system. This data was linked to prescribing data available through the HSE- Primary Care Reimbursement Services (PCRS). The HSE-PCRS is a means tested scheme for those under 70 years, but all-inclusive for those over 70 years. Prescribing data was linked 12 months before and after discharge, on 821 patients. Logistic regression analysis was used to examine the likelihood of prescription of anti-osteoporotic medication pre and post discharge in relation to age, gender, and type of fracture.
Results: The prescribing of anti-osteoporosis treatment before fracture increased from 2.6% (95% CI 2.23,2.93%) in 2005 to 10.6% (95% CI 9.32, 11.86.%) by 2008 while post fracture prescribing increased from 11% (95% CI 9.64,12.36%) to 47% (95% CI 43.6, 50.3%). Bisphosphonates accounted for 79% of this prescribing and teriparatide (PTH) a further 5%. For those admitted for fractures in 2007, post fracture prescribing was 31.8% (95% CI 28.66, 35.02%) at 12 months, but increased to 50.3% (95% CI 46.6, 53.9%) up to 24 months post fracture. The highest rate of prescribing post fracture was in the 65 – 69 compared to the 55-59 year age group (OR =8.51 95%CI 1.75- 41.35). Females were twice as likely to be prescribed anti-osteoporosis medications post fracture than their male counterparts (OR =2.05 95% CI 1.27-9.16) and patients discharged in 2008 were significantly more likely to be treated than patients discharged in 2005 (OR =8.01 95% CI 4.55-14.09).
Conclusions: The proportion of patients being discharged on anti-osteoporotic treatment post fragility fracture has increased significantly since 2005. Secondary prophylaxis prescribing was more frequently associated with older age and female gender. This significant increase in the prescribing of anti-osteoporotic medications may be largely due to the introduction of an orthogeriatric ward round and osteoporosis clinic to the hospital in 2005 where patients were actively encouraged to take treatments and whose compliance appeared to have improved after clinic follow-up.

Disclosure of Interest: None Declared

P597 - WEIGHT CHANGE OVER THREE DECADES AND THE RISK OF HIP FRACTURE IN MEN – THE OSLO STUDY

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Aims: Low weight and weight loss is related to osteoporotic fractures. We have previously reported that low weight in middle-aged men and subsequent weight loss both were strongly and inversely related to BMD three decades later (1). The aim of this study was to assess how this translates into subsequent risk of hip fracture.
Methods: Of men born 1923-1932 initially examined in 1972-1973 as part of the population-based Oslo Study, 5558 were re-examined (defined as having a valid height and weight measurement) in 2000-01. At both baseline and re-examination weight and height were measured. We used BMI (kg/m^2) from the baseline examination and weight change calculated as weight at the re-examination minus weight at the baseline examination. Hip fractures were identified in the participants by linkage to the hospitals' electronic patient administrative systems for the period 2000-2007 by the unique personal identification code. A total of 155 hip fractures were identified in the follow-up period after the re-examination in 2000-2001. Data were analysed by Cox proportional hazards regression. Baseline BMI, weight change, smoking status and age were included as covariates in all analyses.
Results: BMI at the baseline examination was related to hip fracture three to four decades later. Men in the lower quarter of BMI had a hazard ratio (HR) of hip fracture of 1.8 (95% CI 1.1 – 3.0) compared to men in the higher BMI quarter at baseline. Men who lost more than 5% of their body weight between the two screenings had an HR of hip fracture of 2.1 (95% CI 1.3-3.4), compared to men who gained 10% or more in weight.
Conclusions: Low BMI in middle-aged men and weight loss during the following three decades were both clearly related to the risk of future hip fracture.
References: (1) Meyer HE et al, Am J Epidem 2008;168:454

Disclosure of Interest: None Declared

P598 - THE SUCCESS OF A GENERAL SCHOOL-BASED PHYSICAL ACTIVITY INTERVENTION ON BONE MINERAL CONTENT DEPENDS ON PUBERTAL STAGE BUT NOT ON GENDER

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Aims: We performed a randomised controlled trial in children of both gender and different pubertal stages to determine whether a school-based physical activity (PA) program during a full school-year influences bone mineral content (BMC) and whether there are differences in response for boys and girls before and during puberty.
Methods: Twenty-eight 1st and 5th grade classes were cluster randomised to an intervention (INT, 16 classes, n=297) and control (CON; 12 classes, n=205) group. The intervention consisted of a multi-component PA intervention including daily physical education during a full school year. Each lesson was predetermined, included about ten minutes of jumping or strength training exercises of various intensity and was the same for all children. Measurements included anthropometry (height and weight), tanner stages (by self-assessment), PA (by accelerometry) and BMC for total body, femoral neck, total hip and lumbar spine using dual-energy X-ray absorptiometry (DXA). Bone parameters were normalized for gender and tanner stage (pre- vs. puberty). Analyses were performed by a regression model adjusted for gender, baseline height, baseline weight, baseline PA, post-intervention tanner stage, baseline BMC, and cluster. Researchers were blinded to group allocation. Children in the control group did not know about the intervention arm.
Results: 217 (57%) of 380 children who initially agreed to have DXA measurements had also post-intervention DXA and PA data. Mean age of prepubertal and pubertal children at baseline was 9.0±2.1 and 11.2±0.6 years, respectively. 47/114 girls and 68/103 boys were prepubertal at the end of the intervention. Compared to CON, children in INT showed statistically significant increases in BMC of total body (adjusted z-score differences: 0.123; 95%>CI 0.035 to 0.212), femoral neck (0.155; 95%>CI 0.007 to 0.302), and lumbar spine (0.127; 95%>CI 0.026 to 0.228). Importantly, there was no gender*group, but a tanner*group interaction consistently favoring prepubertal children.
Conclusions: Our findings show that a general, but stringent school-based PA intervention can improve BMC in elementary school children. Pubertal stage, but not gender seems to determine bone sensitivity to physical activity loading.

Disclosure of Interest: None Declared

P599 - CORRELATION BETWEEN CALCIUM INTAKE AND BONE MINERAL DENSITY IN WHEELCHAIR ATHLETES

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Aims: Exercise during younger years is widely recognized as being effective for increasing bone *mass* and preventing osteoporosis. However, many wheelchair-bound, physically disabled persons are at risk for lifestyle diseases such as osteoporosis and cardiovascular disorders, bringing about a decrease in their quality of life together with a decrease in physical activity. This study clarifies the correlation between nutrient intake and bone density among wheelchair athletes and examines countermeasures for preventing osteoporosis from the viewpoint of providing nutritional support.
Methods: Body composition and bone density were measured by *dual energy* X-ray absorptiometry (DXA) in subjects consisting of 28 wheelchair athletes. A survey was simultaneously conducted of nutrient intake and intake of various food groups using a food frequency questionnaire (FFQ). Dietary reference intakes for Japanese were used as evaluation indices in the study of correlation with bone density.
Results: There were no significant differences in bone density of wheelchair athletes for age, type of sport and location of injury. A significant negative correlation ($P<0.05$) was observed between duration of disability and bone densities of the left and right legs, trunk, pelvis and total body density. An examination of the correlation between calcium intake and bone densities by body region revealed a significant negative correlation between calcium intake and bone densities of the left and right legs as well as duration of disability (left leg: $P<0.01$, right leg: $P<0.05$). In addition, a significant positive correlation was observed between calcium intake and right arm bone density ($P<0.05$). In comparison of bone density by dividing the subjects into a high calcium intake group and low calcium intake group based on the median value of calcium intake when adjusted by duration of disability, we found that bone density was increased with increased calcium intake, and a significant difference was observed for the right leg ($P<0.05$).
Conclusions: since the arms play an important role when operating wheelchairs, calcium was determined to be an important factor in maintaining and improving bone density. On the other hand, leg bone density is unable to be maintained by calcium intake, and although it decreases the longer the duration of a disability, decreases in leg bone density are comparatively mild in persons having high calcium intakes, positive methods for calcium intake as a nutritional support are recommended.

Disclosure of Interest: None Declared

P600 - ASSOCIATION BETWEEN DIFFERENT DOMAINS OF PHYSICAL ACTIVITY AND OSTEOPOROTIC FRACTURES

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Aims: Epidemiological studies suggest for an inverse relationship between physical activity and risk of fractures. However, it is unclear how this association varies according to the domain of life in which the activity is undertaken.
Methods: In this analysis of the European Prospective Investigation of Cancer- Norfolk study, we assessed total and domain-specific physical activity using a validated questionnaire (EPAQ2) in 14,903 participants (6,514 men, mean age 62 yr) who also underwent quantitative ultrasound of the heel. After a median follow-up of 8 years, there were 504 fractures of which 164 were hip fractures. Metabolic equivalent measures were calculated according to frequency and duration of different activities for all participants.
Results: In multivariable linear regression analysis, broadband ultrasound attenuation (BUA) was positively associated with total and leisure time activities while showing no association with transportation and work activities. Home activities were associated with a lower BUA among younger participants. In multivariable Cox proportional-hazards models, moderate activities at home and for leisure were associated with reduced hip fracture risk among women (hazard ratios [HR] 0.51 and 0.55, 95% confidence intervals 0.29-0.90 and 0.30-0.93, respectively). Leisure time activities were associated with highly reduced risk of hip fracture among men (HR=0.58; p for trend<0.001) whereas activities at home increased the risk of any fracture among men (HR=1.25; p for trend=0.008). Walking for leisure or transport was associated with reduced risk of any fracture (HR=0.74, 95%CI 0.58-0.95) and hip fracture (HR=0.57, 95%CI 0.37-0.87) in both men and women. The associations between different domains of physical activity and fractures were more evident in younger participants (age <65 yr) and those without previous history of fracture.
Conclusions: This study suggests that different domains of physical activity may relate differently to fracture risk and these relationships may vary by age and sex. The interaction observed between age and physical activity suggests for a higher impact of activity on bones in the younger ages which might not be achievable for the elderly people. Further attention to the interactions between different domains of physical activity and known fracture risk factors among men and women is recommended.

Disclosure of Interest: None Declared

P601 - RISEDRONATE DECREASES FRACTURES AND COSTS OF POSTMENOPAUSAL OSTEOPOROSIS IN GERMANY

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Aims: To estimate the costs of proximal femur fractures in women 50 to 90 years of age and a T-score ≤ 2.5 or a prevalent vertebral fracture and to calculate the changes of fractures and costs by treatment with risedronate.
Methods: A validated Markov model of osteoporosis was populated with German epidemiological and cost data and risedronate efficacy data. The prevalence of low bone mineral density (T-score ≤ 2.5) was derived by data from the CaMos trial and the prevalence of vertebral fractures was estimated by data of the EPOS trial in the German female population (2007) 50 to 90 years of age. The HIP trial has shown a risk reduction of hip fractures with risedronate of 60% in patients with prevalent fractures and of 40% in patients without prevalent fractures. The costs of hip fracture in the first year after the fracture of 24,580 Euro and in each year subsequent to the fracture of 12,167 Euro were taken from a published German study(1). Annual costs of drug treatment was 507,35 Euro. The time horizon of modeled costs and fractures was 10 years with a treatment period of 3 years. Costs and outcomes were discounted at 5%.
Results: It is estimated that 2.929.609 German women 50 to 90 years of age have low BMD or have sustained a vertebral fracture. It is estimated that in this population 528.757 women will suffer from a hip fracture at costs of 28.8 billion Euros. Treatment with risedronate will decrease the number of hip fractures to 435,242 and costs to 25.8 billion Euros.
Conclusions: Treatment with risedronate can decrease the number of hip fractures and costs in the German population with postmenopausal osteoporosis.
References: (1) Thompson M et al, Value Health 2010;13:46

Disclosure of Interest: W. Moehrke Employee of: Warner Chilcott, K. Abendroth Consultant / Speaker's bureau / Advisory activities with: Warner Chilcott, H. Kruse Consultant / Speaker's bureau / Advisory activities with: Warner Chilcott

P602 - THE INCIDENCE OF HIP FRACTURES IS ASSOCIATED WITH OSTEOPOROSIS DRUG UTILIZATION IN GERMANY

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Aims: The objective of this analysis was to assess the association of osteoporosis drug utilization and hip fracture rates in different regions of Germany.
Methods: The Federal Statistical Office (Statistisches Bundesamt) provided data on hip fractures (ICD-10 codes S72.0, S72.1, S72.2) categorized by age, gender and region for the years 2000 to 2007. The

average populations by age, gender and region for the years 2000 to 2007 were extracted from tables of the Federal Health Monitoring. Drug utilization of osteoporosis drugs defined as DDD in different regions of Germany for years 2001, 2006 and 2007 were compiled from the rapid information of the statutory health insurance. This source covers almost 90% of all drug use in Germany. The number of female persons insured by the statutory health insurance by age and region was extracted from statistics provided by the Federal Ministry of Health (KM6 statistics). Hip fracture incidence was adjusted by age using Poisson distribution. Drug use of osteoporosis drugs was adjusted by the number of female persons insured by the statutory health insurance. The association of the adjusted fracture incidence and adjusted drug utilization within different regions of Germany was assessed by weighted linear regression.
Results: Estimates of hip fracture incidence decreased from 146.3 per 100,000 (95% confidence interval 122.4 – 186.8) in year 2001 to 143.1 (118.3 – 169.4) and 141.1 (112.4 – 166.7) in 2006 and 2007, respectively. DDD drug utilization increased from 2.35 per person (1.12 – 4.14) to 5.43 (4.00 – 7.84) and 5.99 (4.62 – 8.39). The regression model explained the variance of adjusted hip fracture incidence by 6.0% in 2001, by 8.9± in 2006 and by 13.3% in 2007. It was projected that 3564, 8084 und 10570 hip fractures were prevented in years 2001, 2006 and 2007 by osteoporosis drug use in female persons insured by the statutory health insurance.
Conclusions: The adjusted incidence of hip fractures is associated with osteoporosis drug utilization. Osteoporosis drug use is increasing but still inadequate in postmenopausal women with low BMD or prevalent vertebral fractures. If guidelines on osteoporosis are followed more consequently hip fractures rates can be further reduced.

Disclosure of Interest: W. Moehrke Employee of: Warner Chilcott, K. Abendroth Consultant / Speaker's bureau / Advisory activities with: Warner Chilcott, A. Defèr Consultant / Speaker's bureau / Advisory activities with: Warner Chilcott

P603 - CLINICAL COURSE AND CARE GAPS IN ELDERLY PATIENTS FOLLOWING A HIP FRACTURE IN A TERTIARY CARE HOSPITAL, MONTRÉAL, QUEBEC

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Aims: Hip fractures cause severe disability and mortality in the elderly. The care process, within and after discharge from hospital, affects clinical outcomes. This study aims to identify current practices, and care gaps for elderly patients admitted to a tertiary care trauma centre, following a hip fracture.
Methods: Randomly selected charts of patients, 65 years and older, admitted following a hip fracture between January 1st 2006 and September 1st 2008 were reviewed. A modified version of Veterans Affairs Stroke Unit Acute Care chart review was used to extract data. We documented patients' characteristics; characteristics of in-hospital care, and follow-up care.
Results: We identified 408 and audited 81 charts, 3 were excluded. Of the 78 patients, 66 were admitted from the community (mean age 83 [7] years; 79% women) and 12 from long-term care [LTC] (mean age 86 [7] years; 50% women). The mean length of stay was 23 days, 64% were discharged to a rehabilitation institution. Patients from LTC were discharged more rapidly (mean 12 days) as 92% returned to LTC. In hospital death occurred in 11% and 8% of the community and LTC samples respectively. 30% of patients from the community and 50% from LTC were using a walker pre-fracture. At discharge, 88% of the community sample were able to walk (most with assistance); versus 50% of the LTC sample. Fifty percent of the community sample were dependent for self-care and mobility (Barthel Index <60) compared to 91% of the LTC sample. In-hospital care included internal medicine (94± community, 100% LTC) and physical therapy (97% community 92% LTC), social work (76± community, 58% LTC), geriatric (50% community, 17% LTC), occupational therapy (38% community, 17% LTC),and nutrition service (24% community, 8% LTC) consultations. Despite evidence of bone fragility, 56% of the community sample had a bone mineral density measurement during admission (LTC: 67%), 36% received calcium, 39% vitamin D, and 24% received anti-osteoporosis medications, (LTC: 42%, 42% and 17± respectively). Only 50%of the community sample had a follow-up surgical visit by 6 weeks, and 21% had no documented follow-up over 1 year after discharge (LTC 72% and 9%).
Conclusions: Despite the availability of clinical guidelines for optimal care following hip fractures, important care gaps remain. The care is fragmented during the hospital stay and after discharge. Healthcare providers in the front line of hip fracture care must not miss opportunities to manage these key aspects of care.

Disclosure of Interest: None Declared

P604 - NON-ADHERENCE IN WOMEN WITH OSTEOPOROSIS TREATED WITH ORAL BISPHOSPHONATES: GERMAN RETROSPECTIVE COHORT ANALYSIS ON NON-ADHERENCE (GRAND)

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Aims: To estimate levels of compliance and persistence associated with different treatment regimens of oral bisphosphonates (oBP) in women with osteoporosis in Germany.
Methods: The IMS® Disease Analyzer database, containing representative information on approximately 11 million patients from office-based physicians, was used for the data analysis. Any patients with malignant diseases, anticancer or cytostatic hormone prescription, Paget's disease, AIDS or receiving intravenous BPs were excluded. Eligible osteoporosis patients had data available for at least 1 year before and after initiating oBP therapy between December 2004 and November 2007. Compliance was measured as Medication Possession Ratio (MPR) for all patients who had at least two prescriptions with oBPs of the

same type and was defined as the ratio of prescribed to assumed number of therapy units. Patients with a MPR >80% were considered compliant. MPR was calculated for patients on therapy for a maximum of 2 years. Persistence was measured as a continuation of the initial oBP prescriptions filled over 12 months. Patients were considered non-persistent if their prescription was not refilled within 30 days of the due date. Statistical analyses were performed using Kaplan-Meier curves and Cox Regression models.
Results: Data were analyzed from 4147 women, of whom 3704 (89.3%) were older than 60 years. A total of 139 (3.4%) received daily, 3824 (92.2%) weekly and 184 (4.4%) monthly oBP treatment. The mean MPR was 61% (daily), 83% (weekly) and 84% (monthly) in the oBP treatment period. Overall compliance was poor: only 51.0% of patients had a MPR>80%. Persistence was also poor: overall, 72.1% patients discontinued/switched oBP regimen during the first year: 92.8% (daily), 71.4% (weekly) and 70.6% (monthly).
Conclusions: The majority of patients received weekly oBP therapy. Overall compliance was poor and varied with the different treatment regimens, but was particularly low in patients receiving daily oBP therapy. A high proportion of patients discontinued/switched oBP regimens during the first year, but there was no difference in persistence between monthly and weekly dosing regimens. This study provides further evidence of poor adherence in patients with osteoporosis receiving oBP therapy.
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P605 - ADHERENCE TO TREATMENT OF OSTEOPOROSIS IN SWEDEN: THE SWEDISH ADHERENCE REGISTER ANALYSIS (SARA)

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Aims: To assess adherence to treatment of osteoporosis in Sweden.
Methods: The study was based on a historical cohort extracted from the Swedish Prescription Register and included all patients >50 years of age who filled prescriptions for one or several osteoporosis treatments (alendronate, risedronate, strontium, and/or raloxifene) between 2005 and 2008. A washout period of 5 months was used to capture treatment-naïve patients. Inpatient care data and death dates were extracted from the National Patient Register and the Causes of Death Register. Patients with secondary osteoporosis were excluded via ICD-10 codes. Treatment persistence and its determinants were investigated using failure time analysis, employing a permissible treatment gap of 2 months (switching allowed). Medication Possession Ratio (MPR) was used to measure compliance while patients were on treatment.
Results: The final cohort comprised 53,327 treatment-naïve patients (85% females) with a mean age of 71 years. Average follow-up was 316 days (max 1,126). A total of 92%, 74%, 63%, 46%, 29%, and 16% remained on treatment after 1 month, 3 months, 6 months, 1 year, 2 years, and 3 years, respectively. The median number of days on treatment was estimated at 326. Average MPR in persistent patients was 94.67% (95% confidence interval:94.61–94.73). Weekly regimens were associated with better persistence compared to daily regimens (Hazard ratio (HR)=0.63, p<0.001). Patients with prevalent co-morbidities were more likely to terminate treatment (HR=1.13, p<0.001) and females had better persistence to therapy than males (HR=0.86, p<0.001).
Conclusions: Real-world persistence was found to be poor: one in four patients terminated treatment immediately after their index prescription, less than half of the cohort persisted with therapy for more than 1 year and only 16% remained on treatment after 3 years. Females were found to be significantly more persistent to therapy compared with males. Compliance to treatment was almost perfect. Dosing regimens and prevalent co-morbidities were important factors for the estimated discontinuation rates. Medication adherence to treatment of osteoporosis in Sweden is far from optimal and is consequently a serious problem in the medical management of osteoporotic patients.

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P606 - RETROSPECTIVE ANALYSIS OF PERSISTENCE TO ANTI-OSTEOPOROSIS MEDICATIONS IN THE UK GENERAL PRACTICE RESEARCH DATABASE (GPRD)

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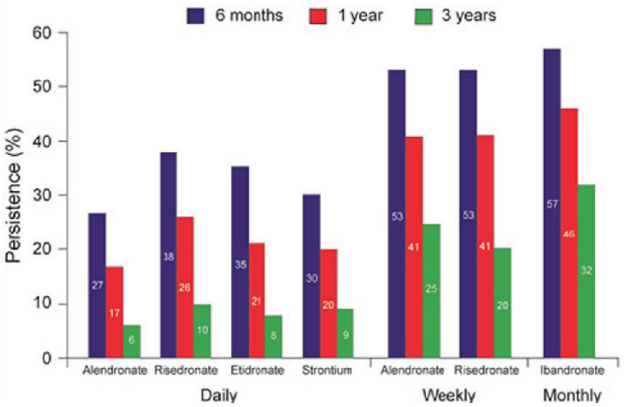
Aims: To assess persistence levels for oral anti-osteoporosis medications in women in the UK.
Methods: Analysis was based on data from the UK GPRD for postmenopausal women who had received an initial prescription for an oral bisphosphonate or strontium between 1/1/95 and 31/3/08. Eligible patients were required to have data available for at least 12 months before initiating therapy. Patients with a history of cancer or metabolic bone disease before or on the date of first prescription were excluded. Eligible women were classified into two sub-cohorts: a stable cohort with one category of therapy and a switch cohort with two or more categories of therapies during follow-up. Patients lost to follow-up were censored. Persistence was estimated as the proportion of women who continued therapy over a 3-year period (discontinuation defined as a gap of ≥30 days from the end of a prescription to receipt of a refill pre-

scription or a switch to a different therapy), using Kaplan-Meier methodology.

Results: Data from 63,350 women were analyzed: 42,836 (68%) in the stable cohort and 20,514 (32%) in the switch cohort. Mean age (SD) was 71.4±11.0 years overall (stable: 72.3±11.3, switch: 69.7± 10) with approximately 59% initiating therapy at ≥70 years. By 12 months over 50% of all women had discontinued therapy (stable: 51.8%; switch: 60.0%). Figure 1 shows cumulative persistence rates for prescribed study medications over time (all women).

Figure 1: Cumulative persistence rates (%) of anti-osteoporosis therapy at different time points among women with PMO (63,350)



Conclusions: Persistence to anti-osteoporosis medication in women with PMO in the UK is low, with less than 50% continuing therapy after 12 months. Persistence is better among women who do not change therapies and in those with less frequently administered treatment.

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P607 - ASSOCIATION OF OCCUPATIONAL ACTIVITY WITH MINIMUM JOINT SPACE WIDTH, JOINT SPACE AREA, AND OSTEOPHYTE AREA AT THE KNEE IN THE ELDERLY OF A POPULATION-BASED COHORT: THE ROAD STUDY

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Aims: Knee osteoarthritis (OA) is a disorder that severely affects the activities of daily living and impairs the quality of life in the elderly. We investigated the association of minimum joint space width (mJSW), joint space area (JSA) and osteophyte area (OPA) at the knee with occupational activity in elderly Japanese subjects in a large-scale population-based cohort.

Methods: With the aim of establishing epidemiologic indexes for bone and joint diseases, we conducted a large-scale nationwide cohort study called ROAD (Research on Osteoarthritis Against Disability) in 2005. Of the participants in the baseline survey of the ROAD study, 1,402 participants (512 men and 890 women) living in mountainous and coastal regions were analyzed in the present study. The information collected included lifetime occupational history and details of specific physical activities at the workplace. To estimate the severity of knee OA, the mJSW, JSA, and OPA in the medial compartment of the knee were measured by the knee OA computer-aided diagnosis (KOACAD) system.

Results: Agricultural, forestry, and fishery workers had significantly lower values of mJSW and JSA than clerical workers or technical experts; however, their OPA values did not differ significantly. With regard to occupational activities, sitting on a chair was significantly associated with a higher JSA. Kneeling and squatting were associated with lower mJSW, lower JSA, and higher OPA. Walking and lifting weights were associated with lower mJSW and lower JSA but not with OPA.

Table. The mJSW, JSA and OPA according to job title and occupational activity

		mJSW (mm)	JSA (mm²)	OPA (mm²)
Job titles				
Agri/fores/fish		2.4±1.2*	86.1±35.7*	2.9±6.5
Fact/const		2.5±1.1	89.8±32.9*	2.9±6.8
Cleri/tech		2.8±1.0	100.2±31.6	1.6±4.0
Other*		2.4±1.1*	88.3±36.2*	3.9±10.2*
Occupational activity				
Sitting	No/Yes	2.4±1.2 /2.6±1.0	86.7±36.4 /96.1±32.6**	3.5±8.8 / 2.4±6.7
Kneeling	No/Yes	2.6±1.1 /2.3±1.2**	92.9±32.1 /83.4±37.8**	2.5±6.9 / 4.8±10.9**
Squatting	No/Yes	2.6±1.0 /2.3±1.1**	93.7±33.7 /83.2±37.5**	2.5±6.8 / 4.3±10.5**
Standing	No/Yes	2.7±0.9 /2.5±1.1	96.9±30.7 /89.8±35.7	2.1±5.6 / 3.2±8.3
Walking	No/Yes	2.6±1.0 /2.4±1.2**	94.8±33.9 /86.3±35.9**	3.0±8.7 / 3.0±7.0
Climbing	No/Yes	2.5±1.0 /2.5±1.2	92.4±34.9 /86.0±35.1**	3.1±8.4 / 2.7±6.2
Lifting weights	No/Yes	2.6±1.0 /2.5±1.1**	93.5±33.3 /88.7±36.3**	3.0±8.1 / 3.0±7.8

Values are the mean±SD.
*p<0.05 vs. clerical workers/technical experts by Tukey HSD test after adjustment for age and body mass index.
**p<0.05 vs. subjects without the corresponding occupational activity by multiple regression analysis after adjustment for age and body mass index.

Conclusions: This population-based cohort study suggests that sitting on a chair is a significant protective factor against joint space narrowing in Japanese subjects. Occupational activities that

include kneeling and squatting appear to have a greater effect on knee OA.

Disclosure of Interest: None Declared

P608 - VITAMIN D SUFFICIENCY IS ASSOCIATED WITH LOW INCIDENCE OF LIMB AND VERTEBRAL FRACTURES IN COMMUNITY-DWELLING ELDERLY JAPANESE WOMEN: THE MURAMATSU STUDY

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Aims: This study aimed to clarify the association between vitamin D and other markers of nutritional status with the incidence of fracture in elderly Japanese women.
Methods: We conducted a cohort study with a six-year follow-up of 773 community-dwelling women aged 69 years and older. The six-year follow-up ended in 2009. We assessed serum 25-hydroxyvitamin D (25(OH)D), undercarboxylated osteocalcin (an index of vitamin K status), and calcium intake. The primary outcome was incident limb and vertebral fractures. Covariates were forearm bone mineral density (BMD), age, body mass index, osteoporosis treatment, and physical activity.
Results: The mean serum 25(OH)D concentration was 60.0 nmol/L. Thirty-six limb fractures and 14 vertebral fractures occurred in 4,392 person-years. Lower forearm BMD was significantly associated with increased incident fracture (P=0.0242). The adjusted hazard ratios (HR) of fracture for the first quartile (<47.7 nmol/L) and the third quartile (59.2-70.9 nmol/L) of serum 25(OH)D, compared to the fourth quartile (≥71.0 nmol/L), were 2.82 (95% confidence interval (CI): 1.09-7.34) and 2.82 (95%CI: 1.09-7.27), respectively. The pooled adjusted HR was 0.42 (95%CI: 0.18-0.99) when the incidence in the fourth quartile (≥71.0 nmol/L) was compared to the other three quartiles combined (<71.0 nmol/L). Vitamin K status and calcium intake were not associated with incident fracture.
Conclusions: Sufficient vitamin D status, i.e., serum 25(OH)D ≥71 nmol/L, contributes to reduced osteoporotic fracture risk in community-dwelling elderly women.
Acknowledgement: We wish to thank the staff of Muramatsu Health Center for their help in data collection. We are also indebted to Kyowa Medex Co., Ltd. and Eisai Co., Ltd. for assays of serum 25(OH)D and serum ucOC, respectively, and to Toyo Medic Inc. for their assistance in making the BMD measurements. This study was supported in part by a grant from the Nakatomi Foundation for scientific research relating to health promotion focusing on physical exercise, a grant from the Japan Rheumatism Foundation, a grant from the Japan Dairy Association, the Japan Osteoporosis Society encouragement award, a grant from the Foundation for Total Health Promotion, and a Grant-in-Aid for Scientific Research (C) No.40339958 from the Japanese Ministry of Education, Culture, Sports, Science and Technology. The authors have no conflict of interest.

Disclosure of Interest: None Declared

P609 - PECULIARITIES OF CHRONIC PERIODONTITIS IN PATIENTS WITH OSTEOPOROSIS AND OSTEOPENIA

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Aims: To study peculiarities of chronic periodontitis in osteoporosis and osteopenia patients.
Methods: A cohort of 3,150 patients, 1,037 male and 2,113 female with the average age of 57.6±17.3, were studied in the period from 2005 to 2009. The subjects underwent routine dental investigations and bone density tests using a Lunar DPX Bravo device. Of the total number two groups were formed: the first included 729 (23.1±) patients with osteoporosis and 1,712 (54.3%) with osteopenia, the second - the remaining 709 with normal BMD values. The groups did not significantly differ in age, gender or BMD.
Results: Chronic periodontitis was diagnosed in 96.5± of the subjects in the first group and in 80.1% (p>0.05) of those in the second. The analysis of the CPITN index revealed that most severe impairment of periodontium (bleeding, dental deposits, pockets varying in depth) was noted in 38.1± of the cases in the first group against 24.5% in those of the second one (p<0.05). Orthopantomographic studies revealed resorption of interalveolar septa up to two-thirds of root length in 54.9% and 34.7% of the cases in the first and second groups respectively. A definite connection between bone loss and periodontal damage was established for all the studied subjects (the BMD to periodontal index correlation (PI, Russell, 1956), r=0.4, p=0.036).The PI values in selected age subgroups of up to 30, 31-40, 41-55, 55 and older were found to be 3.2 and 1.3, 4.6 and 1.6, 5.1, and 1.8, 5.9 and 2.1 for the first and the second groups respectively. Severe chronic periodontitis was observed in 47.1% of the osteoporosis cases, 34.2% of those with osteopenia, and 18.79% (p<0.05) of subjects with no bone loss.
Conclusions: Periodontal pathologies are more likely to occur in patients with osteoporosis or osteopenia, severity of the disease obviously depending on the extent of systemic bone loss.

Disclosure of Interest: None Declared

P610 - DIETARY CALCIUM INTAKE IS NEGATIVELY CORRELATED WITH BONE TURNOVER INDEPENDENT OF PARATHYROID HORMONE IN POSTMENOPAUSAL WOMEN

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Aims: The sufficient calcium (Ca) intake has been a fundamental and crucial issue for the prevention of osteoporosis. Ca supplements have a positive effect on bone mineral density (BMD). Several studies indicated that low Ca intake was associated with increase in bone resorption markers. The aim of this study is to further clarify the effect of Ca intake on bone turnover, and

whether the effect is influenced by intact parathyroid hormone (PTH) or BMD.
Methods: We enrolled 205 healthy postmenopausal women who had examination of osteoporosis. We measured serum levels of N-terminal propeptide of type I collagen (PINP), C-terminal cross-linked telopeptide of type I collagen (CTX) as markers of bone turnover, and intact PTH, as well as BMD at lumbar spine (L2-4) and femoral neck (FN) by dual-energy X-ray absorptiometry. Nutrient intakes (protein, fat, Ca, magnesium, phosphorus, sodium, vitamin D and vitamin K) were calculated using dietary records and a food frequency questionnaire.
Results: Mean values of age and BMI were 63 years old and 22.9kg/m^2, respectively. Mean serum levels of PINP, CTX and PTH were 54.6ng/ml, 0.404ng/ml and 45.6ng/ml, respectively. Mean BMD value were 0.840 g/cm^2 (T-score -1.5) at L2-4, and 0.619 g/cm^2 (T-score -1.5) at FN. Mean daily Ca intake was 655mg and had fulfilled tentative dietary goal for preventing life-style-related diseases (DG) of DRI, but not adequate ingestion (AI); the 64.9% of participants fulfilled the DG of DRI for Ca and 42.4% of participants fulfilled the AI. Simple regression analysis showed that Ca intake was negatively correlated with PINP ($r=-0.278$, $p<0.0001$) and CTX ($r=-0.324$, $p<0.0001$). PTH had positive correlation with PINP ($r=0.158$, $p<0.05$) and CTX ($r=0.217$, $p<0.005$), but not with Ca intake. Ca intake had a weak but significant positive association with BMD (FN) ($r=0.144$, $p<0.05$). Multiple regression analysis adjusted for age, BMI, years after menopause, and all nutrient intakes showed that Ca intake was negatively correlated with PINP and CTX, but not BMD. Moreover, Ca intake was still significantly correlated with PINP ($r=-0.574$, $p<0.05$) and CTX ($r=-0.748$, $p<0.01$) after additionally adjusted for PTH and BMD as independent variables.
Conclusions: These findings suggest that low Ca intake is the major nutrient factor that could suppress bone turnover independent of PTH and BMD. Increasing Ca intake is important for the prevention of osteoporosis.

Disclosure of Interest: None Declared

P611 - A FRAX® MODEL FOR THE ASSESSMENT OF FRACTURE PROBABILITY IN BELGIUM

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Aims: The objective of this study was to evaluate a Belgian version of the WHO fracture risk assessment (FRAX®) tool to compute 10-year probabilities of osteoporotic fracture in men and women. A particular aim was to determine fracture probabilities that corresponded to the reimbursement policy for the management of osteoporosis in Belgium and the clinical scenarios that gave equivalent fracture probabilities.
Methods: Fracture probabilities were computed from published data on the fracture and death hazards in Belgium. Probabilities took account of age, sex, the presence of clinical risk factors and femoral neck BMD. Fracture probabilities were determined that were equivalent to intervention (reimbursement) thresholds currently used in Belgium.
Results: Fracture probability increased with age, lower BMI, decreasing BMD T-Score, and all clinical risk factors used alone or combined. The 10-year probabilities of a major osteoporosis related fracture that corresponded to current reimbursement thresholds ranged from approximately 7.5% at the age of 50 years to 26% at the age of 80 years where a prior fragility fracture was used as an intervention threshold. For women at the threshold of osteoporosis (femoral neck T-score=-2.5 SD), the respective probabilities ranged from 7.4 to 15%. Several combinations of risk factor profiles were identified that gave similar or higher fracture probabilities than currently accepted for reimbursement in Belgium.
Conclusions: The FRAX® tool has been used to identify possible thresholds for therapeutic intervention in Belgium, based on equivalence of risk with current guidelines. The FRAX® model supports a shift from the current DXA based intervention strategy, towards a strategy based on fracture probability of a major osteoporotic fracture that in turn may improve identification of patients at increased fracture risk. The approach will need to be supported by health economic analyses.

Disclosure of Interest: None Declared

P612 - BONE STRENGTH AND HOME LIFE OF SCHOOL-AGE CHILDREN IN JAPAN

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Aims: The manner in which school-age children spend their time after returning home from school, namely their lifestyles, has a considerable effect on their bodies in terms of physical strength, immunity and the like, and are believed to be related to bone mass, either directly or indirectly, as synergistic effects of their lifestyles. The incorporation of muscle exertion in daily life is expected to have the effect of increasing bone mass. On the basis of this point, a study was conducted of the actual state of the correlation between the major lifestyles of school-age children in Japan and bone strength.
Methods: The subjects of the study consisted of 1363 elementary school students, 493 junior high school students and 787 high school students, and bone strength was measured based on the propagation speed of ultrasonic waves (speed of sound (SOS): m/s) using the CM-100 Ultrasound Bone Densitometer. Evaluation of bone strength was divided into three levels (low group, average group, high group) using separate reference values for boys and girls. Simultaneous to measurement of bone strength, a survey was conducted of such factors as lifestyle and the use of information devices using a questionnaire.

Results: Those parameters for which significant differences were observed among the three bone density groups with respect to the manner in which children spend their time after school consisted of "playing video games" and "reading magazines" among lower grade elementary school students, "listening to music" and "helping around the house" among upper grade elementary school students, "listening to music" among junior high school students, and "playing video games", "reading magazines" and "talking with family members" among high school students.
Conclusions: The lifestyles of children after they return home from school, with respect to such factors as "playing video games", "reading", "talking with family members", "listening to music" and "helping around the house", have an effect on bond strength, either directly or indirectly. Namely, although there are thought to be problems in perceiving this in the form of a direct causative relationship, it is expected that the results of this study will be applied to the field of health education by determining indices for bone strength as well that demonstrate the need to warn of disturbances in daily activities by perceiving lifestyle to be a phenomenon that has an effect on the body.

Disclosure of Interest: None Declared

P613 - MAGNETIC RESONANCE IMAGE ANALYSIS USING SEMI-AUTOMATED SOFTWARE FOR QUANTIFICATION OF KNEE ARTICULAR CARTILAGE

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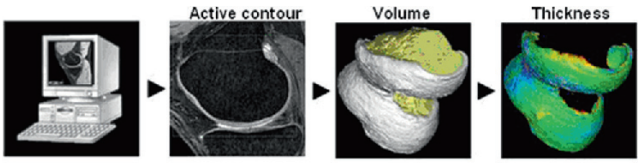
Aims: Software-based image analysis is important for studies of cartilage changes in knee osteoarthritis (OA). We developed a semi-automated software to quantify knee cartilage volume on high-resolution knee magnetic resonance (MR) images, and assessed the intra and inter-observer reproducibility of measurements obtained via this software.
Methods: MR image sets from 20 subjects were selected from the baseline data in the ROAD (Research on Osteoarthritis Against Disability) urban cohort database. The 3D double-echo and steady-state (DESS), like sequence on Siemens images, were obtained on a 3.0-T Philips MR system with a 8ch sense-knee extremity coil. In our developed semi-automated software, cartilage segmentation was determined using a active contour model on each slice of MR image series. This step serves to provide a more precise and objective segmentation by making automatic modifications to the computer-determined cartilage margins. Then the software counts the number of pixels contained within each contour, multiplies by the pixel size, and sums the results from all slices. This value represents the volume of articular cartilage. The cartilage thickness is computed by the distance perpendicular from the bone surface to the cartilage surface using scaled color mapping. These steps are demonstrated in Image. Two trained orthopaedists independently performed the measurement of femur cartilage volume twice using the software. The intra- and inter-observer reproducibility were determined by means of the coefficient of variation (CV%) of repeated cartilage volume measurements.
Results: The mean (±SD) intra-observer CV% for the 20 cases was 0.98 (±0.95)% for observer 1 and 0.99 (±1.00)% for observer 2, while the mean (±SD) inter-observer CV% was 1.00 (±1.16)% for session 1 and 1.19 (±1.42)% for session 2. There was no significant difference between the two intra-observer CV%'s (P =0.152) and between the two inter-observer CV%'s (P=0.443).



Schema of Image Processing

Conclusions: The semi-automated software allowed us to measure cartilage from high-resolution 3.0 T MR images of the knee with high intra- and inter-observer reproducibility. This software will not only be useful for objective evaluation of the disease severity in daily clinical practice, but also act as a proper surrogate measure for the development of disease-modifying drugs for OA, just as bone mineral density does in osteoporosis.

Disclosure of Interest: None Declared

P614 - EDUCATION STATUS AND INFORMATION LEVELS OF PREMENOPAUSAL AND POSTMENOPAUSAL WOMEN ABOUT OSTEOPOROSIS

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Aims: Osteoporosis is a systemic skeletal disease characterized by low bone mass, increased bone fragility and fracture risk and conceiving an important problem of public health.

The aim of our study was to evaluate women's information and attitude about osteoporosis.
Methods: 100 premenopausal and 100 postmenopausal women attended to outpatient clinic of physical medicine and rehabilitation were included to the study. The demographic characteristics and medical features of subjects were recorded. A descriptive questionnaire which concerns information, attitude and risk factors about osteoporosis was performed for all subjects.
Results: The mean age of the pre and postmenopausal women were 41.2 and 60.3 years respectively. 10% of premenopausal women were illiterate and 88% of them received elementary education. 52% of the postmenopausal women were illiterate and 44% of them received elementary education. 46% of premenopausal and 56% of postmenopausal women had no information about osteoporosis. The education levels of pre and postmenopausal women were significantly correlated with the information levels about osteoporosis. 20% of postmenopausal women were on the treatment of osteoporosis and 18% of treated subjects indicated that they had benefit from osteoporosis treatment.

Conclusions: In conclusion a considerable number of both premenopausal and postmenopausal women in our study were unaware of the risk factors and the consequences of osteoporosis. Basic approach at osteoporosis is prevention, therefore related physicians should be focused on the education to enhance women's information level about osteoporosis. There should be also information resources easily accessible for the patients in order to increase the awareness of this insidious condition.

Disclosure of Interest: None Declared

P615 - OSTEOPOROSIS RISK FACTORS IN HYPERTENSION PATIENTS

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Aims: To determine osteoporosis risk factors in patients with arterial hypertension
Methods: We examined 367 patients with arterial hypertension. Exclusion criteria: endocrine disorders besides diabetes mellitus type 2, severe gastrointestinal, kidney, liver, pulmonary diseases, heart failure, arrhythmia, ischemic heart disease. Control group consisted of 168 subjects without hypertension selected by the same criteria as the main group. All the participants were interviewed for the presence of osteoporosis risk factors, calculation of fracture risk by FRAX® tool was performed. All the data were analyzed statistically.
Results: Mean age of the patients included into the study was 59,25±3,4 years [35-67], control group 49,3±2,6 years [31-58]. Distribution by sex was the following: main group 67,3% females and 32,7% males, control group 72,4% and 27,6% respectively. Risk factors as sex hormones deficiency (65% vs. 58%), long term corticosteroid use (2,2% vs. 2,4%), fractures in the first degree relatives (21% vs. 18%), diarrhea (4% vs. 3,2%) were registered with the same frequency in both groups. We noticed that non-traumatic fractures and height reduction more than 3 cm was more often in hypertension group. Thus, non-traumatic fractures were diagnosed in 26,4% of patients in the first group and 7,8% of patients in the second group ($p<0,05$), and height lowering more than 3 cm in 36,3% и в 18,7%, accordingly, ($p<0,05$). In the study group osteoporotic fracture risk probability by FRAX® for total risk vary from 1 to 27%, mean of 5,9±0,47; for hip fracture risk varied from 0,1 to 16%, mean 1,21±0,86. There was significant difference between total fracture risk in the main and control group 5,9±0,47 vs. 2,6±0,24, ($p<0,05$). By morphometry study of vertebral column X-ray vertebral body deformations were diagnosed in 14,9% of cases in the study group, while in control group only in 10,6%, $p<0,05$. Low back pain was registered in 70,5% of hypertensive patients and only in 56,2% in control group.
Conclusions: Among the most important risk factors of osteoporosis in hypertensive patients we found non-traumatic fractures, height lowering, sexual hormones deficiency and the first degree relatives fractures. Osteoporosis fracture risk by FRAX®, low back pain incidence was higher in hypertension group with statistically significant difference. Thus we may conclude that hypertensive patients may be a group of patients who require tighter osteoporosis screening and treatment considerations.

Disclosure of Interest: None Declared

P616 - ASSOCIATION BETWEEN FALLS AND FRACTURES BY LOW IMPACT ON ELDERLY RESIDENTS IN A CITY OF THE SOUTH OF BRAZIL

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Aims: Low-impact fractures may be associated with increased morbid mortality and the risk of a new fracture. Our objective was to evaluate the relation between falls and fractures in elderly through mild trauma in the city of Chapecó, state of Santa Catarina, Brazil.
Methods: Case-control study with 100 white women over 60 years of age. Sequential and random selection from the results of the X-column of a population study, with division into groups with and without fractures. Interviews were conducted to apply a standardized questionnaire.
Results: The mean age was 70.71±6.12 years, 45% were married, 22% were illiterate. Over the past 12 months 31% of women reported some episode of a fall. Of these, 53% fell from inside the home, with 31% of the falls being in the hallway of the residences. Among the risk factors for falls, 66% have rugs in the house, 67% have dizziness, 50% do not see well, and only 3% reported using the aid of a cane. The results of the multivariate analysis of risk factors and falls are found in the table. There was no relationship between falls and history of low impact fractures (OR 1.19, 95% 0,52-2,78, p 0.95) nor between falls and vertebral fractures (OR 0.75, 95% 0 .41-1,36, p 0.46).

Risk factor	n /%	Unadjusted OR (95%)	p
Age group			
<70 years	70.0	1.00	
>70 years	30.0	1.00	0.16
Education			
None	22.0	0.73 (0.06-8.91)	0.81
1 to 8 grade	68.0	0.94 (0.23-3.76)	0.93
> 9 grade	10.0	1.00	
Income per capita			
Up to R$ 465.00	68.0	0.55 (0.09-3.45)	0.53
R$ 466.00 to 1,394.00	20.0	1.08 (0.27-4.28)	0.91
>R$ 1,395.00	12.0	1.00	
BMI			
Normal/low	27.0	1.00	
Overweight/obesity	59.0	1.05 (0.32-3.47)	0.94
Smoking			
Never	57.0	1.00	
In the past	24.0	1.15 (0.22-6.06)	0.87
Currently	19.0	1.89 (0.29-12.11)	0.50
Alcohol intake			
Never	90.0	1.00	
Regularly	10.0	1.52 (0.45-5.13)	0.50
Current physical activity			
≥ 30 min/day	69.0	1.00	
None	31.0	0.89 (0.27-2.96)	0.85

Risk factor	n /%	Unadjusted OR (95%)	p
Rug at home			
Yes	66.0	0.63 (0.19-2.13)	0.46
No	34.0	1.00	
Stairs at home			
Yes	44.0	0.91 (0.26-2.99)	0.88
No	56.0	1.00	
Dizziness			
Yes	67.0	2.46 (0.67-9.06)	0.17
No	33.0	1.00	
Sees well			
Yes	50.0	1.00	
No	50.0	2.14 (0.65-7.04)	0.21
Hears well			
Yes	66.0	1.00	
No	34.0	0.57 (0.17-1.88)	0.36

Conclusions: We believe that no correlation was found between falls and risk factors or fractures due to our sample size. However, we can state that the prevalence of falls among the elderly could be reduced through simple care organization in the home, since most events occur in this environment.

Disclosure of Interest: None Declared

P617 - CORRELATION BETWEEN OSTEOPOROSIS RISK QUESTIONNAIRE AND QUANTITATIVE ULTRASOUND OF THE CALCANEUS IN BRAZILIAN WOMEN

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Aims: Knowing the prevalence and specific risk factors for osteoporotic fractures in a population represents an important strategy to implement educative actions of health. Our objective was to estimate the prevalence of increased fracture risk assessed by quantitative ultrasound of the calcaneus (QUS) and to correlate it with the risk factors.

Methods: The sample consisted of people older than 50 years. The group was selected by non-probabilistic sampling of convenience in a medical reference ambulatory. A fracture risk questionnaire (FRQ) were applied. We considered the postulation: <5=low risk, 6-14=medium risk, >15=high risk; and altered if t-score of QUS<-10. Anthropometric measures and QUS were did in the same time.

Results: The general characteristics are in table 1. In the general population, 80% had altered QUS (83% of women and 64% of men). Nobody did more than 13 points in the FRQ; 70.6% and 29.4% of the patients presented low and medium fracture risk, respectively. Among the risk factors, 67.9% had inappropriate sun exposure, 38.1% height <1.58m, 35.1% insufficient physical exercise, 4,7% familiar history of hip fracture. Only 4,7% them used drink milk, 5,8% drink alcoholic drinks, and 11,6% were smoking.

Characteristics	All people (n=261) mean±SD/%	Women (n=197) mean±SD	Men (n=64) mean±SD
Age (years)	67,76 ± 6,97	67,45 ± 7,05	68,72 ± 6,68
Weight (kg)	70,70 ± 14,84	69,22 ± 15,14	75,25 ± 13,00
Height (cm)	158,82 ± 10,75	155,50 ± 9,41	169,05 ± 7,78
Body mass index (kg/m2)	27,68 ± 4,86	28,13 ± 5,16	26,30 ± 3,49
T-score	-1,92 ± 0,91	-2.07 ± 0,92	-1,45 ± 0,69
BUA	74,12 ± 15,94	71,03 ± 15,59	71,03 ± 15,59
SOS	1545,40 ± 32,91	1541,50 ± 32,66	1541,50 ± 32,66
BQI	69,79 ± 17,98	66,61 ± 17,52	66,61 ± 17,56

There are only weak correlation between FRQ x BUA (r=-0,28, p<0,001), and FRQ x BQU (r=-0,15, p<0,001) to all population. There are not correlation to men and women separately.

Conclusions: We observed high prevalence of altered QUS and many risk factors to osteoporosis in our population. Despite it, we didn't observe correlation between this kind of FRC and altered QUS. We will intend to test other kind of questionnaires to evaluate its applicability in this population.

Disclosure of Interest: None Declared

P618 - URBAN-RURAL DIFFERENCES IN FOREARM FRACTURES IN POSTMENOPAUSAL WOMEN – THE NOREPOS STUDY

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Aims: To compare forearm fracture rates among women 65 years and older in rural and urban communities

Methods: Women aged 65 years or older who participated in two large longitudinal health surveys in Norway, The Tromsø Study (1994-1995) and The Nord-Trøndelag Health Study (1995-1997), were included in this study (n=11,209). Hospital verified distal forearm fractures sustained after the baseline health screening were registered (mean follow up: 6.1 years). Weight and height were measured and information about physical activity, smoking and alcohol intake at baseline were obtained through self-administered questionnaires. A total of 1960 women lived in communities classified as urban (in the city of Tromsø) and 9249 women lived in communities classified as rural (either Nord-Trøndelag or the rural part of Tromsø).

Results: After adjusting for age, women residing in urban communities had higher forearm fracture risk, RR=1.29 (95% confi-

dence interval (CI): 1.09-1.52) compared with women in rural communities. When adjusting for body mass index (BMI), the RR of forearm fracture in urban compared with rural women decreased to 1.21 (95% CI: 1.02-1.43). Similar adjustments for smoking, alcohol intake or physical activity did not change the estimate.

Conclusions: Overall forearm fracture rates were 29% higher among women in urban compared with rural communities. The difference was partly explained by a higher BMI in women in rural communities, whereas differences in life-style factors (smoking, alcohol intake or physical activity) were not responsible for the urban-rural forearm fracture difference.

Disclosure of Interest: None Declared

P619 - BONE TURNOVER MARKERS AND BONE MINERAL DENSITY IN HYPERTENSIVE POSTMENOPAUSAL WOMEN ON TREATMENT

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Aims: To evaluate bone mineral density (BMD) and bone metabolism in hypertensive postmenopausal women, and to differentiate the effect of thiazides from that of other antihypertensive agents.

Methods: A community-based population of 636 postmenopausal women, 293 with hypertension (160 receiving thiazides, and 133 receiving only other antihypertensive treatments), and 343 control women were evaluated. Serum levels of aminoterminal propeptide of type I collagen (P1NP), C-terminal telopeptide of type I collagen (β-CrossLaps, β-CTX), 25-Hydroxivitamin D (25OHD), and intact parathyroid hormone (iPTH) were measured by a fully automated electrochemiluminiscence system. BMD was determined by DXA, and heel quantitative ultrasound measurements (QUS) were evaluated with a gel-coupled device.

Results: BMD expressed as Z-score was higher in both groups of hypertensive women at all locations. Expressed as g/cm^2, it was also higher in patients on thiazides at femoral neck and lumbar spine. Only in the latter site, differences remained significant after adjusting for potential confounding variables, including BMI. Bone turnover markers were lower in both groups of hypertensive women, although the difference was greater in those on thiazides. After adjusting for potential confounders, differences remained significant only in the thiazide group.

Conclusions: Our results add evidence to the idea that thiazides are beneficial to prevent bone loss.

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Disclosure of Interest: None Declared

P620 - PREVALENCE OF VITAMIN D DEFICIENCY IN PATIENTS WITH RHEUMATIC DISEASES

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Aims: To determine the prevalence of vitamin D deficiency among patients with rheumatic diseases.

Methods: A cohort of 120 patients with rheumatic diseases were included in the study. Serum 25(OH) vitamin D assay was obtained using the Roche Diagnostics electrochemiluminescence immunoassay in all patients. Bone densitometry was performed on patients who had risk factors for osteoporosis.

Results: A total of 122 subjects, 100 females and 22 males were included. Patients' ages ranged from 22 to 98, with 46% of females and 23% of males respectively, aged 60 and older. Majority were not taking any vitamin D supplement. Serum 25-OH vitamin D ranged from 6.6 to 66 ng/ml. The serum 25-OH vitamin D level was normal in 24% of females and 27% of males. Overall prevalence of vitamin D deficiency (<20ng/ml) was 23% in females and 32% in males; while overall prevalence of vitamin D insufficiency (20 to 30 ng/ml) was 53% in females and 41% in males. Of the 82 patients who had bone densitometry results, 39% (9/23) of females with vitamin D deficiency had osteoporosis, while had 17% (4/23) osteopenia. Of the females with vitamin D insufficiency, 43% (23/53) had osteoporosis while 19% (10/53) had osteopenia. Other co-morbidities of the patients included: SLE, osteoarthritis, rheumatoid arthritis, gout, cerebral infarct, tuberculous arthritis, hypertension, diabetes and others.

Conclusions: There is a high prevalence of vitamin D deficiency and/or insufficiency, even among residents of tropical countries like the Philippines and even in patients who are being treated for osteoporosis; hence screening for vitamin D deficiency should be routinely performed in patients who do not have adequate sunlight exposure, particularly to ultraviolet B rays or do not take vitamin D supplements.

Disclosure of Interest: None Declared

P621 - INCIDENCE OF VENOUS THROMBOEMBOLISM (VTE) IN USERS OF STRONTIUM RANELATE: A CASE SERIES FROM PRESCRIPTION-EVENT MONITORING (PEM) IN ENGLAND

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Aims: To estimate the incidence of VTE in patients within the strontium ranelate PEM study cohort during the first 12 months after starting treatment. Strontium ranelate is indicated for the treatment of postmenopausal osteoporosis.

Methods: Patients were identified from dispensed prescriptions that had been issued by general practitioners (GPs) for strontium ranelate between October 2004 and January 2008. For each patient, a questionnaire was sent to their GP 12 months after the date of the first prescription, requesting outcome (event) data,

patient demographics and selected clinical characteristics. VTE was defined as reports of deep vein thrombosis (DVT) or pulmonary embolism (PE). The crude incidence of VTE was calculated for events that occurred during the first 12 months after starting treatment (plus 30 days after stopping) [+95% Poisson exact confidence intervals] for the whole cohort and subsets defined by age and past history of VTE.

Results: The final analysis cohort consisted of 10,782 patients. Where specified mean age was 73.3 years (SD 11.45) [n=10696]; 9,833 (91.2%) were female. Where specified, 2.5% (233/9255 patients) had a history of VTE prior to starting. In the first 12 month period there were 48 incident reports of VTE, during treatment (or within 30 days of stopping), in the cohort with 7696.89 years of exposure, giving a crude incidence rate of VTE of 6.24 cases (95% CI: 4.60-8.27) per 1 000 years of patient-time exposed (pte). Stratified by age, the crude incidence rate of VTE in patients <70 years (n= 7) was: 2.68 cases (95% CI: 1.08-5.52); in those aged 70-79 years (n=18) it was: 6.47 cases (95% CI: 3.77-10.35) per 1 000 years pte, whilst for patients ≥80 years (n=23) it was 9.63 cases (95% CI: 6.11-14.45). Stratified by history of VTE revealed 32.60 cases (95% CI: 10.59-76.09) per 1000 years pte in patients with a past history, and 6.11 cases (95% CI: 4.33-8.39) per 1000 years pte in patients without a history.

Conclusions: This analysis provides an estimate of the crude annual incidence of VTE in patients treated with strontium ranelate in the general practice setting and although higher than the background annual incidence rate found in the UK population, it is similar to estimates reported from observational studies in similar populations. It also corresponds to estimates reported from Phase III clinical studies. Under-reporting is a limitation. Nevertheless this analysis contributes to the ongoing post-marketing safety assessment of this product.

Disclosure of Interest: V. Osborne Other: The Drug Safety Research Unit (DSRU) is a registered independent charity (No. 327206) which works in association with the University of Portsmouth. It receives unconditional donations from pharmaceutical companies. The companies have no control on the conduct nor the publication of the studies undertaken by the DSRU. The DSRU has received unconditional donations from the manufacturer of strontium ranelate (Servier)., D. Layton Other: As stated previously, S. Shakir Other: As stated previously

P622 - BONE CHANGES IN COUPLES HAVING SHARED COMMON LIFE AND ENVIRONMENTAL FACTORS FOR 40 YEARS

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Aims: Most bone mineral density (BMD) familial resemblance studies assess the role of genetic factors in osteoporosis, but few have studied the relationship of bone loss within wife-husband pairs. The aim of the present study was to determine whether or not bone loss was the same within heterosexual partners who shared the same environment for many decades.

Methods: From the longitudinal VIGGOS cohort, 104 couples who came at least twice and had >1 yr of follow-up were selected for our study. The mean (± SD) age of wives was 63 (± 5) yrs and that of their husbands was 66 (± 5) yrs. They had been living together for 40 (± 8) yrs, and their follow-up was 5 (± 3) yrs. BMD of the hip was evaluated by DXA at each of the 4 (± 2) visits. At baseline, lifestyle characteristics (current nutritional habits, smoking, daily physical activity) were assessed using structured questionnaires, and biological and clinical parameters. Intra-couple correlations of baseline parameters were assessed by Pearson's correlation tests. For each gender independently, bone loss at the femoral neck (FN) was estimated as the slope resulting from a mixed-effects linear model. The intra-couple correlation of bone loss using the Pearson's correlation test was also evaluated. In each gender, a multivariate linear model (between bone loss and the independent environmental factors and their two-by-two interactions) was conducted.

Results: Most of the environmental baseline factors were highly correlated within wife-husband pairs: age ($r=0.70$, $p<0.0001$), BMI ($r=0.26$, $p<0.01$), 25-OHD serum level ($r=0.32$, $p<0.01$), daily calories ($r=0.52$, $p<0.001$) and calcium intake ($r=0.31$, $p<0.01$), physical activity ($r=0.43$, $p<0.0001$). In contrast, the baseline BMD at FN was not correlated ($r=0.03$, $p=0.79$). Bone loss was observed in wives (-0.0023 g/cm²/yr, $p<0.01$), while it was not in their husbands (0.0016 g/cm²/yr, $p=0.10$). Bone loss was not correlated within wife-husband pairs ($r=0.0004$, $p=0.99$). In women, 25-OHD and interactions of Tobacco with 25-OHD and Calories intake explained 37% of the bone loss variance ($p<0.01$), whereas there was no significant relation between bone loss and environmental factors in their husbands.

Conclusions: Couples who lived together for 40 yrs shared lifestyle and environmental factors. However, bone loss was not correlated within couples. Environmental factors do not appear to influence bone loss in the same manner in subjects of different genders and genetic background.

Disclosure of Interest: None Declared

P623 - IS OSTEOPOROSIS A RISK FACTOR FOR DISTAL RADIUS FRACTURES? A CASE-CONTROL STUDY OF 1374 WOMEN AND MEN AGED 50-90 YEARS

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Aims: The objectives of this case-control study were to compare the prevalence of osteoporosis between female and male low-energy distal radius fracture patients and matched controls, and to investigate whether observed differences in bone mineral density (BMD) between patients and controls could be explained by potential confounders.

Methods: 676 female and 86 male patients and 558 female and 54 male controls aged 50-90 years were included. BMD was assessed by dual energy X-ray absorptiometry. A self-administered questionnaire provided information on clinical and other factors.

Results: The prevalence of osteoporosis at femoral neck was 34% in female patients and 10% in female controls. Corresponding figures in male patients and controls were 17% and 13%, respectively. In adjusted conditional logistic regression analyses, osteoporosis (OR=7.08, 95% CI: 4.26-11.69, p<0.001), osteopenia (OR=2.78, 95% CI: 1.95-3.99, p<0.001), and previous fracture (OR=1.50, 95% CI: 1.01-2.24, p=0.045) were statistically significant associated with distal radius fractures in women. Osteoporosis was statistically significant associated with distal radius fractures in men (OR=8.08, 95% CI: 1.38-47.40, p=0.021).
Conclusions: The prevalence of osteoporosis in distal radius fracture patients is high compared to control subjects, and osteoporosis is a risk factor for distal radius fractures in both genders.

Disclosure of Interest: None Declared

P624 - OSTEOPOROSIS IN ELDERLY PATIENTS PRESENTING WITH MUSCULOSKELETAL PAIN

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Aims: The aim of this study was to identify the ones who have osteoporosis (OP) in a large sample of elderly presenting with musculoskeletal complaints. We also examined the distribution of the regions of musculoskeletal pain and medications for the musculoskeletal diseases in these patients
Methods: This multicenter study was conducted in nine provinces located in six different geographical regions between April and December 2008. A total of 1141 patients aged ≥ 60 years who were consecutively admitted to the Physical Medicine and Rehabilitation departments, were screened for diagnosis of OP. Age, gender, complaints, diagnosis and current medications related to musculoskeletal system disorder(s) of the patients were recorded.
Results: Out of 1141, 382 patients with a diagnosis of OP according to the World Health Organization criteria were included in the study. The mean age of the participants were 71.9±5.3 years. Low back (54.5%) and back (39.6%) pain were the most common complaints in both genders. These were followed by knee (28.2%), hip (17%), cervical (14.1%) and shoulder (13.6%) pain. While 50% of those who reported pain experienced the pain in only one site, 32.1% have pain in two, and±17.9 in three or more areas. Osteoarthritis (35.9%), lumbar (20.7%) and cervical spondylosis/stenosis (10.2%) were the most common musculoskeletal diseases coexisting to OP. The mean number of drugs used, including the ones for osteoporosis treatment, was 3.0±1.2. While 38.2% of the patients were using medication only for osteoporosis, 22% of them were using one, 28.8% two and 11% three or more additional drugs. Most commonly prescribed anti-osteoporotic agents were biphosphonates (59%), followed by calcitonin (13.8%), strontium ranelate (11.6%), parathyroid hormone (7.1%) and selective estrogen receptor modulators (1.6%). Moreover, 91.8% of the patients were advised to take calcium and vitamin D supplements. For the treatment of musculoskeletal disease(s), non-steroidal anti-inflammatory drugs (NSAIDs) were used in 46.6% and paracetamol in 24.6% of the patients.
Conclusions: It is imperative to perform a thorough physical examination to reveal the underlying cause of back pain in elderly osteoporotic patients; spodylosis or OP itself. Furthermore, with regard to polypharmacy, non-pharmacological approaches like physical therapy and exercise programs should be considered as an integral part of management of musculoskeletal diseases, especially in elderly patients

Disclosure of Interest: None Declared

P625 - ARE POST BARIATRIC SURGERY FRACTURES DIFFERENT FROM FRACTURES IN SEVERELY OBESE SUBJECTS?

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Aims: Bone strength and fracture are related to multiple factors. Bone fractures have been associated to body mass index (BMI). Prior studies have documented an increased risk of fracture with low BMI. In severely obese patients who have had bariatric surgery, changes in absorption of minerals and alterations in hormones cause bone and mineral loss and may contribute to bone fractures. Little is documented about fractures in these post surgical obese patients. The aims of this study are to report fracture characteristics in severely obese subjects following bariatric surgery and compare fractures to severely obese patients before bariatric surgery.
Methods: Cases of bone fractures were reviewed and confirmed in a community cohort of 525 subjects who underwent bariatric surgery from 1992 to 2007. Fractures were classified and analyzed according to trauma, site of fracture and conventional osteoporotic fractures. Additional comparison analysis was performed between pre-operative and post operative fractures.

Results: In 525 subjects who underwent bariatric surgery, 54 subjects developed definite fractures after surgery. Post-operatively, the mean weight loss was 35.4 ±20 kg over a mean follow up period of 5.4 ±3.5 yrs. Most fractures occurred in the lower extremity (34%). In a multivariate analysis, post-operative fractures were related to age, duration of follow up ($p < 0.01$), and prior fractures ($p=0.01$) but not BMI, percent of weight loss or sex. Pre-operatively, there were 80 definite fractures which occurred on average 7.4±5.2 yrs. before surgery. Most fractures were in the lower extremity (42%) In a multivariate analysis, pre-operative fractures were related to BMI and age ($p < 0.01$), but not sex. Fracture rates after surgery are not significantly different from those before surgery ($p=0.19$). Traumatic fractures, conventional osteoporotic fractures and fracture sites were similar in both groups ($p>0.05$).
Conclusions: Bone fracture rates and sites in obese subjects who underwent bariatric surgery are not different from bone fracture rates or sites before bariatric surgery.

Disclosure of Interest: None Declared

P626 - CHANGES IN HIP FRACTURE INCIDENCE IN SOUTH-EASTERN AUSTRALIA, 1990-3 TO 2006-7: GEELONG OSTEOPOROSIS STUDY

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Aims: Recent data suggest that hip fracture incidence may be declining in western populations. The aim of this study was to investigate changes in hip fracture incidence in south-eastern Australia over a period spanning from 1990 to 2007.
Methods: Comprehensive hip fracture data were obtained from radiology reports for a geographically distinct region, the Barwon Statistical Division, and compared for the two periods 1990-1993 and 2006-2007. Multiple admissions and pathological fracture cases were excluded. During the study period, the population increased by 19%. For ages 55+ there was a 53% increase (57% men and 49% women); corresponding figures for ages 85+ were 133% (176% and 116%). To facilitate direct comparisons, sex-specific fracture incidence rates were age-standardised to the 1991 census population.
Results: Between 1990-3 and 2006-7 the absolute number of hip fractures per year increased by 86% in men and by 19% in women. The age-standardised hip fracture ratio (2006-7 compared to 1990-3) for ages 55+ were 0.93 (95% CI 0.80-1.09) for men and 0.70 (95% CI 0.62-0.77) for women. Mean age-specific hip fracture incidence rates decreased for women in age-groups 55-64, 65-74, and 75-84 years (from 0.76 to 0.23, 2.63 to 1.62, 12.52 to 7.18 fractures/1000 p-yr, respectively; all $p<0.05$). Non-significant decreases were observed for women aged 85+ and for men aged 65-74, and 75-84 years (27.32 to 24.90, 1.54 to 0.97, 5.69 to 5.04 fractures/1000 p-yr, respectively). No changes were observed among younger men and women.
Conclusions: Hip fracture incidence rates in women aged 55-84 years decreased in 2006-7 compared to 1990-3 and a similar pattern was observed in men, consistent with an effect on osteoporotic fractures. This may reflect improved efficacy and increased uptake of anti-fracture drug treatments, together with increased application of falls prevention programs. However, a cohort effect or unknown environmental influences cannot be excluded.
Acknowledgement: Funding from VHPF and NHMRC project no. 628582 (Australia).

Disclosure of Interest: None Declared

P627 - PREVENTION OF FALLS AND FRACTURES IN THE CHAOS CLINIC – CHARACTERISTICS OF HOME HAZARDS AMONG FALL-PRONE OLDER FINNS

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Aims: Home hazard assessment and modification are recommended for older adults with high risk of falling. Limited information is available concerning the characteristics of hazards discovered at people's homes. The aim of this study is to describe the number and characteristics of hazards found during home visits of fall and fracture-prone, community-dwelling older Finns.
Methods: This study is a part of the Chaos Clinic Intervention - a randomized controlled falls clinic intervention to prevent falls and fall-related fractures among home-dwelling older adults. The trial started in January 2005 and is still in process. This sub-analysis was implemented for subjects randomized to the intervention group and who lived in the City of Tampere, Finland between January 2005 and June 2008 (n=315). The one-hour, structured home visit was carried out by a physiotherapist or a public health nurse as one element of the year-long intervention. Among nutritional and home exercise guidance, one of the main objectives of a home visit was to assess hazards related to safety of the home and its environment. Guidance in reducing these hazards was also given. In addition, individual assessment of and guidance for other fall-related risk factors and assistive devices, such as canes and walkers, were provided. Hazards and agreed proposals for improvement were recorded.
Results: By June 2009, 34 men and 281 women, mean age 78 years (range 70-92), had completed the 12-month intervention. At baseline, one participant of four (25%) received regular home help and 61% reported fear of falling.

The most common fall-related home hazards were missing handrails in stairs, toilets and washing facilities (51% of the participants), missing anti-slip devices (such as friction mats) in toilets and washing facilities (29%), missing friction surface under carpets (25%), deficiencies in night lights (38%), unsuitable use of indoor shoes (16%), and unsuitable indoor stepladders (14%). Unsafe outdoor shoes and nearby other environmental hazards were recorded only in 3% of the participants. These hazards were also recommended to reduce.
Conclusions: As a part of a multifactorial fall and fracture prevention program among home-dwelling older Finns, the home hazard assessment should especially focus on handrails and friction mats

in toilets and washing facilities. In addition, attention should be given to proper use of night lights and anti-slip indoor shoes
Acknowledgement: We are indebted to Jaana Lindberg and Seija Nordback.

Disclosure of Interest: None Declared

P628 - EPIDEMIOLOGY OF TOTAL HIP AND KNEE REPLACEMENT AND REVISION SURGERIES

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Aims: To analyze the evolution of total hip and knee arthroplasties and revision surgeries, in a period of eleven years.
Methods: Data from hospital admissions registries, from Central Administration of the Portuguese Health System were used. Admissions of patients were selected according with procedures coded with 81.51 and 81.53 respectively for total hip arthroplasties (THA) and total hip revision (THR) and 81.54 and 81.55 respectively for total knee arthroplasties (TKA) and total knee revision (THR), according to the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM). The age standardized incidence rates (IR), for each year between 1997 and 2007, were calculated for THA and THR, using the standard population of Europe (1976) and the direct method. The denominator was the estimated population for each year, except for 2001 a Census year. The burden of revision was calculated as the fraction of revision surgeries among all primary and revision arthroplasties.
Results: During the study period, the IR of THA had a linear increased of 19%, both for women and men, being 34.5 and 39.6 in 1997 and 41.4 and 47.4 in 2007, per 100 000 persons-year, respectively for women and men. The revision burden of THR increased from 1997 to 2002, from 10.1% to 15.8% and remained stable from that year on. Regarding the IR of TKA, there was an accentuate increase, being, in 1997, 11.4 and 4.9 and in 2007 49.3 and 21.6, per 100 000 persons-year, respectively for women and men. This represents an increase of more than four folds in both genders. The revision burden of TKR decreased from 1997 to 2004 (from 7.3% to 4.7%) and from 2005 to 2007 increased up to 6%. During the study period the number of orthopedic surgeons increased 4.8% in Portugal and the annual average of THA per surgeon remained stable, around 7.6, while the annual average of TKA increased from 4 to 6.
Conclusions: Total hip and knee arthroplasties are the international standard of care for degenerative joint diseases and help reducing pain and improving quality of life in patients. The increased trends in the age standardized incidence rates of TKA in Portugal follows what is observed in the international studies, while for THA the trends show a smaller increased than in USA, Canada and several European countries. Knowing the demand for arthroplasties is crucial for health managers and an important epidemiological issue, since the osteoarticular diseases has a major impact in the society.

Disclosure of Interest: None Declared

P629 - PARENTAL FRAGILITY FRACTURES CORRELATE WITH OSTEOPENIC AND/OR OSTEOPOROTIC STATUS IN POSTMENOPAUSAL WOMEN: PRELIMINARY RESULTS OF PROF STUDY WITH BONE ULTRASONIC TESTING

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Aims: Within the project PROF (Prevention of Osteoporotic Fractures) where synergic efforts between researchers and healthcare physicians are in place for preventing osteoporotic fractures in Southern Apulia, we have analyzed the correlation between familial fragility fractures and osteopenic/osteoporotic status in postmenopausal women.
Methods: in the year 2009, we have screened 1414 postmenopausal women (mean age 62 years, range from 39 to 86) by using quantitative ultrasound testing, either at heel or phalanx anatomic level. Demographic and anamnestic data were recorded for all the patients, including BMI, nutrition, menopause, physical activity, previous fractures, parental fragility fractures. Three categories were a priori identified: a) Demineralization, whenever any T-score value was inferior to -1.0 SD; b) Severe demineralization, whenever a T-score inferior to -2.0 was observed, corresponding to a higher risk of fracture; c) Osteoporosis, whenever a T-score values QUS inferior to -2.5±0.2 (in case of heel) or T-score inferior to -3.2±0.2 (in case of phalanx). Descriptive statistical analyses have been performed in order to assess the correlation between parental fragility fractures (any osteoporotic fracture occurred in patients' parents) and the osteopenic or osteoporotic status of the patients.
Results: Demineralization was observed in 1115 patients out of 1414 (79%). Demineralization corresponding to a severe osteopenia or osteoporotic status was confirmed in 734 women (52% of the overall examined subjects); 453 patients were found to be osteoporotic (32%). A total of 226 women declared to have parents with fragility fractures: out of them, 196 (86.7%) presented a demineralization – as defined by T-score <-1 - corresponding at least to an osteopenic status. In the subgroup of women with familial fragility fractures, a status of severe osteopenia or osteoporosis was diagnosed in 122 patients (54.0%), with 69 of them being frankly osteoporotic (30.5%).
Conclusions: PROF study dataset suggests that the presence of familial fragility fractures correlates with osteopenic and/or osteoporotic status in postmenopausal women. Such an evidence may be considered an opportunity (a flag) to focus attention of both General Practitioners and of Specialties Doctors toward an integrated/preventive approach to family relatives of patients with fragility fractures.

Disclosure of Interest: None Declared

P630 - CORRELATION BETWEEN HYPOGONADISM AND RISK OF FALLING IN MEN WITH LOW BONE MINERAL DENSITY

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Aims: Establish the correlation between hypogonadism and the risk of falling in men over 65 years old with low bone mineral density (BMD).

Methods: The research was conducted on a sample of 138 men aged over 65 years clinically and imaging diagnosed with osteoporosis or osteopenia. They were compared with a control group composed of 115 men with normal lumbar spine and hips BMD determined by dual energy X-ray absorptiometry. The risk of falling was assessed using four simple tests considered good independent predictors for failure. These tests were: Tandem Standing, Up & Go Chair - Rising, the speed of walking.

Results: The average age of men was similar in both groups: 69.45 years in control group and 70.57 years in study group. Risk of falling was more frequently increased at men from the study group (109 patients, 60.89%) compared with those from the control group (70 patients, 39.11%) (p=0.002). In the control group, hypogonadism was diagnosed in 68.57% cases (48 patients) of men with increased risk of falling, compared with only 2.22% cases (1 patient) with sex hormones deficiency at men without risk of falling (p=0.000). Men from the study group with increased risk of falling presented hypogonadism in 68.47% cases (76 patients), while at those without risk of falling sex steroid deficiency was seen only in 6.89% cases (2 patients) (p=0.000). In the study group, 97.43% of patients (76 cases) with hypogonadism had increased risk of falling, the result being similar to the control group (97.96%; 48 cases). Among men with increased risk of falling, 12.64% (32 patients) had low total testosterone, 49.01% low free testosterone and 18.97% low estradiol levels.

Conclusions: Men with low bone mineral density and increased risk of falling had significantly more often hypogonadism than those without risk of falls. The vast majority of men diagnosed with hypogonadism showed increased risk of falls. Free testosterone deficiency was most commonly associated with increased risk of falling.

Disclosure of Interest: None Declared

P631 - INCIDENCE AND COSTS OF HIP FRACTURES VS. ACUTE MYOCARDIAL INFARCTIONS AND STROKES IN ITALY

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Aims: Previous studies have suggested that economic burdens of osteoporotic fractures follows the ones due to cardiovascular diseases. Thus, in order to rule out/rule in such an evidence, we compared the impact of hip fractures in an aged population versus acute myocardial infarctions (AMI) and strokes, in Italy.

Methods: the Italian database for hospitalized people was explored to evaluate hospital admissions and costs between 2001 and 2005 in people ≥45 and ≥65 and ≥75. Hospital and rehabilitation costs were calculated on the basis of both DRGs classification and of official rates.

Results: In 2005, as many as 75.586 men and 43.164 women were hospitalized because of AMI, showing an increase of 17.2% and 29.2%, respectively, across 5 years. In the 45-64 age-group, 29.925 hospitalizations were registered in men and 6.443 in women. In the 65-74 age-group, 21.621 men and 10,145 women were hospitalized following AMI, while in the ≥75 age-group, 24.040 and 26.576 hospitalizations were recorded in men and women, respectively. Hip fractures were experienced by almost 400.000 people ≥65 across 5 years, resulting in over 100.000 deaths. In year 2005, as many as 94.471 people aged ≥65 were hospitalized due to hip fractures, with an increase of 25% over 5 years. The majority of hip fractures occurred in patients ≥75 (82.9%); in fact, they did amount to 420.890 with an increase of 16% across 6 years) and particularly in women. Among women, 84.2% of fractures (n =334,223; +28.0% over 6 years) were experienced by patients in the ≥75 age-group, which is known to be the one with the highest prevalence of osteoporosis, accounting for 68.6% of the overall observed increase in the total number of fractures. Hip fractures in men ≥75 increased by 33.1% (up to 16.540). Hospitalizations due to strokes increased from 178.163 to 193.258 across 5 years, with elderly people going from 73.493 to 94.471. Overall costs undertaken for hip fractures in the elderly increased from 890 million Euros (€) to 1 billion €, growing faster than AMI costs which went - in people >45 - from 654 to 794 million € and - in elderly people - from 428 to 568 million €.On the contrary, costs sustained for Strokes were pretty stable, with a reduction trend going from 574 to 569 million €, being more relevant in patients affected by Transient Ischemic Attacks that went from 149 to 129 million €.

Conclusions: In elderly people, incidence and costs of hip fractures are comparable to the overall costs of AMI and Strokes.

Disclosure of Interest: None Declared

P632 - VITAMIN D DEFICIENCY AND INSUFFICIENCY IN UKRAINIAN POPULATION

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Aims: Vitamin D levels in peripheral blood have been assessed at Ukrainian Scientific and Medical Center of Osteoporosis. 129 patients, aged 20-79 years (median 55.8±1.3) underwent peripheral blood sampling with subsequent assessment of 25(OH)vit D values by EIA test.
Methods: Patients have been split into 5 groups according to their age: 20-39, 40-49, 50-59, 60-69 and 70-79 years old. 95 of them were females and 34 males. Vitamin D levels were assessed with the 25-OH Vitamin D EIA Kit by means of the Immundiagnostic Enzyme-Immuno-Assay (EIA) for quantitative determination of 25-OH Vitamin D in human serum and plasma.
Results: Results in groups: 25-OH vitamin D level in group 20-39yrs was 60.7±9.5 nmol/l; in 40-49yrs - 53.4±5.7 nmol/l; in 50-59yrs - 58.5±6.9 nmol/l; in 60-69yrs - 58.0±7.3nmol/l; in 70-79yrs - 68.0±9.7 nmol/l. Average value throughout the assessed population was 58.4±3.5 nmol/l. Deficiency has been found in 11.7%, 14.3%, 17.1%, 17.2%, 11.1% of cases ("younger" to "older" group, respectively). Insufficiency: 47.1%, 57.1%, 57.2%, 62.1%, 48.2% of cases. Normal values of 25(OH) vitamin D have been determined in 41.2%, 28.6%, 25.7%, 20.7%, 40.7% (same group breakdown). In total the diagnosis of vitamin D deficiency was established in 14.7% of the subjects, insufficiency – in 55.0%; normal values in 30.3% of the population in question.
Conclusions: Patients in the following age groups: 40-49, 50-59, 60-69 years are most susceptible to deficiency and insufficiency of vitamin D. The occurrence of higher 25(OH)vitamin D levels in patient population between 70-79 years old might be explained by prophylactic intake of calcium and vitamin D preparations among this population.

Disclosure of Interest: None Declared

P633 - LOW BACK PAIN AMONG CHILDREN WHO ARE LIVING IN MOUNTAIN REGION OF UKRAINIAN ZACARPATHYA

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Aims: Low back pain (LBP) among children is actual problems in medicine. According to Herreby M. et al. (2002) 85± people, who had been suffered from low back pain at 14 years old, had multiple relapses of symptom in next 35 years. The aim of work - to evaluate the frequency of LBP and establish risk factors among children, who are living in one of the mountain region of Ukraine (Kobyletska Polyana, Transcarpathian region).
Methods: 208 schoolchildren in age 10-17 years old were examined. It was used objective examination and risk-factors questionnaire for person with LBP (Povoroznyuk V.V., Dzerovych N.I., 2003).
Results: 21.3± schoolchildren had complaints in LBP (19± - boys, 23± - girls). The age-related peak of symptom was in 14-15 years among girls, at 14 and 16 years among boys (22.2± and 27.7± correspondingly). The localization of the pain was in lumber region in 45.5± children, and combination of lumber and thoracic or cervical pain in 25.5±. The mild pain intensity was in 30.8± girls and moderate - in 26.9± girls and 55.6± boys. 62± children had pain in day-time with duration not more than 30 min. LBP was increasing with heavy load lifting or during continuous bending or sitting position. All children with LBP had overweight book bags. There were 32± family-related cases of LBP.
Conclusions: LBP was diagnosed in 21.3± of children of the mountain region. The main risk-factors were heredity and hard physical activity.

Disclosure of Interest: None Declared

P634 - THE PREVALENCE OF OSTEOPOROSIS IN PATIENTS WITH ANKYLOSING SPONDYLITIS

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Aims: Ankylosing spondylitis (AS) is a chronic inflammatory disorder, characterized by an inflammatory enthesopathy progressing to ossification and ankylosis. Osteoporosis is a well-reported complication of AS. Bone loss begins early in the disease at the spine, and later progresses to the hip. This reduction in bone density leads to an increased risk of fractures. However, there is a lack of awareness regarding this common complication, thus adding to the morbidity associated with AS. Aim of the study was to calculate the prevalence of osteoporosis in patients with ankylosing spondylitis.
Methods: We evaluate 50 subjects with ankylosing spondylitis (35 male, 15 female). Clinical, biological and radiological status was assessed by the Bath AS Disease Activity Index (BASDAI), Bath AS Functional Index (BASFI), C-reactive protein (CRP), *Erythrocyte sedimentation rate* (ERS), Bath AS Radiology Index (BASRI). BMD was evaluated at the lumbar spine and femoral neck by dual energy X-ray absorptiometry (DXA).
Results: The mean age was 36.84, ratio men / women was 3.5 / 1 (70% men and 30% women), the mean disease duration was 9, 8 years±6.7. Prevalence of osteoporosis was 20%. Factors associated with osteoporosis were higher CRP, ESR, BASFI and BASDAI, low weight longer disease duration. In AS patients BMD was significantly reduced in both lumbar spine 1.06±0.20 g/cm2 (T=-1.21±1.60) and femoral neck 0.90±0.16 g/cm2 (T= -1.32±1.31).
Conclusions: Osteoporosis is common in patients with AS and seems to be related to disease. Patients with active disease are especially at risk for developing osteoporosis.

Disclosure of Interest: None Declared

P635 - EFFECTS OF SELF-REPORTED OSTEOPOROSIS AND INCIDENT FRACTURES ON QUALITY OF LIFE: A PROSPECTIVE POPULATION-BASED STUDY

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Aims: Adverse effects of fragility fractures on quality of life have been reported in a number of studies. There is also evidence that the presence of osteoporosis, defined as a BMD T-score ≤ -2.5, may be associated with reduced quality of life even in the absence of fracture. We have assessed the effects of incident fractures and a self-reported diagnosis of osteoporosis on quality of life in a cohort of women studied prospectively over a one year period.
Methods: 4079 women were recruited from Southampton UK for The Global Longitudinal registry of Osteoporosis in Women (GLOW). GLOW is an observational follow-up study of women aged 55 years and older recruited through 723 primary physician practices in 17 sites in 10 countries. All non-institutionalized patients visiting the practice within the prior 2 years were eligible. Quality of life was assessed using the EQ5D and SF-36 questionnaires. Completed questionnaires at 1 year of follow-up were available in 1760 women.
Results: After adjustment, quality of life at one year was negatively associated with self-reported osteoporosis, falls, last menstrual period more than 20 yrs ago, BMI, and co-morbidities (hypertension, heart disease, and COPD) and positively associated with number of days per week spent walking for more than 20 minutes and education level. A significant association between quality of life and incident fractures was not demonstrated in this cohort.
Conclusions: After one-year of follow-up self-reported osteoporosis was negatively associated with quality of life in women participating in the UK cohort of the Glow study. This association appears to be independent of the presence of incident fractures.

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P636 - IS THERE SEXUAL DIMORPHISM IN THE RELATIONSHIP BETWEEN SERUM 25(OH)D AND BONE MASS? RESULTS FROM THE HERTFORDSHIRE COHORT STUDY

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Aims: There is considerable interest in the relationship between vitamin D status [circulating 25-hydroxyvitamin D (25(OH)D) concentration] and musculoskeletal health in adult populations, particularly given the high reported prevalence of vitamin D insufficiency/ deficiency. We utilised a well characterised Caucasian cohort based in Hertfordshire, UK to study this relationship.
Methods: We studied 430 women and 398 men born in Hertfordshire, UK between 1931-39 and resident there in adult life. Anthropometric data were recorded and a health questionnaire completed. A fasting blood sample was taken and 25(OH)D measured using automated DiaSorin Liason chemiluminescent assays. Bone densitometry was performed at the lumbar spine and femoral neck using a Hologic QDR 4500 instrument. Bone mineral density (BMD) and bone mineral content (BMC) were adjusted for age, BMI, social class, smoking status, alcohol consumption, physical activity, dietary calcium, season of clinic visit, and HRT use and years since the menopause in women. Individuals were grouped according to their 25(OH)D concentration: <10ng/ml, 10-20 ng/ml, >20ng/ml.
Results: The mean age of males and females was 64.2 years and 65.6 years respectively. Circulating 25(OH)D concentrations were higher in those attending clinic in summer/autumn compared to those attending in winter/spring ($p<0.001$). 12.1% men and 17.2% women were vitamin D deficient (concentration <10 ng/ml) and 47.7% men and 53.3% women had concentrations between 10 and 20 ng/ml. Among men, individuals with 25(OH)D levels > 20ng/ml had significantly higher BMD and BMC at all sites, compared with their counterparts with 25(OH)D concentrations<20ng/ml ($p<0.05$). No such threshold effect was evident among women.
Conclusions: We have observed high levels of 25(OH)D insufficiency/ deficiency in a UK middle aged cohort. While a threshold of 20ng/ml appeared to be associated with better bone health among men, no such threshold was apparent in women from this cohort.

Disclosure of Interest: None Declared

P637 - PREDICTION OF BONE FRACTURE RISK WITH FRAX® TOOL AND PTH LEVEL IN PATIENTS WITH END-STAGE RENAL DISEASE TREATED WITH HEMODIALYSIS

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Aims: Patients with end-stage renal disease (ESRD) treated with hemodialysis have increased risk of bone fractures. It is suggested by KDIGO (2009) to maintain PTH level in the range of 2 to 9 times the upper normal limit for the assay on the stable level. Justification for the probe to use FRAX® method, practiced in osteoporosis, to estimate the fracture risk in ESRD patients is the lack of accepted method in ESRD and simultaneous presence of the same risk factors as in the general population (age, gender, family history of fractures, substances). The aim of this study was to evaluate the usefulness of the FRAX® tool in prediction of fracture risk in patients with ESRD undergoing dialysis in comparison with the assessment of serum PTH measurements.
Methods: The study was performed for 1 year in 56 patients (30 men and 26 women) aged 64.2±13.7 years treated with hemodialysis for 7-372 months (median 55). The 10-year fracture risk (10-FR) of main bones was calculated using British FRAX® tool with DXA results (T-score) of femoral neck. PTH level was evaluated in the beginning of the study and after 1 year or before fracture. It was taken as optimal (KDIGO) when it was between 2-9 times above upper normal limit (norm 15-65 pg/ml; optimal PTH 130-585 pg/ml). Changes of PTH higher than 50% between first and the last exam were taken as abnormal (arbitrary decision).
Results: New low-energy bone fractures occurred in 7 patients (femoral neck in 5 and shoulder in 2). In accordance to KDIGO 26 patients had PTH level in optimal range and 30 in abnormal (16 too high and 14 too low). Four out of 7 patients with fracture had PTH level in optimal range during the study, 3 others had it too low. Initial 10-FR in all patients was 10.6±8.8%. 10-FR was higher in fractured group than in other (19.9±13.4 v 9.4±7.1% respectively; $p<0.01$). High risk (>20%) was found in 5 patients (2 of them had new bone fracture) and low risk (≤10%) in 33 (2 with fracture). High risk was found statistically more often in fractured group than in without ($p<0.05$). Patients with fractures were older than without (76.3±7.7 v 62.4±13.8 respectively; $p<0.05$).There was no difference in duration of dialysis treatment.
Conclusions: Patients with ERSRD and newly recognized bone fractures have higher fracture risk estimated with FRAX® tool than those without fractures. High fracture risk (>20%) estimated with FRAX® tool predicts fracture risk in ESRD patients in the same degree as lower than suggested serum PTH level.

Disclosure of Interest: None Declared

P638 - COMPARISON OF FRAX® TOOL AND BMD CHANGES ALONE IN ASSESSMENT OF THE EFFICACY OF PHARMACOLOGICAL TREATMENT IN OSTEOPOROSIS: POMOST STUDY

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Aims: It is suggested not to use FRAX® tool in the assessment of the efficacy of osteoporosis treatment with antifracture medicines because it depends not only on BMD changes. However, in our every day practice we universally accept BMD as the exclusive method in assessing of this efficacy. Using FRAX® method in the follow-up of our patients, we would have opportunity to take into consideration the coexistence of changes in patients age, bone density and in the presence of new osteoporotic fracture risk factors. The aim of our study was to assess FRAX® in evaluation of the efficacy of pharmacological treatment of osteoporosis in comparison with BMD changes only.
Methods: Calculation of 10-year bone fracture risk (10-FR) of the main bones with British version of FRAX® was performed in 142 patients (13 men and 129 women) aged 69.2±6.2 years selected from the group of 1188 patients admitted for the first time to National Centre of Osteoporosis during 1 year (2006/2007) who continued the treatment with antifracture medicines (1-weekly or 1-monthly bisphosphonates, strontium ranelate, vitamin D and calcium) for 2-3 years with available results of DXA of femoral neck (FN) and actual information on the clinical risk factors of bone fracture. The new age (older for 2-3 years), DXA results (new T-score) and information on the new osteoporotic events were used in the repeated calculations. LSC of FN BMD change was 5%. LSC of 10-FR changes is not defined.
Results: Sixty six patients were treated for 3 years and other 76 for 2 years. 10-FR risk at the start of observation was 19.4±9.9%. There were 9 new low-energy bone fractures during treatment. BMD of FN was increased in 40 patients, decreased in 21 and not changed in 81. There was significant negative correlation between changes of BMD and 10-FR during 2-3 years of treatment ($r=-0.7200$; $p<0.001$). Nineteen out of 81 patients with stable BMD had increased 10-FR >2 percentage points (PP), 3 out of 40 patients with increased BMD had increased 10-FR or no changed (1) and all patients with decreased BMD had increased 10-FR >1 PP.
Conclusions: Fracture risk estimated with FRAX® tool negatively correlates with BMD changes during 2-3 years of treatment of osteoporosis and in most of patients 10-FR calculations with FRAX® tool has no advantage over BMD changes only. In group of patients with stable BMD, and especially in those with new osteoporotic events during observation, calculation with FRAX® more clearly shows the real further risk of bone fracture.

Disclosure of Interest: None Declared

P639 - RELATIONSHIP BETWEEN BONE MINERAL DENSITY CHANGES AND RISK OF NONVERTEBRAL FRACTURES AMONG WOMEN RECEIVING CALCIUM WITH OR WITHOUT VITAMIN D SUPPLEMENTATION: A META-ANALYSIS

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Aims: To examine the association between changes in bone mineral density (BMD) with reduction in the risk of nonvertebral fracture in osteoporotic patients.
Methods: We conducted a systematic review of randomized placebo-controlled clinical trials of calcium with or without vitamin D supplementation, using electronic databases, supplemented by a hand-search of review articles and conference abstracts. To be included in this analysis, the studies were required to report both BMD (Hip/Proximal femur and/or lumbar spine) and the incidence of nonvertebral fractures.Meta-regression analyses were used to pool the data across all trials and to examine the associations of treatment and changes in BMD with reduction in risk of nonvertebral fracture over the duration of each study. A separate model was used for each measure of BMD (Hip or Spine; at 1 year or at the end of the study). The change in BMD was the difference between changes (from baseline) observed in the active treatment group and placebo group. Publication bias was explored by drawing a funnel plot and analyzed using the Begg and Mazumdar and Egger *et al.* tests.
Results: A total of 8 randomized trials (n=42172) were identified. No evidence of publication bias was showed. In 4 trials, patients received calcium and vitamin D supplementation (n=39019), whereas in the other 4 trials, they received calcium-only supplementation (n=3153). Results show that larger increases in BMD at 1 year were not associated with greater reduction in nonvertebral fracture risk (p=0.255 for lumbar spine; p=0.635 for hip). Similarly, larger increases in BMD from baseline to study endpoint were not associated with greater reduction in nonvertebral fracture risk (p=0.447 for lumbar spine; p=0.316 for hip).
Conclusions: In conclusion, there was no evidence of a statistically significant relationship between BMD changes and reduction in risk of nonvertebral fracture among patients receiving calcium with or without vitamin D supplementation. Calcium and/or Vitamin D may extent antifracture efficacy through a mechanism independent of bone density.

Disclosure of Interest: None Declared

P640 - FREQUENCY OF DIAGNOSED AND TREATED OSTEOPOROSIS IN FEMALE PATIENTES WITH HIP FRACTURE

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Aims: The purpose of this study was to determine the frequency of diagnosed and treated osteoporosis in population of postmenopausal female patients with fragility hip fracture.
Methods: This study took place in Institute for Rehabilitation-Belgrade on female postmenopausal patients that were rehabilitated after hip fracture. Data were collected by filling out a questionnaire with general information about the patient, the previous examination and treatment of osteoporosis and the existence of risk factors: previous fracture, early menopause, positive family history of fractures, co morbidity and conditions associated with loss of bone mass and a higher probability of falls, long-term application of corticotherapy, BMI less than 19kg/m^2. The questionnaire was fulfilled for each patient by her physician on the basis of anamnesis, if necessary after talk with family and insight into the medical documentation.
Results: The subjects were 105 patients with fragile hip fracture, the average age of 74.13 years. In the observed patient group 93 of them or 88.57% was older than 65 years. Previous fragility fracture was found in 22 cases or 20.95%, early menopause was recorded in 21 (20%), and associated diseases in 14 cases or 13, 33%. Even 17 (16,19%) of our patients except gender and age, had additional three of considered risk factors, and only three from the whole group had no additional risk factors for the development of osteoporosis. Approximately half of the patients at the time of initiation of rehabilitation had a BMI lower than 19kg/m^2. In the observed group DXA measurement was performed only in 12 patients before current fracture. Four of them received a recommendation for regular intake of calcium and vitamin D, and in 8 patients began treatment with bisphosphonates. Five of them started with taking therapy on regular base, but only three longer then one year.
Conclusions: After this research, unfortunately it can be concluded that despite the great efforts in the prevention of osteoporosis and fragility fractures there is still insufficient in recognizing, diagnosing and treatment of our patients, even in a population in high risk for fractures.

Disclosure of Interest: None Declared

P641 - OSTEOPOROSIS AMONG FIRST AND SECOND GENERATION IMMIGRANTS TO BEDFORD, UK

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Aims: Our aim was to assess the osteoporosis risk in the Italian group by comparing them with a control group to determine if current case finding practice in osteoporosis needs to include ethnic background as a relevant risk factor.

Methods: Anonymised data from the open access densitometry service were analysed from the Lunar GE database. Those of Italian origin were compared with a control group of Bedfordians with regard to fracture incidence and BMD. The two groups were controlled for age, height and weight across three age decades: 60s, 70s and 80s.
Results: Bedford, a town of 100,000 people, has a large Italian community - with some 14% of Italian origin. The immigration began over 50 years ago after the Second World War as Italian men from the Mezzogiorno were recruited to work in the brickwork industry centred to the west of Bedford. A previous study has highlighted the lower BMD among Italians who migrated from the south of Italy to Milan. (ref.) In the datasets from 128 paired patients the mean weight in the Italian group was 61.3kg and for the Bedfordian group was 65.3kg; the mean heights were 154.4 cm for the Italians and 157.7cm for the Bedfordians. In the Italian group 33% had suffered a major osteoporotic fracture compared to 25% of the Bedfordian patients ($p<0.01$). Analysis of the T-scores in the over 80s showed 63% of the Italians and 36% of the Bedfordians had T-scores less than -2.5 ($p<0.01$); in the over 70s group the results were 40% for the Italians and 32% for the Bedfordians ($p<0.01$) and for the 60s group the results were 37% for the Italians and 12.5% for the Bedfordians ($p<0.001$).
Conclusions: The lower bone density and increased fracture risk are shown in the Italian group after detailed comparison with a controlled group living in the same area. These results are similar across the three age decades studied and tend to support a genetic cause for the enhanced risk of osteoporosis in the Italian group. In the earlier Milan study the lower bone density among their Southern Italian immigrants was attributed to environmental exposures, but the immigrant population had lived in Milan for only 15 years.
References: Varenna M, Binelli L, et al, Osteoporos Int 2002;14:734

Disclosure of Interest: None Declared

P642 - THE IMPACT OF FRACTURE RISK ASSESSMENT ON OSTEOPOROSIS MANAGEMENT IN CLINICAL PRACTICE IN A BRUSSELS COHORT

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Aims: Osteoporosis (OP) is a major public health problem. Currently, the diagnosis of OP relies only on densitometry (T-score<-2.5 by DXA). However, fracture risk depends also on the presence of clinical risk factors (CRFs). Recent management guidelines for OP emphasize the use of WHO Fracture Risk Assessment Tool (FRAX®), which integrates some known CRFs. The aim was to evaluate the use of CRFs assessment to guide OP management in clinical practice
Methods: We performed a cross-sectional observational study in OP female patients. We evaluated for inclusion the first 1043 participants of the "Fracture Risk Brussels Epidemiological Enquiry" (FRISBEE) study, a prospective observational study in order to predict fracture risk by CRFs in a Brussels cohort of postmenopausal women aged 60-80 years. The presence of OP was defined by a T-score<-2.5 by DXA. The frequency of known CRFs was compared among patients receiving a specific treatment for OP vs. untreated patients (chi-squared test; significance level of $p<0.05$).
Results: 214 osteoporotic patients (20.5%) were included: 125 patients with specific treatment for OP (bisphosphonates 88%, SERM 10%, Sr ranelate 2%)(group 1, 58.4%) and 89 untreated patients (group 2, 41.6%). HRT was taken by 13 patients (10.4%) in group 1 vs. 4 patients (4.5%) in group 2. The prevalence of evaluated CRFs was not different in treated vs. untreated OP patients: age >70 years: 55.6% vs. 57.3% ($p=0.81$), BMI<20: 24.2% vs. 22.5% ($p=0.77$), previous fracture: 36.8% vs. 38.2% ($p=0.83$), parental hip fracture: 0.8% vs. 2.2% ($p=0.37$), current smoking: 8.8% vs. 15.7% ($p=0.12$), glucocorticoid use: 14.4% vs. 10.1% ($p=0.12$), causes of secondary OP: 19.2% vs. 20.5% ($p=0.82$), alcohol intake $\geq$ 3 units daily: 6.4% vs. 9.0% ($p=0.48$), menopause before 45 years: 37.6% vs. 39.3% ($p=0.80$), sedentary (defined by WHO criteria): 20.0% vs. 21.3% ($p=0.81$). All patients had regular medical follow-up.
Conclusions: We observed no significant differences in the prevalence of studied CRFs between the group with specific treatment for OP vs. the untreated group. This suggests that fracture risk assessment has little impact on OP management in clinical practice. Efforts in order to increase the awareness of practitioners on the need for fracture risk assessment for proper OP management are warranted.

Disclosure of Interest: None Declared

P643 - DISTRIBUTION OF CLINICAL RISK FACTORS FOR FRACTURE IN A BRUSSELS COHORT: IMPLICATIONS FOR FRACTURE RISK ASSESSMENT.

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Aims: Currently, the diagnosis of osteoporosis (OP) relies only on densitometry (T-score<-2.5 by DXA) despite the low predictive value of DXA for fracture risk. In this regard recent guidelines for OP management emphasize the use of the WHO fracture risk assessment tool (FRAX®), which integrates some known clinical risk factors (CRFs). However, not all identified CRFs are included in the FRAX® model and variability in CRFs prevalence between countries is likely. The aim was to evaluate the distribution of CRFs in a Brussels cohort and to compare it with those reported in the trials used for the construction of the FRAX® model.
Methods: We performed a cross-sectional observational study of the prevalence of CRFs among the first 1449 participants included in the "Fracture Risk Brussels Epidemiological Enquiry" (FRISBEE) study, a prospective study assessing the fracture risk using CRFs in a Brussels cohort of postmenopausal women (60-80 years).

Results: The mean (± SD) age was 70.3±6.2 years with mean age (± SD) at menopause 48.6±5.6 years. Based on densitometric criteria 175 patients (12.1%) had defined osteoporosis, 676 patients (46.7%) were osteopenic. 183 patients (12.6%) were taking specific treatment for OP (bisphosphonates 87.7%, SERM 10.3%, Sr ranelate 2.2%). The observed prevalences of known CRFs in our population were age > 70 years: 46.4%, BMI<20: 8.4%, previous fracture: 27.5%, parental hip fracture: 2.0%, current smoking: 11.9%, glucocorticoid use: 9.0%, causes of secondary OP: 14.6%, alcohol intake ≥ 3 units daily: 7.4%, menopause before 45 years: 36.4%, sedentary (defined by WHO criteria): 10.6%, fall in the last 6 months: 19.7%.
Conclusions: The prevalence of CRFs in our cohort varied from those observed in the trials used for the construction of FRAX®: notably previous fracture, current smoking and glucocorticoid use were more frequent in our cohort; parental hip fracture was less common. Further epidemiological evaluation is warranted in order to determine whether these different prevalences implicate a varying contribution of a specific CRF to fracture probability in different countries. This may also allow to develop more accurate population-based fracture risk assessment tools in the future.

Disclosure of Interest: None Declared

P644 - INCREASED FRACTURE RISK IN SECONDARY HYPERPARATHYROIDISM: A 16-YRS FOLLOW-UP STUDY

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Aims: Secondary hyperparathyroidism increases bone turnover and decreases bone mineral density (BMD). Low plasma 25-hydroxyvitamin D (25OHD) levels cause secondary hyperparathyroidism, but the relative contribution of low 25OHD- and high PTH-levels on risk of fracture is largely unknown. Accordingly, we studied risk of fracture in secondary hyperparathyroidism
Methods: Within the Danish Osteoporosis Prevention Study (DOPS), we performed a population based cohort study in 1097 women who all were perimenopausal at inclusion. We studied effects of high PTH levels (i.e., in the upper tertile; ≥4.5 pmol/l) on risk of incident fractures at different 25OHD levels during 16 years of follow-up. Incident fractures were assessed using a nation-wide hospital discharge register. In addition, effects of high PTH levels on BMD and vertebral fractures were assessed by DXA-scans and spinal X-ray examination after 10-years of follow-up.
Results: High PTH levels were associated with a decreased body mass index adjusted BMD and an increased risk of any fracture (HR 1.41, 95%CI, 1.11-1.79), as well as an increased risk of osteoporotic fractures (HR 1.59; 95%CI, 1.20-2.10). Plasma 25OHD levels *per se* did not affect fracture risk, but high PTH levels were associated with an increased fracture risk only at 25OHD levels <50 nmol/l, and between 50-80 nmol/l. High PTH levels did not increase risk of fracture at 25OHD levels >80 nmol/l.
Conclusions: High PTH levels increase risk of fracture. Our data suggest that risk of fracture is reduced when low PTH levels are combined with high vitamin D levels (25OHD>80 nmol/l).

Disclosure of Interest: None Declared

P645 - VITAMIN D LEVEL IN TYPE 2 DIABETIC PATIENTS

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Aims: Recent evidence suggests a role for vitamin D in pathogenesis of type 2 diabetes mellitus (DM). Despite discrepancies between bone mineral density (BMD) and fracture rates, clinical trials uniformly support the fact that new bone formation and bone microarchitecture and, thus, bone quality, are altered in type 2 DM. Calcium and vitamin D deficit may be potential risk factors for osteoporosis and one of the mechanisms of bone loss in type 2 diabetic patients. Therefore, the aim of our study was to assess the level of vitamin D and bone metabolism in type 2 diabetic patients.
Methods: 32 patients with type 2 DM (12 men and 20 women) (age – 51,44±7,31 years, duration of disease –5,57±6,34 years, body mass index - 30,97±4,65 kg/m^{2,} HbA1c – 8,92 ±1,51%) were examined. The control group consisted of 14 normal age-, sex- and body mass index-matched subjects. There have been measured the markers of calcium-phosphate metabolism (Ca, P); the markers of bone formation (serum alkaline phosphatase (ALP), serum N-MID osteocalcin (OC)) and bone resorption (cross-linked C-telopeptide (CTX)). There has been assessed the serum level of $25(OH)_2vitD_3$ in autumn-winter period. Bone mineral density (BMD) was measured at lumbar spine (L_1-L_4) and femoral neck using DXA.
Results: The normal levels of vitamin D were not revealed in patients with type 2 DM. Hypovitaminosis of vitamin D was revealed in 7 cases (21,88%), insufficiency of vitamin D – in 21 (65,62±), deficit of vitamin D – in 4 (12,5±). In control group hypovitaminosis of vitamin D was discovered in 4 subjects (28,6±), insufficiency of vitamin D – in 5 (35,4±), deficit of vitamin D – in 1 (7,4±), the normal levels of vitamin D – in 4 (28,6%). Vitamin D level was significant lower in diabetics than controls (36,52±15,5 vs. 83,07±20,43 p<0,05). The level of vitamin D positively correlated with duration of DM (r=0,51), waist (r=0,48), BMD at femoral neck (r=0,45).
Conclusions: There has been revealed the significant decrease of the vitamin D level in type 2 diabetic patients. Vitamin D hypovitaminosis was found in 21,88±, vitamin D insufficiency – in 65,62±, vitamin D deficit – in 12,5%. Anthropometric data, duration of diabetes may affect at the vitamin D level in type 2 DM patients.

Disclosure of Interest: None Declared

P646 - BONE MINERAL DENSITY, BONE TURNOVER MARKERS IN TYPE 2 DIABETIC MEN OLDER 50 YEARS

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Aims: Recent data confirmed an increased risk of osteoporotic fractures in type 2 diabetes mellitus (DM), including men. Lower bone mineral density (BMD) is a risk factor for bone fractures. In elderly women, loss in bone mass and micro-architectural changes are generally attributed to the onset of menopause. Men do not experience menopause, they do, however, experience age-related acceleration in bone loss and micro-architecture deterioration. The aim of the study was to assess the BMD and bone markers in type 2 diabetic men older 50 years.
Methods: 63 type 2 diabetic men older 50 years (mean age: 60,44±6,31 years, duration of DM: 10,47±5,34 years, age of manifestation: 50,53±8,68 years, BMI: 30,97±4,65, HbA1c: 8,91±1,8%) were examined. There have been measured the markers of bone formation (serum alkaline phosphatase (ALP), serum N-MID osteocalcin (OC)) and bone resorption (cross-linked C-telopeptide (CTX)), the markers of calcium-phosphate metabolism (Ca, P). BMD was measure by DXA at lumbar spine (L_1-L_4) and femur. Criteria WHO T-score less -2,5 was used for osteoporosis diagnostic. All findings were compared with 25 normal age-, sex- and body mass index-matched control subjects.
Results: BMD (g/sm^2) was statistically lower in diabetic patients at femoral neck (0,873±0,151 vs. 0,972±0,161, p<0,02) in comparison with controls. BMD (g/sm^2) at lumbar spine wasn't statistically significant in type 2 DM men and controls (1,186±0,163 vs. 1,219±0,138, p<0,08). There is a stronger degree of bone loss manifestation at femoral neck than at spine (0,873±0,151 vs. 1,186±0,163, p<0,05). Osteopenia in spine was revealed in 22,22± (1,214± 0,187 g/cm^2); at femoral neck – 32,26± (0,979±0,135 g/cm^2), osteoporosis in spine – 7,94± (1,205±0,186 g/cm^2); at femoral neck – 4,84± (0,955±0,147 g/cm^2) in type 2 diabetic men. There is negative correlation between BMD at femoral neck and duration of DM (r= -0,46). Also BMD at femoral neck slightly negative correlated with BMI (r=-0,29) and waist (r=-0,25). The serum levels of markers of bone formation were significantly lower in diabetic patients than in control: OC (13,21±4,56 vs. 21,71±6,59 ng/ml, p=0,002).
Conclusions: The data confirmed the high prevalence of bone loss in type 2 DM men at femoral neck (37,1%). Anthropometric data and duration of diabetes may affect BMD in type 2 DM. There has been demonstrated a lowered bone formation as one of the mechanisms of the bone density loss in type 2 diabetes mellitus.

Disclosure of Interest: None Declared

P647 - HEALTH-ECONOMIC ASPECTS OF VITAMIN D-SUPPLY IN GERMANY

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Aims: Evidence is accumulating that adults with low vitamin D status have excess mortality rates. We examined the average vitamin D supply in the adult German population and calculated the extent by which annual mortality rates could theoretically be reduced by optimizing vitamin D status.
Methods: Throughout Germany, 266 GPs participated in this study; blood samples were taken at the end of winter from their daily ambulatory patients including both sexes and the age range from 20 to 99 years. From this cohort individual and mean values for 25-OH-D were analysed (1). Based on the data, an annual mortality rate of 1.34% in the total adult German population and data from two large prospective trials about the excess mortality in subjects with inadequate vitamin D status (2, 3) we calculated the chance of reducing mortality by a population wide improvement of vitamin D supply.
Results: The average age of the 1343 patients (615 m and 728 w) was 57.6 years. The mean 25-OH-D-value for the whole cohort was 16.2 ng/ml (range: 6.0 to 66.8). 16% of the patients had values below 8 ng/ml (=20nmol/l), 37% below 12 ng/ml (=30nmol/l) and 94% below 32 ng/ml (=80 nmol/l). According to conservative estimations, at least 2.2% of all deaths or 18,300 lives annually could be saved by achieving 25-OH-D levels of at least 30 ng/ml (75 nmol/l) in the entire adult German population. Absolute risk reduction is probably much higher and may be up to approximately 18% or 147,000 lives saved annually.
Conclusions: In a representative sample of the adult German population at the end of winter a very low mean 25-OH-D level of 16.2 ng/ml was recorded. Improving vitamin D status in the adult German population might be an effective strategy to reduce annual mortality rates and probably health related costs. Our findings should be confirmed by prospective studies.
References: 1. Ringe JD et al, Osteoporos Int 2008;19(Sl):S46; 2. Dobnig H et al, Arch Intern Med 2008;168:1340; 3. Melamed ML et al, Arch Intern Med 2008;168:1629

Disclosure of Interest: None Declared

P648 - FRAX® IN CLINICAL PRACTICE

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Aims: 1.To establish ten-years fracture risk in patients receiving treatment of osteoporosis with antiresorptives in clinical practice. 2. To assess the projection of Austrian and UK databases on Czech patient population.
Methods: We performed retrospective database analysis.10-years risk of both major osteoporotic fracture (hip, clinical spine, hu-

merus or wrist) and hip fracture according to FRAX® algorithm was calculated using Austrian and UK databases. Outpatients with osteoporosis: BMD T-score ≤-2.5 (lumbar spine, proximal femur) and/or osteoporotic fracture indicated for antiresorptive treatment (alendronate, raloxifene, risedronate, ibandronate) during I-X/2008, with respect to presence clinical risk factors (women n=183, men n=15) were screened.
Results: In women, history of osteoporotic fracture was given by 56.8%, parental history of hip fracture by 12%, smoking by 18.6%, glucocorticoid therapy was present in 4.4%, history of rheumatoid arthritis in 3.3%, secondary osteoporosis in 20.2% and higher alcohol intake in 1.6%. The average 10-years risk of major osteoporotic fracture was 19.6% and 16.7%; the average 10-years risk of hip fracture was 8.2% and 5.7% (Austrian and UK database, respectively).
Conclusions: On average, calculated values of 10-years fracture risk exceed minimal values of therapeutic intervention in patients with osteopenia according to NOF 2008 guidelines (major osteoporotic fracture ≥20% or hip fracture ≥3%). 70.2% of our patients with osteoporosis ((BMD T-score ≤-2.5) fulfilled NOF criteria for therapeutic intervention if calculated by Austrian database. History of osteoporotic fracture doubles fracture risk (major osteoporotic fracture 23.5% vs. 12.9%; hip fracture 12.9 vs. 4.7%).

Disclosure of Interest: None Declared

P649 - OSTEOPOROSIS FRACTURE RISK AMONG OLDER WOMEN TREATED IN CONVENTIONAL PRACTICE SETTINGS: DO PRIOR FALLS OR FRACTURES MATTER?

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Aims: Our aim was to describe the effect of a previous history of falls and fractures on the risk of fracture following a diagnosis of osteoporosis in peri- and postmenopausal women (PMW).
Methods: A retrospective cohort study was performed among women with osteoporosis aged 50+ years, identified from a large "real world" electronic medical record (EMR) database for years 2001-2007. Poisson regression models were used to estimate fall and fracture rates by age at osteoporosis diagnosis. Multivariable Cox-proportional hazards models were used to identify risk factors associated with fracture in PMW following a documented diagnosis of osteoporosis or treatment with an osteoporosis medication.
Results: We identified 99,924 PMW with osteoporosis; mean age was 67.5 years and 2,572 (2.6%) had a history of fall and/or fracture reported during their baseline year. 51% of PMW received osteoporosis medication before documented diagnosis in the database. Fracture rates per 1000 women-years increased with increasing age at osteoporosis diagnosis (women aged 50-59=20.1; 60-69=23.4; 70-79=49.6; 80plus=452). The same trend was observed for fall. Compared to PMW with no fracture or falls histories, those with a history of falls and/or fractures had higher future fracture risk. (Table 1)

Fall and fracture history	Person-level count (N=99,924)	Hazard ratio*	95% Confidence interval
Neither falls nor fractures	97,352	1	Ref
History of falls, no fractures	343	1.86	1.46, 2.36
History of fractures, no falls	2,139	2.24	2.04, 2.46
History of falls and fractures	90	1.53	0.93, 2.49

*After adjustment of patient demographic characteristics, comorbidities and medication use before diagnosis.

Conclusions: Real world data suggest that PMW with osteoporosis and history of falls or fractures before their diagnosis are at higher risk for future fracture. Screening for falls and fracture history should be documented in the medical record so that interventions to prevent future fractures can be implemented.
Acknowledgement: This work was supported by Merck, Inc.

Disclosure of Interest: G. Rattinger: None Declared, C. Franey: None Declared, T. Fan Employee of: Merck & Co., Inc., I. Zuckerman: None Declared

P650 - FALL IN ELDERLY MEN CAN BE PREDICTED BY PHYSICAL ABILITY TESTS – THE MR OS INTERNATIONAL STUDY

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Aims: Fractures are usually preceded by a fall. If we could identify fallers, we may be able to define individuals with need for fracture preventive interventions. The aim of this study was to evaluate if simple clinical estimates of physical ability and estimates of habitual level of physical activity could be used to identify elderly male fallers
Methods: Included were elderly men in Hong Kong (n=2000, ages 65-92 years), United States (US) (n=5995, ages 64-100 years) and Sweden (n=3014, ages 69-81 years), all participating in the MrOS International Study (n=11009). At baseline, physical ability was estimated by handgrip strength test, time stand test, 6-meter walking test and 20-cm narrow walking test. Habitual level of

physical activity was estimated as the duration of daily exercise walk, daily routine walk, daily sitting, daily lying and weekly level of training sessions and level of household activities. Falls during the preceding year were evaluated by a questionnaire. In this report we evaluate individuals in 5-year classes from age 64-69 years to above age 85 years and across the three countries.
Results: 2070 men (18.8%) fell at least once and 842 (7.6%) several times during this 12-month period. The physical performance tests were not different when comparing fallers and non-fallers below age 70 years. In all 5-years classes above this age, virtually all tests differed when comparing fallers and non-fallers (most comparisons $p<0.01$). For example, having a left grip strength test below -2 SD, compared to being between +1 to -1 SD, was associated with an odds ratio (OR) of 2.0 (95% CI 1.5, 2.7) for having had a fall. The performance tests differed when comparing fallers and non-fallers in the US and Sweden (virtually all tests $p<0.001$) but not in Hong Kong (all ns). In contrast, there was virtually no difference in the estimate of habitual physical activity when comparing fallers and non-fallers in the different 5-year categories or separately in Hong Kong men, US men or Sweden men (all ns). Neither performance tests, nor estimates of habitual physical activity, differed when comparing single and frequent fallers.
Conclusions: This study indicates that clinical tests of physical ability in elderly men in general could identify a high risk group for falls but the predictive ability possibly differs in different settings. The tests seem not to discriminate between single and frequent fallers.

Disclosure of Interest: None Declared

P651 - PHYSICAL ABILITY TESTS DISCRIMINATE FALLERS WITH FROM FALLERS WITHOUT A FRACTURE – THE MR OS INTERNATIONAL STUDY

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Aims: Many of the same risk factors account for falling and fractures and elderly men who have sustained a fall do inferior in clinical performance tests than non fallers. However, if we could identify not only men with a high risk to fall but specifically men with a high risk to sustain a fall related fracture, we could improve our targeting for fracture preventive interventions. The aim of this study was to evaluate if men with a history of a fall-related fracture had worse physical performance than men with a fall with no fracture.
Methods: Included were men >64 years in Hong Kong (n=2000), United States (n=5995) and Sweden (n=3014) (The MrOS International Study). Physical ability was estimated by handgrip strength test, time stand test, 6-meter walking test and 20-cm narrow walking test. Habitual physical activity was estimated as the duration of daily exercise walk, daily routine walk, daily sitting, daily lying and weekly level of training sessions and level of household activities. Fall that had occurred during the 12 months preceding the baseline evaluation was registered by a questionnaire. Differences within 5-year classes were tested by chi square, between the 5-year classes by logistic regression and between fallers with a fracture, fallers with no fractures and non fallers by ANCOVA adjusted for age, country and measuring site.
Results: 150 men (1.3%) were fallers with a fracture, 1920 (17.5%) fallers with no fracture and 8928 (81.2%) non fallers. Both the numbers of fallers with a fracture and fallers with no fracture increased with higher age ($p<0.001$) so that the proportion of fallers was 2 times higher in age group >85 years compared to those 64-69 years while the proportion of individuals with a fall related fracture was 3 times higher. All physical performance tests were differed when comparing fallers with and without fractures versus non fallers ($p<0.05$, respectively). Fallers with a fracture were weaker in right hand grip strength ($p=0.02$) and used more steps for 6 metres walking test ($p=0.04$) than fallers without a fracture while the slower time stand test ($p=0.09$) and 20-cm narrow walking test ($p=0.07$) only reached borderline significance. Fallers with a fracture were spending more time lying than fallers with no fractures ($p=0.04$) but not training less or being less active in the household work.
Conclusions: This study indicates that grip strength test and steps needed for walking differs between fallers with or without a fracture, at least on group level.

Disclosure of Interest: None Declared

P652 - MIDLIFE WOMEN AND LOW-TRAUMA FRACTURES: A LONGITUDINAL UNDERSTANDING THE RISK PERCEPTION AND RISK MITIGATION OF OSTEOPOROSIS

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Aims: To explore fragility fracture and osteoporosis risk mitigation over time in women aged 40-65 who have experienced a low-trauma fracture.
Methods: This is a qualitative longitudinal cohort study. Twenty-six participants were recruited from an existing cohort of 50 women to participate in a five year follow-up. Participants have had at least one low trauma fracture between the ages of 40-65, without having previously been clinically diagnosed with Osteoporosis. Individual interviews were conducted yearly for five

years, collecting data around women's experiences with fractures, and perceptions around risk and prevention of future fractures and Osteoporosis. Within case analysis and cross-case analysis was used to analyze transcribed interview data.
Results: Eight of the 26 women had a subsequent fracture within the study period. Despite the risk for future fractures following a low-trauma fracture, and its indication for Osteoporosis, most women are not internalizing risk. In early data collection it was apparent that women either believed they were not at future risk for fractures, thought that they might be at risk in the future and would address risk mitigation then; or pursued risk mitigation as clinically indicated. Over time external influences on risk perception are becoming apparent, and include aging, overall health attitudes, influence of others, perception of Osteoporosis as a disease of old age, and the invisible nature of Osteoporosis.
Conclusions: While a fragility fracture at midlife should trigger clinical follow up for investigation of bone strength and density with results communicated to patients this is not the current situation in Canada. Most women perceive fragility fractures as isolated accidents; therefore they do not understand risk mitigation for fractures and Osteoporosis as relevant. Health literacy around fracture risk and upstream prevention related to fractures and osteoporosis is an important adjunct to the success of pharmaceutical intervention and disease prevention.
References: Meadows LM et al, Osteoporos Int 2007;18:159; Meadows LM, Mrkonjic L, Lagendyk L, Annals Family Medicine 2005;3:64.
Acknowledgement: CIHR, Centre for Advancement of Health, Calgary Health Region and University of Calgary.

Disclosure of Interest: None Declared

P653 - OSTEOPOROSIS-RELATED VERTEBRAL FRACTURES IN SAUDI ARABS

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Aims: With the objective to assess the prevalence of Osteoporosis Related Spinal fractures among healthy Saudi Arabians this study was conducted.
Methods: We analyzed chest radiographs of consecutive Saudi Arabian men over the age of 50 years for a period of 12 months between November 1st 2007 and October 31st 2008, done at emergency room of King Fahd University Hospital, Alkhobar, Saudi Arabia. The site of the fractures and type were classified as mild, moderate or severe as per the semi-quantitative technique. The other data which was retrieved from the medical records of the patients included was medications, investigations, DXA Scan if performed and the result. Patients with the diagnosis of malignancy or connective tissue disorder and those on steroids were excluded from the analysis. Ulticare patient care system was checked for the report of the chest radiographs.
Results: Between the study period 970 chest radiographs were performed and 876 radiographs could be analyzed. One hundred and fifteen patients (13.1%) had 157 fractures. The mean age was 67.85±10.1 years. In 27 patients (24.1%) there was more than one fracture. Majority of the fractures 102 (89%) were observed in the thoracic spine and thoracic 7th, 9th and 10th vertebral body was found be fractured in 65 patients. Seventy-one (45.2%) fractures were classified as mild, 54 (34.4%) moderate and severe 32(20.4%). In 26 (22.6%) patients the report of the radiologist highlighted the fracture. Eight (6.9%) a bone mineral density was ordered and none of the men who had spinal fracture were on anti-resorptive therapy.
Conclusions: Despite the high prevalence of male osteoporosis leading to spinal fractures Saudi Arabian male patients with osteoporosis continue to be underdiagnosed, hence undertreated. We believe it is important for physicians to identify vertebral fractures early and treat appropriately before an extremity fracture occurs with high mortality.

Disclosure of Interest: None Declared

P654 - SPANISH POSMENOPAUSICAL RURAL WOMEN: VERTEBRAL ALTERATIONS AND OSTEOPOROSIS RISK FACTORS

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Aims: 1) Know the osteoporosis risk factors in a sample procedent of rural areas.
2) Determine what are the most common vertebral structural changes in the sample.
Methods: It is about a descriptive and cross-sectional study which included all women postmenopausal who demanded medical attention for any reason during the month of November 2009 in four consultations of Primary Care of the rural gallician environment (Spain). The main variables to study were the osteoporosis risk factors considered at this time by the scientific community as main and the three main types of structural vertebral changes (biconcavism, wedging and crush).
Results: The sample is composed of 84 cases with a mean age of 67.54 (±18.5) years. The prevalence of osteoporosis risk factors was the following one: hip fracture of the mother: 15.5%,smóking habit:11.9%, BMI<19: 0%, fracture before 45 years: 8.3%, menopause before 45 years: 6.0%, surgery menopausical: 20.2%, therapy with corticoids more than 6 months: 4.8% and heel densitometry<2.5 SD:36.9%. The 32.3% didn't have any risk factor. The biconcavism was found in 59.5% of the cases, the wedging in 16.7%, and the crush in the 12.61%.
Conclusions: The women's postmenopausal 2/3 parts have a osteoporosis risk factor at least. The osteoporosis risk factor more common is the abnormal densitometry. The most frequent vertebral structural alteration is the biconcavism.

Disclosure of Interest: None Declared

P655 - RISK FACTORS FOR PROXIMAL HUMERUS FRACTURES

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Aims: Our aim was to investigate and reassess these risk factors already studied, as well as identify potential new decisive factors in the etiology of these fractures. In this respect we paid particular attention to variations among different levels of vitamin D and how they might act as risk markers. We also carried out a comparison of risk factors of fractures of the proximal end of humerus found with those known for hip fractures
Methods: We did a prospective study in which 45 patients with a proximal humerus fracture were directly interviewed on a series of possible risk factors divided in 6 mayor groups: Personal factors, bone fragility factors, falling risk factors, other pathology suffered, characteristics of the injury mechanism, analytic data.
Results: The standard patient, according to our results was a woman (73,3%) between 70 an 80 years old, not necessarily obese (average BMI of 26.06 kg/m2), with a high degree of independence (88.9% had a good balance of independence), who do not fall frequently (71.1% have not suffered any fall in the last year, 46.7% have undergone no previous fracture) and without any major mental or physical disability (88.9% does not refer abnormal gait, 91.1% did not need aid for walking). We compared levels of vitamin D, calcium and phosphorus between study patients and a control group, and among those who reported taking vitamin supplements (22.2% take supplements of Calcium and Vitamin D) and those that reported no such collection, obtaining discrete differences only in the second comparison.
Conclusions: Several conclusions were drawn from the basic descriptive analysis of the data. Some of them surprisingly divergent to what could have been previously thought obvious. The patient who suffers this kind of fracture differs to the typical patient suffering a hip fracture in slight risk factors which can be assessed and intervened on before a more serious event occurs. We cannot conclude that, in our environment, low levels of vitamin D modify the incidence of proximal humerus fractures. Recent studies stress de fact of studying and considering less important osteoporotic fractures as direct risk factor, and therefore indicator, of a future severe osteoporotic fracture.

Disclosure of Interest: None Declared

P656 - WORLDWIDE T-SCORES AND RISK OF HIP FRACTURE

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Aims: To calculate internationally comparable T-scores for femoral neck (FN) bone mineral density (BMD) and the relative risk (RR) for hip fracture.
Methods: As part of the current Global Burden of Disease (GBD) 2005[1] Study, the musculoskeletal expert group (MSK EG) is performing a systematic review to measure the burden of osteoporosis worldwide. MEDLINE, EMBASE, CINAHL, CAB abst, WHOLIS, and SIGLE databases were searched for population based studies with FN BMD measured with Dual-X-Ray-Absorptiometry. Eligible articles were assessed for bias using a quality assessment tool developed and tested by the MSK EG. Data extraction was standardised through workshops and quality checks assessed data accuracy. Values of BMD at FN were extracted by sex, age band and GBD region, and converted to Hologic[2]. Values were weighted by their sample size. Mean T-scores were calculated using the young female reference range from NHANES III[3]. The following gradients of risk[4] were used to estimate the RR for hip fracture: 3.35/SD, 2.89/SD, 2.58/SD and 1.93/SD for the age bands 50-59, 60-69, 70-79 and 80+ respectively. Data were analysed in SPSS.
Results: The following ranges in age and gender specific T-scores were observed:- 50-59 years: t-0.54 (North America) to -1.60 (Central Europe) for women and +1.52 (Caribbean) to -1.04 (South Asia) for men; 60 - 69 years: t-0.40 (East Europe) to -2.08 (East Asia) for women and from +0.99 (Caribbean) to -1.52 (South Asia) for men; 70-79 years -1.70 (North America) to -3.30 (Sub-Sahara) for women and from +0.15 (Caribbean) to -1.64 (Asia Pacific) for men; 80 years or over East Asia and South Asia showed the lowest t (-3.33 and -1.68 for women and men respectively) while the highest appeared in Central Europe and Caribbean (-1.83 and +0.08 for women and men, respectively). The highest RR for hip fracture was found in men aged 60-69 in South Asia (about 25-fold the risk in 50-59 years old Caribbean men) and in Sub-Saharan women aged 70-79 (12-fold compared to 50-59 years old North American).
Conclusions: T-scores and risk of hip fracture based on BMD show important differences worldwide.
References: 1 http://www.globalburden.org; 2 Lu et al (2001) Osteoporos Int; 3 Looker et al (1995) Osteoporos Int; 4 Johnell et al (2005) JBMR.
Acknowledgement: Sociedad Española de Reumatología, JA Kanis. C Cooper, R Norman, L Veerman, P Sambrook, P Clark, Z Man, M Deleze.

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P657 - USE OF A QUALITY ASSESSMENT TOOL FOR A SYSTEMATIC REVIEW ON OSTEOPOROSIS PREVALENCE

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Aims: To test a Quality Assessment Tool designed for a systematic review on osteoporosis prevalence.

Methods: As part of the current Global Burden of Disease (GBD) 2005 Study[1], the musculoskeletal expert group is performing a systematic review to measure the burden of osteoporosis worldwide. For prevalence estimates, values of bone mineral density (BMD) at femoral neck measured with Dual-X-Ray-Absorptiometry are extracted by sex, age band and GBD region, and converted to Hologic[2]. Eligible articles are assessed for bias using a quality assessment tool (QAS) developed by the same group. Assessment items in the QAS are: definition of the anatomical location of the BMD, reliability of the BMD measurement, representativeness of the national population, quality of the sample frame, randomization, non-response bias, selection bias, and overall risk of bias. Risks of bias for each item were *Low*, *Moderate* (only some items), *High* and *Unclear* taking into account established and peer-reviewed criteria attached in the QAS. Selection bias was *Low* when most recruited subjects were included, *Moderate* when only healthy subjects were included, and *High* when subjects with prior fractures were excluded. Mean BMD values of the articles with high risk of selection or overall bias were compared to those from the age and sex-matched articles with low or moderate risk of bias in the same GBD region.

Results: Data for the GBD regions and age bands with a significant number of articles was analysed. Values in the table are percentage of change in the mean BMD of the *high* group compared with the *low* and *moderate* groups together. In some cases there was a minor change in the mean BMD values, while in other cases the difference was considerable. The BMD from studies excluding subjects with prior fractures was often lower than expected.

Age	50-59		60-69		70-79	
Type of bias	Selection	Overall	Selection	Overall	Selection	Overall
Asia East	0.4	0.4	0.2	0.8	-1.1	0
	-6.9	-3.3	-10	-0.4		1.6
Asia South	1.5	1.5	-16.6	1.5	-7.3	
	-2.6	-2.6	-15.8	-15.8		
Western Europe	-1.1	1.2	-5.1	-4.4	-1.1	-2.7
	-4.8	-4.8	-7.1	-7.1	-17	-17
Middle East	-4.4	2.4	-3.5	2.7	4.7	3.8
	-7.1	-1.2	-10	-2.2	-10.3	-10.3
North America	-3.4	17	3.9	10	-0.5	17.4
	2.3	-9.9	-0.7	10.9	4.5	-10.4

Conclusions: A QAS is a useful tool to assess heterogeneity among epidemiological studies and can help in the quality-check and eligibility decision.

References: 1 http://www.globalburden.org; 2 Lu et al (2001) Osteoporos Int.

Acknowledgement: Sociedad Española de Reumatología, GBD Expert Group.

Disclosure of Interest: None Declared

P658 - PREDICTION OF FRAGILITY FRACTURE WITH THE FRAX® TOOL IN THAILAND

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Aims: The FRAX® tool has been developed for risk of osteoporotic fracture evaluation by WHO. A 10-year probability of fracture result is very helpful for osteoporotic fracture treatment and prevention. However, this tool has limitation in the number of country using. The purpose of this study was to determine the output of FRAX® tool in Thai people at the age over 50 year old.

Methods: The retrospective data of 774 people (average aged of 72 year old) from 2006 to 2008 were reviewed by interviewing and medical record. The patient group, 374 cases at the age over 50 years who were diagnosed with a major osteoporotic fracture (spine, forearm, hip or shoulder), were recruit. The control group was age-related people. The FRAX® tool (age, sex, BMI, and seven clinical risk factors) was used to assess 10-year probability of major osteoporotic fracture. The T-score for BMD was not included due to incomplete data correction. The data was calculated by using WHO fracture risk assessment tool based on Hong Kong country with the reason of higher sensitivity and specificity than other Asians countries. Over twenty percents of major osteoporotic fracture probability (the cut point) was decided to be treated and assumed as risky fracture patients.

Results: Age and gender ratio from both groups were similar. At the cut point, probability of major osteoporotic fracture was more than twenty percent; 271 out of 374 in the fracture group and 138 out of 400 in the control group. Sensitivity and Specificity were 0.72 and 0.66, respectively. Positive predictive value (PV+) was 0.66. The Negative predictive value (PV-) was 0.72. And Likelihood ratio LR (+ve) was 2.10, LR (-ve) was 0.42

Conclusions: Using the FRAX® tool with the cut point of 20% to predict fracture in Thai population was accurate. It may appropriate for screening people who have risk of fragility fracture due to moderate sensitivity and specificity. Thai specific data reference, prospective cohort study and vary in cut point are needed to improve evaluation of the probability of fracture.

Disclosure of Interest: T. Sangkomkamhang Grant / Research Support from: no, Consultant / Speaker's bureau / Advisory activities with: no, Employee of: no, Board member of: no, Stock ownership

or royalties of: no, Patent licensing of: no, Other: no, U. Sangkomkamhang Grant / Research Support from: no, Consultant / Speaker's bureau / Advisory activities with: no, Employee of: no, Board member of: no, Stock ownership or royalties of: no, Patent licensing of: no, Other: no, T. Vaseenon Grant / Research Support from: no, Consultant / Speaker's bureau / Advisory activities with: no, Employee of: no, Board member of: no, Stock ownership or royalties of: no, Patent licensing of: no, Other: no, K. Piyakunmala Grant / Research Support from: no, Consultant / Speaker's bureau / Advisory activities with: no, Employee of: no, Board member of: no, Stock ownership or royalties of: no, Patent licensing of: no, Other: no

P659 - CORRELATION OF VITAMIN D AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Aims: Correlation of vitamin D and BMD in postmenopausal women in 3 different regions of Turkey.
Methods: Bone mineral density was measured with DXA in spine and hip areas by Hologic QDR4500. Serum Vitamin D and calcium levels were measured. The 3 cities (İstanbul, İzmir, Osmaniye) were located in different geographical regions. Women over age 40 in different cities were divided into 3 groups according to their age group. The first group consisted of women between 40-49 years. The second group consisted of women between 50-59 years. The third group consisted of women over 60 years of age.
Results: A total of 558 women were included in the study. All subjects were volunteers attending an educational meeting organized by the Osteoporosis Patient Society. İstanbul was represented by 143, in İzmir 297,in Osmaniye 118 women were included. In İstanbul in group 1 a weakly significant inverse correlation was found between Vitamin D level and L1-4 T-score (r= -0.50,p<0.01) as well as serum calcium level and L1-4 T-score (r=-0.45, p<0.01). In İstanbul in group 2 there was a weakly significant inverse correlation between Vitamin D level and L1-4 T-score (r= -0.46,p<0.01) as well as serum calcium level and L1-4 T-score (r=-0.34, p<0.05). The significance for the correlation of femoral neck T-score and Vitamin D and calcium levels was inverse and weak (r= -0.26, p<0.05 and r=-0.30, p<0.05, respectively).In İstanbul for the total of 3 groups generally there was a weakly significant inverse correlation between Vitamin D level and L1-4 T-score (r= -0.44, p<0.001). Correlation of T-scores in spine L1-4, femur neck and total hip regions in İstanbul, İzmir and Osmaniye was not found to be significant. Vitamin D levels in the 3 cities were found to be significantly different from each other (p<0.05). Vitamin D level in İzmir was significantly higher than in İstanbul and Osmaniye, while the lowest levels were detected in Osmaniye. Vitamin D levels, in İstanbul were significantly lower in women between ages 40-49 as compared to the other 2 age groups.
Conclusions: It can be concluded that in İstanbul for the total of 3 groups there was a weakly significant inverse correlation between Vitamin D level and L1-4 T-score (r= -0.44, p<0.001).

Disclosure of Interest: None Declared

P660 - QUALITY OF LIFE REDUCTION ONE YEAR AFTER AN OSTEOPOROTIC FRACTURE IN AUSTRIA

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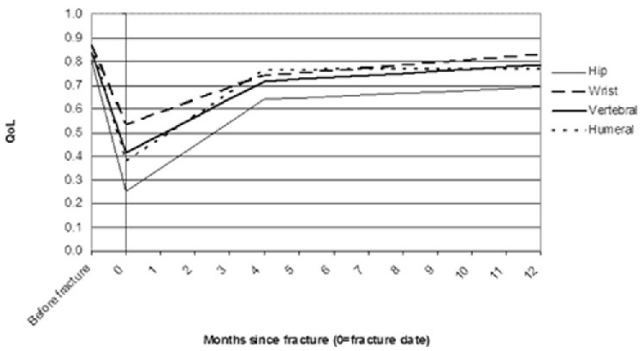
Aims: The International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) is a large prospective multinational study with the aim of estimating costs and quality of life related to osteoporotic fractures. The purpose of this study was to present an interim analysis of the quality of life (QoL) during the first year after sustaining an osteoporotic hip, vertebral, wrist or humeral fracture in an Austrian patient population.
Methods: Patients were enrolled from 8 study centres in Austria. Patients were asked about their perceived QoL before (recollected), directly after the fracture (within two weeks after fracture), at four and twelve months after the fracture. The QoL was measured using the EQ-5D questionnaire.
Results: A dataset was extracted from the ICUROS database containing 229 patients, with complete data for the one year follow-up. 95 patients had sustained a hip fracture, 66 a wrist, 41 a vertebral and 27 a humeral. 80% were women, on average 71 years old at the time of fracture. The pre-fracture QoL varied over fracture types, with the lowest value for hip and the highest for humeral fractures (0.80, CI_{95}:0.75-0.86 and 0.87, CI_{95}:0.8-0.94, respectively). Figure 1 depicts the QoL estimates before and up to one year after fracture. Hip fractures were associated with the largest QoL loss followed by humeral, vertebral and wrist fractures. After one year, the QoL was close to the pre-fracture QoL for wrist and vertebral fractures but lower for humeral and hip fractures.

Figure 1. Quality of life after sustaining an osteoporotic fracture in Austria



Conclusions: There is a significant impact on a patients´ QoL following an osteoporotic fracture in Austria. After one year, patients with hip and humeral fractures remained on a lower quality of life level than before the fracture whereas for the other fracture types, QoL, measured with EQ-5D, had returned nearly to pre-fracture levels.

Disclosure of Interest: None Declared

P661 - QUALITY OF LIFE REDUCTION FOUR MONTHS AFTER AN OSTEOPOROTIC FRACTURE IN FRANCE

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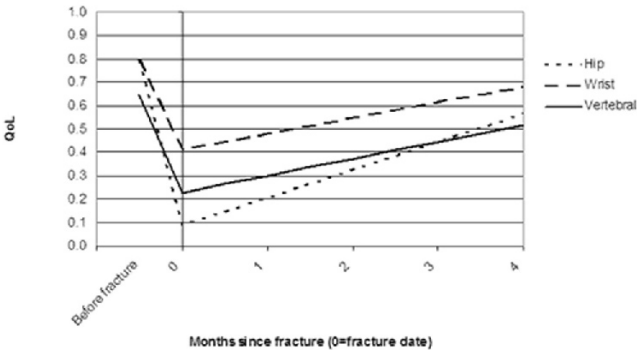
Aims: The prospective International Costs and Utilities Related to Osteoporotic fractures Study (ICUROS) aims at estimating the costs and quality of life related to fractures up to 18 months following a fracture. The purpose of this study is to present an interim analysis of the quality of life (QoL) impact during the first four months after sustaining an osteoporotic hip, vertebral or wrist fracture in France.
Methods: Patients were enrolled from six study centres in France. Patients were asked about their quality of life before (recalled response), directly after the fracture (within two weeks after fracture) and at four months after the fracture. The QoL was measured by the EQ-5D questionnaire and the Time Trade-Off (TTO).
Results: The dataset obtained from the ICUROS database contained 277 patients who had reached the 4 month follow-up, which of 150 patients had sustained a hip fracture, 85 a wrist fracture and 42 a vertebral fracture. The mean age at fracture was 72 years and 82% were women. Patients with vertebral fracture had the lowest pre-fracture QoL and wrist the highest irrespective of estimation method (0.65 CI_{95}:0.56-0.76 and 0.8 CI_{95}:0.75-0.85, respectively with EQ-5D). The largest QoL loss immediately after fracture was associated with hip fractures followed by vertebral and wrist fractures (Figure 1). When estimated with TTO, the drop in QoL was not as large, but for both methods there was a sustained reduction in QoL after four months compared to before the fracture.

Figure 1. Quality of life after sustaining an osteoporotic fracture in France



Conclusions: Sustaining an osteoporotic fracture was associated with a loss in quality of life for patients in France, irrespective of estimation method. A quality of life reduction was still apparent four months after sustaining the fracture. However, the effect was larger when measured with the EQ-5D compared with TTO.

Disclosure of Interest: None Declared

P662 - ASSESSMENT OF 10-YEAR FRACTURE RISKS IN POLISH POSTMENOPAUSAL WOMEN BY THE FRAX® ALGORITHM, STANDARDISED FOR ITALIAN, SPANISH AND UK POPULATIONS

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Aims: Taking into consideration the growing incidence of osteoporotic fractures, an identification of patients with the highest fracture risk seems to be the most rational and cost-effective solution of this clinical problem. The fracture risk assessment tool (FRAX®) is a new diagnostic method, proposed by the WHO and designed for 10-year fracture risk evaluation; there is no Polish version of the FRAX® calculator yet. The aim of the study was to determinate 10-year fracture risk scores in postmenopausal women of the Lodz population, based on the FRAX® algorithm, standardised for the populations of Italy, Spain and UK.
Methods: The study group included 94 postmenopausal females (55-80), divided into five age sub-groups. The patients filled up a questionnaire form, designed to analyze osteoporosis risk factors and were then submitted to femoral neck densitometry by a DXA (Dual energy X-ray absorptiometry) scanner (Lunar EXPERT). The 10-year fracture risk was assessed by the FRAX® method, using a calculator standardised for the populations of Italy, Spain and UK. FRAX® major (the risk of main osteoporotic fractures) and FRAX® hip (the risk of femoral neck fractures) were calculated, using obtained densitometric results (FMD, FHD) and BMI (FM, FH).
Results: In each age sub-group, the highest T-scores of 10-year fracture risk (FRAX® major, FRAX® hip) were obtained, using the UK-oriented calculator, while the lowest ones were found applying the calculator standardised for Spain. The differences were statistically significant and affected patient qualifications to therapy vs. established intervention threshold.
Conclusions: 1. The outcome supports the need for a Polish FRAX® calculator with properly adapted intervention threshold.
2. It is fairly justified to use the British calculator option until the Polish FRAX® version is available.

Disclosure of Interest: None Declared

P663 - MENTAL DISTRESS, USE OF PSYCHOTROPIC MEDICINE AND HIP FRACTURES: 7 YEARS FOLLOW-UP OF THE OSLO HEALTH STUDY

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Aims: The aim of this study was to prospectively assess the association between mental distress and hip fractures when use of psychotropic medicine was accounted for, in order to evaluate whether increased hip fracture risk was attributed to the impaired mental health per se or to the psychotropic medicine used to treat the distress.

Methods: All women and men in selected age groups were invited to the population-based Oslo Health Study (HUBRO) in 2000/2001. In all 18,770 (46%) attended the survey. The main questionnaire covered sociodemographics, chronic diseases, mental distress, lifestyle and use of prescribed antidepressants, sleep medication and tranquilizers. Those who reported use of these drugs at least once a week during the last four weeks were defined as users. A sum-score was also made for use of medicine. The participants answered 10 items about mental distress (Hopkins Symptoms Checklist – HSCL-10). The mean score was used as a measure of global mental distress (range 1-4). Hip fractures were identified in the participants by linkage to the hospitals electronic patient administrative systems for the period 2000-2007. Data were analysed by logistic regression. About 15,100 had valid data on the variables used in these analyses.
Results: When those with a previous hip fracture were excluded, 202 (1.1%) of the HUBRO participants had suffered a hip fracture during the follow-up period. Associations were found between hip fractures and both HSCL-10 and all the three types of psychotropic drugs (p<0.001 for all). Adjusted for age, gender, BMI and use of antidepressants, OR for hip fracture for each level increase in HSCL-10 was 1.7 (95% CI 1.2-2.4). The corresponding OR were 1.6 (95% CI 1.1-2.2) and 1.7 (95% CI 1.2-2.4) when sleep medication and tranquilizers, respectively, were adjusted for. Use of 2 or more of the drugs compared to none, gave OR= 1.9 (95% CI 1.1-3.5) when HSCL-10, age, gender and BMI were accounted for. Additional adjustments for marital status, education, chronic diseases, smoking, physical activity and use of alcohol measured at baseline, did not change any of the results.
Conclusions: We found significant increased risk of hip fractures with increasing score on the mental distress index HSCL-10 after adjustments for use of psychotropic medicine and other covariates. However, use of more than one psychotropic drug also increased the risk of hip fracture after adjustment for mental distress.

Disclosure of Interest: None Declared

P664 - THE RISK OF REFRACTURE ASSOCIATED WITH THE COMPLIANCE AND THE PERSISTENCE WITH BISPHOSPHONATE THERAPY IN TAIWAN

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Aims: To elucidate the relationship of the risk of refractures to compliance and persistence with bisphosphonate therapy in Taiwan.
Methods: The study cohort included all new users of bisphosphonates. Compliance was calculated using the Medication Possession Ratio (MPR). MPR was defined as the sum of days supply of osteoporosis medications dispensed during osteoporosis medication therapy.
Results: The refracture rates of the osteoporosis patients increased with time. The refracture rate was 5.15%, 7.36% and 8.49% at the 1st, 2nd and 3rd years, respectively. The refracture rate of patients with over 80% compliance was significantly lower than those with a compliance below 80% (p<0.05). The study found that nearly half of the patients were noncompliant with therapy (MPR<80%) at as early as 3 months, and only around 30% of the patients were adherent at 1 year. The results also showed that the risk of refracture increased for patients with MPR<80%, . Patients with concomitant statin medication tended to have significantly lower refracture risks than those without.

Figure The incidence rate of refracture within different follow-up periods by compliance rate. Patients with poor bisphosphonate compliance had a higher incidence of refracture (p<0.05).

Conclusions: From the study, the compliance of Taiwanese patients is poor. In addition, the study demonstrated that the risk of refracture is associated with the compliance with bisphosphonate therapy in Taiwan. The compliance issue for osteoporosis treatment warrants much more attention.
References: 1.Siris ES et al, Mayo Clin Proc 2006;81:1013; 2.Shao CJ et al, Bone 2009;44:125.

Disclosure of Interest: None Declared

P665 - THE INFLUENCE OF RISK FACTORS ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN IN REPUBLIC SRPSKA

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Aims: To find out the correlation of risk factors and bone mineral density (BMD), and how the number of risk factors affects BMD in postmenopausal women of Republic Srpska.
Methods: A total of 582 postmenopausal women, 33 to 81 years of age (mean age 57,6) completed a standardized numerical questionnaire. BMD was measured at lumbar spine and left hip using DXA (Hologic QDR 4500). Participants were divided into three groups (WHO criteria): normal BMD (N); osteopenia (Opn) and osteoporosis (Opz). The accepted level of significance was sat at p<0,05.
Results: In total sample normal BMD was found in 72 (12,37%), osteopenia in 178 (30,58%) and osteoporosis in 332 (57,4%). Cor-

relation analyses indicated significant association of low BMD and caffeine intake (p<0,01), low calcium intake (p<0,05) and pure physical activity (p<0,01). The significance was grater between N and Opz groups. As the number of risk factors increased the number of participants with normal BMD decreased (42% had normal BMD with one RF, 28 with two RFs and none with five and six RFs).

Conclusions: Our study shows the characteristics of our female population regarding the life style risk factors for osteoporosis. Low BMD was not significantly associated with smoking and alcohol abuse (only 6 women consumed alcohol regularly). The risk for osteoporosis increases with the number of RFs.

Disclosure of Interest: None Declared

P666 - DECREASING INCIDENCE OF HIP FRACTURES IN OSLO, NORWAY

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Aims: The main aim of the present study was to report the current incidence of hip fractures in Oslo, Norway. These rates were to be compared with those of 1996/97, 1988/89 and 1978/79.

Methods: There are four somatic hospitals to which a patient from Oslo with a hip fracture is referred. All patients with the International Classification of Diseases (ICD-10) code S72.0 and S72.1 (hip fractures) were identified from Jan 1 - Dec 31, 2007 using the electronic diagnosis register of the hospitals. In addition, the lists of the operating theatre of the hospitals were used to identify patients not included in the electronic diagnosis registers with correct diagnosis. Medical records for all the identified patients were retrieved and the diagnoses verified. Patients residing in the county of Oslo with a *new* hip fracture within the observation period were included.

The method for collection of the data was standardized with the two latest incidence studies from Oslo.[1-3]

Results: A total of 1005 hip fractures were verified in 985 patients. 20 patients, of them 3 males, had fractures of both hips, all of them in different episodes. 71± of the fractures occurred in females. The mean age was 82.5±10.2 years and 76.6±13.6 years for women and men respectively. An exponential increase in the incidence of hip fracture by age was observed in both genders.

For the age group 50 years and older, the age- and gender-specific incidence rates of hip fractures in Oslo declined significantly for women, not only during the last decade, but also compared to the rates reported in the late 70ties (table).

	Age adjusted rate pr 10 000 (95 % CI)			
Year	Male		Female	
78/79	33.8	(29.0-38.7)	97.5	(89.6-105.4)
88/89	42.9	(37.7-48.1)	116.6	(109.3-123.9)
96/97	41.4	(36.4-46.4)	110.8	(103.8-117.8)
2007	39.1	(34.4-43.7)	82.0	(75.9-88.1)

Conclusions: The present study shows that the incidence of hip fracture in Oslo has decreased significantly during the last decade.

References: 1. Lofthus CM et al, Bone 2001;29:413; 2. Falch JA et al, Bone 1993;14:643; 3. Falch JA et al, Acta Orthop Scand 1985;56:12.

Acknowledgement: The authors thank the four somatic emergency hospitals serving the population of Oslo for help and assistance during the data collection.

Disclosure of Interest: None Declared

P667 - HIGH PREVALENCE OF VITAMIN D INSUFFICIENCY AMONG SAUDI FEMALE STUDENTS

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Aims: To study the prevalence of vitamin D deficiency among intermediate and high school girls in Saudi Arabia (city of Riyadh) and the clinical and biochemical features in these females.

Methods: This study was a prospective study in the Riyadh region of Saudi Arabia. Intermediate and secondary school girls were interviewed and a questionnaire was distributed among them to know their dietary habits . Fasting blood samples were taken to examine their bone profile, 25 hydroxy vitamin D and parathyroid hormone levels. Vitamin D insufficiency was diagnosed if vitamin D is between 25-50 nmol/l while vitamin D deficiency is when vitamin D level is below 25 nmol/l.

Results: 100 students were recruited in the study. Their age ranged from 15 to 20 years old (16.94 SD 1.1) . 33± of them had generalized bone pains while 5± had some difficulty in walking. Their dairy product consumption was rare (consumption every more than 2 weeks) in 47± of cases while their soft drink consumption was 73.4± with 20.2± consuming 2 cans /day. Biochemical profile revealed that out of 94 students 1 student had vitamin D level below 25 nmol/l, 78 students (83±) had vitamin D levels from 25- 50 nmol/l and in 15 students the level was 50-150 nmol/l. Elevated levels of parathyroid hormone were detected in 14.9± of students. 10.4± of students had calcium levels below 2.2 mmol/l

Conclusions: Vitamin D insufficiency occurs with high frequency among Saudi female students . This insufficiency appears to exert clinical musculoskeletal consequences . Lack of sun exposure and poor intake are suggested explanations for this phenomenon.

Acknowledgement: The researchers would like to thank King Abdulaziz City for Science and technology for supporting this research through grant number (ART 28-91)

Disclosure of Interest: None Declared

P668 - A 10-YEAR FOLLOW UP OF POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS FOR OCCURRENCE OF OSTEOPOROTIC FRACTURES

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Aims: This study aim **t**o determine the occurrence of fractures among postmenopausal women with osteoporosis followed up for 10 years.
Methods: A retrospective cohort study was conducted from the data files of postmenopausal patients diagnosed with osteoporosis by dual x-ray absorptiometry (DXA) from January 1999 – December 2008 in a tertiary referral center. A telephone follow-up call was done to all patients to determine occurrence of fractures and the circumstances behind the fracture to determine if these are indeed osteoporosis-related or not. The data were analyzed using program statistic Stata version 10. Descriptive statistics was used to analyze measures of central tendency and dispersion.
Results: There were a total of 1,499 post menopausal osteoporosis patients included in this study with 21.5% available for follow-up. Among these patients, 15.61% were interviewed, 3.14% have died while 2.74% refused to participate. The mean age was 67.04 years, mostly in the age group of 61-70 years old. Most of the participants have normal BMI (63.68%) and those who fell under the high risk score according to OSTA tool were 23.5%. More than three quarters underwent natural menopause. Only 10.26% admitted to have family history of osteoporosis, 1.28% with family history of osteoporosis fracture. A little more than half of the participants were on anti-osteoporosis medications upon diagnosis of osteoporosis. Most of them were on calcium supplement. Regular walking as physical activity was reported in 55.98%. Upon interview, 11.97% had osteoporotic fracture, within age group of 71-80 years. The most common sites of osteoporotic fracture were hip in 21.43%, followed by lumbar spine 17.86%, radial forearm in 14.29% while those classified as others were 46.43%. Medications taken prior to fracture included bisphosphonates 71.43%, selective estrogen receptor modulator (SERM) 7.14%, while 21.43% received no medication. Treatment using cast in 42.86%, medical management was reported in 25%, body brace in 17.86%, and 14.29% needed a surgical intervention.
Conclusions: We have described the incidence and risk factors associated with fractures among postmenopausal women with osteoporosis. Fractures still do occur despite intake of anti-osteoporosis medications. More studies need to be undertaken in order to better understand the complexities of the pathomechanisms of osteoporotic fracture.

Disclosure of Interest: None Declared

P669 - ASSOCIATION OF QUANTITATIVE CALCANEAL ULTRASOUND WITH LONG-TERM CARE SERVICE UTILIZATION IN ELDERLY WOMEN: A CROSS-SECTIONAL POPULATION-BASED STUDY

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Aims: A number of studies in the world including USA, Europe, and Japan have demonstrated that quantitative ultrasound (QUS) measurements have a certain association with osteoporosis and its associated fractures. To our knowledge, however, very few studies have shown the association of QUS with frailty or loss of independence among the elderly living in the community. We performed a cross-sectional population-based study to investigate the relationship between calcaneal QUS measurements and utilization of care services provided by the long-term care insurance, which can be regarded as an indicator of frailty or loss of independence.
Methods: In 2007 and 2008, a total of 2,388 elderly women aged 78.2±3.53 (mean ±standard deviation) years living in an urban community underwent mass comprehensive health check-ups at the Tokyo Metropolitan Institute of Gerontology (TMIG), for the prevention of health degeneration ultimately requiring long-term care. In the mass health check-ups, calcaneal QUS (CM-200) and forearm DXA (DTX-200) were used for the evaluation of bone health. Utilization of care services provided by the long-term care insurance was confirmed by interview survey, and other general health information such as activity of daily living (ADL) and self-rated health was obtained. QUS was evaluated by CM-200 that measures speed of sound (SOS) at the calcaneus, and DXA was assessed by DTX-200 that measures bone mineral density (BMD) at the proximal regions of the radius and ulna.
Results: Multiple regression analysis was conducted to determine the odds ratio (OR), using utilization of care services as dependent variable and the tertiles of SOS and BMD as independent variables. After adjustment for age, body mass index (BMI), and major chronic diseases including hypertension, stroke, cardiac diseases, diabetes, and osteoporosis, the OR for the lowest tertile of SOS was 2.61 [95% confidence interval (CI): 1.80-3.79] ($p<0.001$) and that for the middle tertile was 1.51 (CI: 1.02-2.26) ($p<0.05$). There was no significant correlation for the tertiles of BMD.
Conclusions: Calcaneal QUS measurement is associated with the risk of frailty or loss of independence, indicated by utilization of care services provided by the long-term care insurance, among the community-dwelling elderly women in Japan. The challenge now is to identify the relationship by conducting a longitudinal follow-up study.

Disclosure of Interest: None Declared

P670 - ARE THERE ANY RELATIONSHIPS BETWEEN OSTEOPOROSIS AND ATHEROSCLEROSIS IN POSTMENOPAUSAL WOMEN?

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Aims: Osteoporotic disease and atherosclerosis have widely been accepted to aging course. Though both processes have parallelism in bone metabolism with biological association, arterial calcification looks like not strictly related to age. The aim of this study was to evaluate the relations among poor bone mineral density, bony markers and atherosclerosis in postmenopausal women.
Methods: From January 2007 to December 2009, 214 consecutive postmenopausal women (mean age 79.8 years; range 48-102 years) with hip fracture presented at our Orthopaedic and Traumatology Department were considered for inclusion in the study. Patients underwent X-rays of the fractured hip, dual energy X-ray absorptiometry (DXA) and bone markers assessment: serum calcium and phosphorus, parathyroid hormone (PTH) levels, serum 25-hydroxy-vitamin D (Vitamin D), osteoprotegerin (OPG), osteocalcin (OCN), serum C-telopeptide of type I collagen (CTX), and bone alkaline phosphatase (BAP) were evaluated. Student-t test was used for statistical analysis calculating the presence of interaction by including a product term with the respective stratification variable. Statistical significance was defined at *p value*<0.05.
Results: A total of 84 women had both serum analysis and DXA scan and were enrolled in this study. Femoral artery calcification was observed in 32 (38,1%) patients. Osteoporosis was present in 60 (71,4%) cases. Association of osteoporosis and femoral artery calcification was noted in 24 women (40%). Matching serum parameters in the osteoporotic group we found a statistically significant relationship between higher levels of PTH and femoral artery calcification (*p value*=0.0027); a similar statistically significant association was found between lower levels of Vitamin D and atherosclerosis (*p value*=0.0081). Similar results were not found in the osteopenic group except for CTX which showed a negative correlation with femoral artery calcification (*p value*=0.0292).
Conclusions: Incidence of atherosclerosis is near 40% in osteoporotic women. High levels of PTH and low levels of Vitamin D play an important role in the biological and metabolic relationships between osteoporosis and atherosclerosis in postmenopausal women. A potential limitation to this study is the possible influence of the hip fracture on serum values though this is not largely demonstrated. Further investigation is needed to evaluate the bone status and vascular diseases in younger population to act an appropriate preventive or therapeutic intervention.

Disclosure of Interest: None Declared

P671 - PREVALENCE OF POSTMENOPAUSAL OSTEOPOROSIS IN GEORGIAN POPULATION

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Aims: The aim of our study was to assess the figures and prevalence of postmenopausal osteoporosis in Georgian population.
Methods: 1987 postmenopausal women were enrolled in the study. In all subjects serum ionized calcium was measured, bone turnover marker - Osteocalcin (OC) was assessed, lumbar spine and proximal femur BMD values were obtained using Dual energy X-ray absorptiometry(Lunar Prodigy Primo, GE Healthcare), heel quantitative ultrasound (QUS) (by Achilles InSight, GE Healthcare) was performed. Patients screened by QUS densitometry with medium to high risk of fracture were followed to further BMD DXA lumbar spine and proximal femur assessment.
Results: Reduced BMD value (T-score ≤ -2) data was obtained in 70, 8% of patients enrolled in investigation. In 21% of assessed individuals the vertebral fractures were diagnosed by X-ray / or using Dual Absorptiometry LVA technique. Ionized calcium values were within the normal range. OC elevation was observed in 5% of patients. OC slight elevation to upper level of the normal range was found in 15%. Following correlations were found: QUS stiffness index correlated with DXA Spine BMD (r=0,4) and proximal femur BMD (r=0,43)
Conclusions: In postmenopausal, Caucasian Georgian woman there is significant Prevalence of postmenopausal osteoporosis that sums up to 70, 8% of studied patients.

Disclosure of Interest: None Declared

P672 - THE DISTRIBUTION OF OSTEOPOROTIC RISK FACTORS IN TURKEY

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Aims: Osteoporosis related fractures keep increasing worldwide. It is crucial to increase awareness of community-based fracture-related risk factors among populations. In this study we aimed to explore major risk factors with regard to osteoporotic fractures in a Turkish population over fifty years of age.
Methods: This study was performed in 25581 residents via face to face interview by trained staff using a structured questionnaire including FRAX®. The sample was stratified according to gender, age, geographical distribution (12 Regions), residential location(urban:70.48%; rural: 29.52%) and Socio-Economic/Cultural Status(SES).

Results: 51.15% of the subjects were female whereas 48.85% of them were male. The distribution of subjects in terms of age groups: 26.35% in 50-54, 21.27% in 55-59, 16.11% in 60-64, 12.76% in 65-69, 10.28% in 70-74, 7.94% in 75-79, 3.90% in 80-84, and 1.40% in subjects over 85 years. The mean BMI was 27.39±4.49 for men whereas it was 30.92±5.95 for women. The number of parental history of hip fracture was detected in 556(4.3%) women and in 464(3.7%) men. History of rheumatoid arthritis was found in 2060(15.7%) women and in 898(7.2%) men. Excessive alcohol intake was detected in 539(5.3%) men, whereas it was found only in 51(0.4%) women. There were 4627 (37%) current smoker among males while this number was 1628 (12.4%) in female population. The distribution of use of oral glucocorticoids was 1794(13.7%) and 963(7.7%) in females and males respectively. Secondary causes of osteoporosis were determined in 9215(73.7%) male subjects whereas this number was 7441(56.9%) in females.
Conclusions: As a conclusion, the most common reason for osteoporotic fractures was observed as secondary diseases which are mainly seen in male subjects, except rheumatoid arthritis. Smoking was detected as a remarkable risk factor for osteoporosis in Turkey. It is crucial to detect these risk factors with population-based studies in order to establish powerful preventive strategies.
Acknowledgement: This study was supported by Turkish Osteoporosis Society

Disclosure of Interest: None Declared

P673 - PAGET'S DISEASE OF BONE PRESENTING AS MULTIPLE FRACTURES IN A 64 YEAR OLD FILIPINA

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Aims: Paget's disease of the bone is characterized by accelerated bone resorption which leads to secondary increase in bone formation. An increase in alkaline phosphatase levels and evidence of lyric and sclerotic lesions in radiographs are diagnostic. Its manifestations include bone pains and deformities. Our patient is a 64 year old female who presented with bowing of the right lower extremity associated with pain. She was found to have elevated total alkaline phosphatase (more than three times the upper limit), serum bone specific alkaline phosphatase (BSAP) and deoxypyridinoline crosslinks (40.11 nmol DPD/mmol creatinine, NV 3-7.4), with normal serum osteocalcin. Intact parathyroid hormone was slightly elevated at 94.6 pg/mL (NV 12-72 pg/mL) while serum creatinine, ionized calcium, vitamin D assay, twenty-four hour urine calcium, sestamibi scan of the parathyroid gland are all normal. Skeletal survey showed multiple fractures involving pubic bone, right femur and tibia-fibula, compression deformity of seventh thoracic vertebra, with severe osteopenia. The serum bone markers were characteristic of Paget's disease. Patient received yearly zoledronic acid 5 mg and oral calcium+Vitamin D supplements with significant decrease in BSAP levels.

Disclosure of Interest: None Declared

P674 - IS THERE AN ASSOCIATION BETWEEN VERTEBRAL FRACTURES DETECTECTED BY VERTEBRAL FRACTURE ASSESSMENT (VFA) AND HISTORICAL HEIGHT LOSS IN POSTMENOPAUSAL WOMEN WITH LOW BONE MINERAL DENSITY (BMD)

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Aims: To determine the association between vertebral fractures detected by VFA and historical height loss (HHL) in postmenopausal women with low BMD.
Methods: Our study was performed from December 2008.to December 2009. and included 109, 71±11 years old postmenopausal women, referred to Our Center for osteodensitometry of lumbar spine and hip. Low bone density was detected in all of our participants. None of them were diagnosed with secondary osteoporosis, while the other risk factors were present. Following the ISCD protocol, because of suspected vertebral fractures, VFA was performed in all participants during the same visit. Vertebral bodies were analyzed by semiquantitative Genant method on Hologic Discovery C device. The chi squared test was used in statistical analyses of our results.
Results: Out of 1417 scanned vertebral bodies,1298 were analyzed and 94 fractures were detected. Average BMD on lumbar spine was 0.742, femoral neck 0.604 and total hip 0.731. 109 participants were divided into two groups. Group I included 57 patients with the HHL of 2-4 cm, and the group II 52 with the HHL of more than 4 cm. We did not take prospective height loss into consideration because of nonreliable facts. Of 15(26.32%) patients from the group I were presented with vertebral fracture,10(17.54%)of them with single and 5(8.77%) with multiple fractures. In the group II 33(63.46%) patients were presented with vertebral fractures,12(23.08%) of them with single and 21(40.38%) with multiple fractures. These fractures were graded as follows:38(40,43%) as grade I,33(35,11%) as grade II and 23(24,47%) as grade III. The incidence of these fractures was as follows:Th6- 2 fractures,Th7-5,Th8 and 9-each 9 fractures,Th10 -6,Th11-7,Th12-19,L1-15,L2-13,L3-5,L4- 4 fractures. There was no statistically significant association between vertebral fractures and HHL of 4cm and less in postmenopausal female with low BMD. The presence of single fracture is significantly associated with HHL of more than 4cm(p=0,0002),as well as the presence of multiple fractures and HHL of more than 4 cm($p<0,0001$).
Conclusions: The results of our study pointed out the necessity of taking into consideration anamnesis of HHL in postmenopausal female with low BMD, as it could help discovering vertebral fractures that are mostly asymptomatic. The fact that VFA could easily be performed as well as right after osteodensitometry(during the same visit),makes it more and more important for daily clinical practice.

Disclosure of Interest: None Declared

P675 - RISK OF OSTEOPOROTIC FRACTURE IN A SPANISH RURAL POPULATION

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Aims: To know the factors of fracture risk in a rural Spanish sample.

To know the most frequent vertebral structural alterations in this sample

Methods: It is a cross and descriptive study in which was included the people that demanded medical attendance, by any reason, during the month of 2009 November in four rural general practice consultations of Galicia (Spain) and that they accepted to participate in the project. There was two inclusion criterions: same age or superior to 65 years (males) and postmenopausal (females). The main variables to study were the fracture risk factors considered at this time by the scientific community as main (fracture of the mother's hip, fragility fractures, smoking habit, body mass index<19 and high risk of fallen [Tinetti Scale]) and three types of vertebral structural alterations (biconcavism, wedging and crush).

Results: The sample is composed of 111 cases (27 males, 84 females) with a half age of 67.5% (± 18.1) years. The fracture risk factors prevalence was: 8.2± (fracture of the mother's hip), 19.8± (fragility fractures), 20.7% (smoking habit), 0.9± (body mass index <19) and 53.2% (elevated risk fallen). The 40.5% of the cases didn't have any risk factor. The wedging was in the 19.8± of the cases, the crush in the 9.9± and the biconcavism in the 64±. The 24.7% of the cases didn't have any vertebral deformities.

Conclusions: 6 of each 10 people of the study population have at least one fracture risk factor. The elevated risk fallen is the fracture risk factor more frequent. The more frequent vertebral structural alteration is the biconcavism.

Disclosure of Interest: None Declared

P676 - DEGREE OF EDUCATION CONCERNING OSTEOPOROSIS AND ITS PREVENTION, AND THE IMPORTANCE OF EFFECTIVE DIAGNOSIS AND TREATMENT OF FEMALE PATIENTS SURGICALLY TREATED FOR UPPER FEMUR BONE FRACTURE

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Aims: to familiarise oneself with the degree of knowledge of patients, surgically treated at the Clinic for orthopedic surgery and traumatology (COST), from the fracture of the upper part of the femur bone; concerning osteoporosis, risk factors, prevention and treatment, and to indicate the necessity of effective diagnosis of osteoporosis in risk patients and adequate implementation of medical and physical therapy, with a goal to prevent complications.

Methods: The cross sectional study included 360 female patients, surgically treated at the COST, Clinical Center of Serbia, due to the fracture of the upper part of the femur bone, between 01.01.2009. and 20.12.2009. The average age of the patient was 76,9. The patients were surveyed concerning risk factors (age, sex, menarche, menopause, number of births and miscarriages, length of lactation, smoking habits, consumption of alcohol and coffee, lengthy intake of corticosteroids, antidepressives and antiepileptics) according to the Questionnaire of the International Foundation for Osteoporosis. Comorbidity and frequency of consultations were as well analysed. Methods of descriptive statistics were used. Values of $p<0.05$ were considered statistically significant.

Results: In surveyed group, neither in patients that have monthly consultations (20%), nor in 80 patients (25%) medically treated for osteoporosis, were present those acquainted with all important aspects of this disease. Four or more risk factors were found in 75% of patients. Osteoporosis was for the first time diagnosed during this hospitalisation in 18% of the patients.

Conclusions: This research indicates the necessity of effective diagnosis of osteoporosis and the importance of educating patients, however, as well as general practitioners, in regard to the implementation of medical and physical therapy and its treatment.

Disclosure of Interest: None Declared

P677 - NEW FRACTURES AND FRACTURE RISK AFTER HIP FRACTURE IN A REMAINING LIFETIME PERSPECTIVE – A CASE-CONTROL STUDY OVER 26 YEARS IN 1029 HIP FRACTURE PATIENTS

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Aims: Previously, we have shown that long-term survival after hip fracture is highly dependent on age at the time of fracture and that the risk of new fractures is similarly age-dependent. In a remaining lifetime perspective, excess mortality is evident up to over 20 years compared to the background population. This report compares fracture pattern (incidence and type) of women and men after hip fracture to an age- and sex-matched control population.

Methods: All adult patients suffering a hip fracture (HFX) due to low energy trauma 1984-1985 in Malmö, Sweden were identified; 1029 cases (766 women, 263 men). Double matched controls from the same background population were available for 1013 cases, all alive and living in the catchment area on the date of the hip fracture in the cases. Cases and controls were followed for new fractures through the department of radiology until death or up to 26 years. Date of death was obtained from the national database, EpC. Data is reported for all, 5-yr age-bands and age-groups.

Results: Median age at hip fracture/inclusion was 81.0 (32-97) yrs for women and 76.3 (33-95) yrs for men. At the end of follow-up 96% of those with HFX had died compared to 91% of controls. Median survival among HFX cases was 4.9 yrs (CI95% 4.4-5.4) women and 3.7 yrs (CI 95% 2.7-4.7) men, which equals to a median loss of 2.9 resp 3.7 life-years in women and men resp, compared to controls ($p<0.001$). Among HFX cases, 45% (344/757) of women/ 30% (76/256) of men suffered new fractures vs. 45%

(687/1514) of women controls/ 23% (120/512) men controls. Multiple fractures: 25% women cases / 21% women controls and 12% in men cases / 7% in men controls. Fracture risk after HFX in women was RR 1.6 (CI95% 1.5-1.8), in men 2.5 (CI95% 2.0-3.1), with four-fold relative risk increase in women 50-60 yrs. The relative risk was similar between the oldest cases and controls over age 85 in men, over age 90 in women. The total number fractures 2.3 fx/case women and 1.8 fx/case men vs. 1.9 fx/control women and 1.5 fx/control men. The distribution of the most common new fracture types; hip, forearm, shoulder, vertebral are compared.
Conclusions: In hip fracture patients, excess mortality is evident both in the short- and long-term and mirrored in the reduced time at risk of new fractures. Nevertheless hip fracture patients have an overall increased risk of new fractures compared to their peers, and most pronounced in those who are relatively young when having a hip fracture.

Disclosure of Interest: None Declared

P678 - DISPARITIES IN PATIENT AND PHYSICIAN PERCEPTIONS OF OSTEOPOROSIS: A NEED FOR INCREASED PATIENT SUPPORT

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Aims: To investigate any gaps that may exist between physician and patient understanding of osteoporosis, understand barriers to patient adherence and identify ways to address unmet needs and improve communications.
Methods: Telephone interviews were conducted with patients (n=844) and physicians (n=837) in 13 European countries in June/July 2009. Patients were women with postmenopausal osteoporosis currently taking prescribed medication or in the past 2yrs. Physicians had 3-35yrs experience in treating osteoporosis patients, which included only general practitioners (GPs) who saw ≥ 10 (exception: in Hungary ≥ 5) and specialists ≥20 patients with osteoporosis per month.
Results: Patients (69%) considered themselves to be educated about osteoporosis although 34% were unable to identify key risk factors. Patients (82%) felt informed about the importance of treatment adherence, but 32% admitted to discontinuing treatment for an average of 5.5 months, 2.6 months longer than estimated by physicians. Noticeably, 29% of patients did not see a problem with missing occasional doses. Physicians consistently underestimated their patients' beliefs on the impact of osteoporosis on their quality of life (QoL). Physicians underestimated how many patients worry about breaking a bone (51% vs. 79%), as well as patient concerns about declines in activity levels (40% vs. 70%), becoming dependent on others (30% vs. 60%) and not being able to work for longer (30% vs. 57%). Patients believed the most credible osteoporosis information was from specialists (94%) or GPs (88%). Patients (75%) would like easy-to-understand materials and 49% would welcome discussing their condition with other patients. Most physicians (88%) believed that osteoporosis organisations are among the most credible sources for information, 80% would give patients written materials to increase adherence and 76% would recommend patient programmes that encourage better communication on managing osteoporosis.
Conclusions: Community-wide patient support programmes may help patients to manage their concerns and address unmet needs in osteoporosis management. The programme should be easy to understand, improve patient–physician dialogue, allow patient–patient contact via support groups, encourage treatment adherence and help improve QoL.
Acknowledgement: This survey was funded by an educational grant from Amgen Inc. and conducted by GfK in conjunction with Hill&Knowlton (UK), on behalf of the International Osteoporosis Foundation 'Osteolink' program.

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P679 - OLD STUDY – OSTEOPOROSIS LINK TO CARDIOVASCULAR DISEASE

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Aims: The objective of this study was to evaluate the relation between Osteoporosis and the presence of cardiovascular disease (CVD) risk factors in women.
Methods: Osteoporosis was identified by evaluation of bone mineral density (BMD), measured with heal ultrasound (Hologic Sahara) with T-score determination. Clinical data like CVD risk factors (hypertension, diabetes, thrombosis) were registered. Adipose tissue was assessed by hand-to-hand bioimpedance analysis (BIA) and biometrics measurements (BMI, body perimeters) were collected. Women over 40 years of age were recruited from several health centers. Statistical analysis included Mann-Whitney and chi-square test.
Results: A total of 825 women were included with a mean age of 62 years old, BMI was 29±5kg/m2, fat mass 39±5%, waist perimeter (WP) 90±11cm. 78% had BMI≥25 and 37% were obese, while 85% presented increased WP and 95% revealed excess body fat mass. The prevalence of evaluated CVD risk factors was 8.4% with

diabetes, 2.2% with history of thrombosis or other AVC events and 37.5% had hypertension. Osteopenia and Osteoporosis were identified in 10.5% and 14.5%, respectively, mainly distributed by normal, overweight and class I obesity. Low BMD risk increased with age and decreased with BMI, fat mass and WP (p<0,005). Significant differences of T-score values between BMI classes (p<0,0001) were found. The groups with normal/excess fat mass did not differ in ultrasound T-scores. There were no significant differences of T-score values in women with diabetes or history of thrombosis. However hypertension was associated with higher values of T-score (p=0.023), where women with osteoporosis had lower prevalence of hypertension (26% vs. 39.4%; p=0.004). We found no association between osteopenia and analyzed CVD risk factors.

Conclusions: Osteoporosis was associated to lower frequency of hypertension. Increased BMI, WP and adipose tissue is described with direct relation to CVD, but also with beneficial or protective effect in high fracture risk, a consistent issue that can justify the obtained results of no positive association to the other studied CV risk factors.

Disclosure of Interest: None Declared

P680 - ABSTRACT WITHDRAWN

P681 - ASSOCIATION OF KNEE OSTEOARTHRITIS, LUMBAR SPONDYLOSIS AND OSTEOPOROSIS WITH METABOLIC SYNDROME: THE ROAD STUDY

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Aims: Musculoskeletal diseases, such as osteoarthritis (OA) and osteoporosis (OP), and cardiovascular diseases (CVD) are two major disorders which impair quality of life in the elderly. We aimed to clarify the association of knee OA (KOA), lumbar spondylosis (LS) and OP with metabolic syndrome (MS), characterised by obesity (OB), hypertension (HT), hyperlipemia (HL) and impaired glucose tolerance (IGT) – the main risk factor for CVD.

Methods: In 2005, we initiated ROAD (Research on Osteoarthritis Against Disability) – a large-scale cohort study – to clarify the epidemiologic features of OA and OP in Japan. In the present study, we enrolled 826 Japanese subjects (277 men; 549 women) residing in the coastal area. KOA or LS was defined as radiographic changes of grade ≥2 (Kellgren–Lawrence) in at least 1 knee joint or vertebral disc. OP was diagnosed according to the World Health Organization criteria (<peak bone mineral density (BMD) - 2.5 SD). MS was diagnosed according to the Japanese criteria: OB (waist ≥85 cm in men; ≥90 cm in women) and the presence of any 2 of the following conditions: HT, HL and IGT. HT was diagnosed as systolic blood pressure of ≥130 mmHg or diastolic blood pressure of ≥85 mmHg, HL as serum high density lipoprotein cholesterol level of <40 mg/dL and IGT as serum haemoglobin A1C level of >5.5%. The subjects were divided into 6 age groups: ≤39, 40–49, 50–59, 60–69, 70–79 and ≥80 years.

Results: The prevalence of KOA in the abovementioned groups was 0%, 2.7%, 8.5%, 21.9%, 45.7% and 56.5% in men and 4.2%, 8.0%, 22.5%, 45.8%, 66.1% and 76.9% in women, respectively. The prevalence tended to be higher with age in both genders. The prevalences of LS and OP also increased with age. The prevalence of MS in the aforementioned age-groups was 8.3%, 10.8%, 15.5%, 23.4%, 21.4% and 30.4% in men and 0%, 1.1%, 6.3%, 10.6%, 13.9% and 20.0% in women, respectively. Logistic regression analysis using presence of KOA and MS as objective and explanatory variables, respectively, after adjustment for age revealed that MS was significantly positively associated with KOA in men and women (men: odds ratio, 2.32; 95% confidence interval, 1.12-4.78; p=0.023; women: 4.73; 2.17-10.35; 0.000). In contrast, OP at the femoral neck was inversely associated with MS in women (0.29; 0.09-0.88; 0.029).

Conclusions: Presence of MS is significantly related to that of KOA in men and women and OP at the femoral neck in women. A follow-up survey is underway to identify the causal relationship among these disorders.

Disclosure of Interest: None Declared

P682 - ASSOCIATION OF KNEE OSTEOARTHRITIS, LUMBAR SPONDYLOSIS AND OSTEOPOROSIS WITH PHYSICAL FUNCTION: THE ROAD STUDY

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Aims: To clarify the association of knee osteoarthritis (KOA), lumbar spondylosis (LS) and osteoporosis (OP) with physical function in middle-aged and older Japanese men and women.

Methods: This study analyzed the data of 735 participants (260 men and 475 women, mean 68.7 years) in a mountainous cohort of the ROAD study who participated in the 2nd visit survey in 2008. KOA and LS were defined as the Kellgren/Lawrence grade ≥3 on plain radiographs. OP was defined as a bone mineral density of <70% of a peak bone mass at lumbar spine or proximal femur according to the criteria of the Japanese Society for Bone and Mineral Research. One leg standing time with eyes open was measured as a parameter of physical function. The subjects were divided into three groups on their age: ≤64, 65–74 and ≥80 years.

Results: The prevalence of at least one of KOA, LS and OP in each age group was, 69.0, 91.8 and 41.0%, respectively. The prevalence of none, one, two and three of the diseases in the overall age group was 32.3, 37.7, 23.7 and 6.3%, respectively. One leg standing time with eyes open was 40.9, 27.8, 17.6 and 8.8 sec in the group with none, one, two and three of the diseases, respectively.

Multiple regression analysis using one leg standing time as an outcome variable and the number of the diseases as an explanatory variable revealed that the number ≥2 was inversely associated with one leg standing time when the number=0 was used as a reference after adjustment for age, sex and body mass index (the number=1; β=-0.039 and P=0.27, 2; -0.086 and 0.03, 3; -0.09 and 0.007, respectively).
Conclusions: This study showed that the ability to keep standing on one leg was inversely associated with the number of degenerative bone and joint diseases, suggesting that it might be a predictor of the severity and occurrence of multiple locomotive organ dysfunction.

Disclosure of Interest: None Declared

P683 - SNP COMBINATIONS IN CHROMOSOME-WIDE GENES ARE ASSOCIATED WITH BONE MINERAL DENSITY IN TAIWANESE WOMEN

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Aims: The interactions between eleven polymorphisms in nine genes on the incidence of low BMD were examined in this study. This is a novel analysis to investigate the association between osteoporosis and combined SNPs with genotypes.
Methods: Eleven polymorphisms were investigated in this study; TNFá-857 (rs1799724), TGFâ1-509 (rs1800469), osteocalcin (rs1800247), TNFá-308 (rs1800629), PTH BstB I (rs6254), PTH Dra II (rs6256), IL-1ra (VNTR), HSP70 hom (rs2227956), HSP 70-2 (rs1061581), CTR (rs1801197), and BMP-4 (rs17563). The relationship between the combined polymorphisms in different genomic regions and BMD variation was investigated.
Results: In postmenopausal women, there was a significant association between low BMD and genotypes ranging from 2 ~ 7 SNPs. For two combined SNPs, the portion of subjects with low BMD was significantly higher in those with CC-AA genotypes in rs1799724-rs1800629, compared to those with non-CC-AA genotypes in postmenopausal women and the combination of all women. Similarly, part of the combined SNPs with rs1799724-rs1800629-rs6254-rs6256-IL-1ra-rs2227956-rs1801197 was significantly associated with reduced BMD. After controlling for age and BMI, postmenopausal women with certain specific SNP combination had a 3.54- to 4.68-fold increased risk for low BMD, comparing to other SNP combinations.
Conclusions: The results of this study suggested that specific SNP combination may be a risk factor for postmenopausal osteoporosis in Taiwanese. The methods of this study may provide a valuable tool in examining multiple low penetrance genetic factors that cooperatively determine the phenotypic traits like osteoporosis.
Acknowledgement: This work was supported by National Science Council in Taiwan grants NSC94-2314-B037-025, NSC94-2320-B028-001, NSC93-2320-B028-001, NSC93-2314-B037-027, NSC 90-2314-B-037-052, NSC 89-2320-B-037-020.

Disclosure of Interest: None Declared

P684 - ESTROGEN RECEPTOR-A GENE POLYMORPHISMS BONE MINERAL DENSITY AND ESTRADIOL LEVELS IN SAUDI POSTMENOPAUSAL WOMEN

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Aims: To study the frequency of ER-α gene polymorphisms *Xba* I and *Pvu* II in relation to bone mineral density (BMD) and serum estradiol (E_2) variation in Saudi postmenopausal women with and without osteoporosis.
Methods: A total of 600 Saudi postmenopausal women (age > 50 years) with osteoporosis (n=300) and as compared with age-matched women with normal BMD (n=300) were studied. Women were genotyped by restriction fragment length polymorphism (RFLPs) of ER-α and BMD [at lumbar spine (L_1-L_4) and femoral neck] were determined by dual energy X-ray absorptiometry (DXA).
Results: Women with the genotypes XX and PP exhibited higher BMD values at both the lumbar spine (by 11.6% and 8.2%, P<0.05) and the femoral neck (12.5% and 4.9%, P<0.05), respectively, than those with xx and pp genotypes. Regression analysis showed that women with xx and pp genotypes had a relatively accelerated decrease in BMD values with age at both the lumbar spine (P<0.001) and femoral neck (P<0.001) sites. The XX genotypes were significantly more prevalent (P<0.001) among women with normal BMD (35.7%) and xx genotypes in women with osteoporosis (23.3%) within the group, respectively. The frequency of PP genotype was higher in women with normal BMD (28.7%) whereas pp genotype was higher in women with osteoporosis (46.3%). The mean E_2 was significantly low in women with pp and xx genotypes as compared with that in women with PP and XX genotypes (P<0.000), respectively: this is more significant in women with osteoporosis. The relative risk associated with the presence of a particular genotype was 2.36 (P<0.001) for xx and 1.66 (P<0.06) for pp genotype, respectively.

Conclusions: Genetic variations at ER-α gene locus are associated with BMD values (lumbar spine and femoral neck) in Saudi postmenopausal women which may contribute to the changes of bone loss with age and osteoporosis with significantly low BMD and E_2 values obtained in women with pp and xx genotypes.

Disclosure of Interest: None Declared

P685 - MUTATIONS IN GALNT3 GENE: TWO CASES OF TUMORAL CALCINOSIS-HYPERPHOSPHATEMIA

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Aims: Tumoral Calcinosis (TC) is a rare congenital disease characterized by ectopic calcifications around large joints and hyperphosphatemia. The occurrence of the disease is often associated with dental abnormalities and inappropriately normal or elevated levels of 1-25 $(OH)_2D_3$. The first genetic mutation discovered was an inactivating mutation in *GALNT3 gene*, encoding an enzyme responsible for initiating O-linked glycosylation of proteins. In the present study we described a 16 yrs old girl and a 19 yrs old boy affected by TC.
Methods: Patients presented to our attention respectively with a rock-hard enlargement of gluteal bilaterally that prevent flexion, as well as internal and external rotation of both hips for the girl and a rock-hard enlargement at the right shoulder for the boy. Biochemical and radiological evaluation was performed by standard methods. Doppler Ultrasound of the legs was also performed. Genomic DNA was extracted from peripheral blood collected from the patient using a microvolume extraction method, QIAamp DNA Mini Kit (Qiagen GmbH, Hilden, Germany) according to the manufacturer's instructions. A coetaneous biopsy was obtained in order to perform functional studies.
Results: A pelvic MRI showed the presence of a mass with some cystic formations and several calcifications in both cases. Both girl and boy had laboratory tests showed serum Pi of 7.9 mg/dL and 5.4 (n.v.:2.5-5) a tubular Pi reabsorption rate (TmP/GFR) of 9.4 mmol/L and 6.3 (n.v.: 0.7-1.45), inappropriate levels of 1-25$(OH)_2$ D_3 52,1 and 110 pg/mL (v.n.:16-65) respectively. The girl had low levels of FSH, LH and 17 βE2. Conversely, boy had normal levels of FSH, LH, T. In addition, low levels of serum intact FGF23 and high level of C-terminal fragment were found in both patients. Artery and Venous Doppler Ultrasound of the legs showed the presence of subcutaneous calcification with perviety of the arteriovenous flow and without DVT and skull CT showed the presence of cerebral calcifications in both patients. We found a novel homozygous splice site mutation in intron I (IVS1-2a>g) likely leading to skipping of exon 2 and a described G>A transition at cDNA position 1524+1 which abolishes the consensus splice donor site.
Conclusions: We described two patients with mutations of *GALNT3 gene* affected by TC. Functional studies may be important to understand the role of GALNT3 in the glycosylation and activity of FGF23. The results could be useful to develop targeted therapies.

Disclosure of Interest: None Declared

P686 - THE IMPORTANCE OF THE REHABILITATION PROGRAM FOR THE TREATMENT OF OSTEOGENESIS IMPERFECTA

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Aims: Osteogenesis Imperfecta (OI) or the Lobstein Disease is a heritable defect, a rare one, that makes bones fragile because of a generalized decrease in bone mass (osteopenia). We present two very interesting cases of OI to adult. A complete rehabilitation program had a major benefit for the patients.
Methods: we present two cases of female with OI type IA (Sillence Classification), diagnosed at an adult age, presenting many complication of the disease. We evaluated the patients from a clinical, functional and quality of life point of view before and after 6 months of rehabilitation program, 3 sessions of two weeks as inpatient and 18 weeks as ambulatory patient to the IIIrd National Institute of Rehabilitation Medicine and Balneoclimatology Clinique in Bucharest. The two persons were treated with drugs and a complete rehabilitation program: kinetotherapy, physical therapy, massage, orthosis.
Results: the global functional score (AQoL – 6D) used to evaluate the patients improved with 37%, the quality of life (using Qualeffo 41) improved also with 42%. The patients could also complete a questionnaire regarding the quality of life after the 6 months of rehabilitation program compared with 6 months before when they were treated only with drugs, the quality of life improved with 67%.
Conclusions: We underline the importance of the Rehabilitation Program for functional and quality of life improvement for adult patients with Osteogenesis Imperfecta.
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Disclosure of Interest: None Declared

P687 - ANALYSIS OF XBA I AND PVU II POLYMORPHISMS IN THE ESTROGEN RECEPTOR GENE IN ASSOCIATION WITH BONE MINERAL DENSITY IN SLOVAK POSTMENOPAUSAL WOMAN

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Aims: It is known that estrogens play an important role in the pathophysiology of osteoporosis. Different genetic studies have shown the relationship between the Estrogen Receptor (ESR) gene and the disease, including fracture risk. The aim of our study was to analyze associations of XbaI and Pvu II polymorphisms in the ESR gene with a variability of femoral (F-BMD) and spinal BMD (S-BMD), as well as circulating alkaline phosphatase (ALP), osteocalcin (OC; formation markers), β-CrossLaps (CTX; resorption marker) and fracture risk in Slovak postmenopausal women.
Methods: Women (N=251; 62.43±8.94 years) were selected according to strict inclusion criteria. Genetic polymorphisms were detected by PCR-RFLP method. Frequencies of fractures were tested using the chi-square test. The differences of quantitative variables between the genotypes were analyzed by covariance analysis (GLM) after correction of the measurements for age, BMI and daily calcium intake. A relative risk (RR) was calculated according to published methods.
Results: In the studied population we found the Pvu II genotype frequencies 23.5±, 46.9±, and 27.5± for PP, Pp, and pp, respectively. For Xba I the frequencies 15.5±, 41.6±, and 42.9± for XX, Xx, and xx, respectively, were counted. We found a statistically significant effect ($P<0.05$) of the both polymorphisms on F-BMD and S-BMD. Individuals with pp genotype had significantly lower BMD values in both cases as compared to the other genotypes. Heterozygous genotype Xx disposed significantly lower BMD in comparison with the homozygous genotype xx ($P<0.05$). No significant effects of the polymorphisms were recorded on bone turnover markers. We calculated a higher fracture risk for heterozygous genotypes of both polymorphisms; however, the effects were insignificant.
Conclusions: We found significant associations between ESR/XbaI, ESR/Pvu II polymorphisms and BMD; however, the effect was not followed by significantly higher fracture risk and bone turnover process. Results of genetic analysis in Slovak population could contribute to a more comprehensive view of the role of genetics in osteoporosis development. Ultimately, the results could be practically applied in the prediction of disease risk in individuals.
Acknowledgement: The study was supported by the grant KEGA 3/7008/09. All procedures were approved by the Ethical Committee of the Specialized Hospital of St. Svorad in Nitra (Slovakia).

Disclosure of Interest: None Declared

P688 - BONE MECHANICAL COMPETENCE IS A HIGHLY HERITABLE TRAIT IN A MOUSE MODEL FOR GROWTH HORMONE DEFICIENCY

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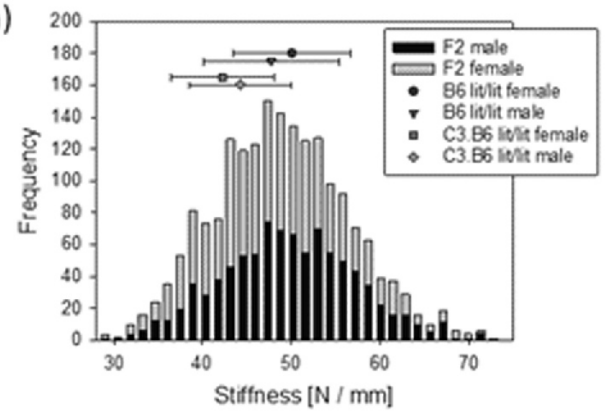
Aims: Bone stiffness and strength are important mechanical characteristics that are genetically regulated. Mouse models are helpful in defining the relative roles of genes in a controlled environment. Complex traits can be analyzed by crossing two genetically distinct progenitors that differ in a specific trait and then measuring the F2 intercross progeny for that trait. Such genetic linkage studies require very large numbers of animals; therefore, a high-throughput structural and mechanical analysis is essential. The aim of the present work was two-fold. First, an automated method for the mechanical assessment of mice femora based on microstructural finite element (FE) was implemented and validated. Second, the method was applied to femora of two growth hormone (GH) deficient inbred strains of mice (B6-*lit/lit* and C3.B6-*lit/lit*) and to the F1 and F2 (n=2000) populations.
Methods: The femora at four months of age were scanned with μCT at 20 μm resolution. After automated alignment, microstructural finite element models were created and the stiffness was computed by loading at the femoral head. In order to validate the FE analysis, inbred strains (B6 and C3H) were experimentally tested. In addition, morphometric parameters were calculated and heritability was estimated.
Results: FE-derived bone stiffness closely matched the experimentally measured stiffness ($r^2=0.94$). In the F2 population a number of parameters, such as cross-sectional moments of area (J, Imax) and stiffness, showed a broader distribution than expected from the parental strains (Fig. 1a). This indicates that both strains carry alleles that could positively and negatively influence the heritability of such "mechanical" traits. For the progenitors, 85% of the variation in stiffness could be explained by looking at morphology, whereas for the F2 population this percentage was reduced to 70% (Fig. 1b). This underlines the importance of directly investigating mechanical parameters instead of using structural surrogates. In addition, heritability analysis showed a high genetic determination for stiffness ($h^2=58\%$).

(a)



(b)

	B6	C3.B6	F1	F2
BV	0.75	0.58	0.56	0.57
TV	0.62	0.66	0.64	0.66
AVD	0.60	0.01	0.00	0.00
C.Th	0.66	0.22	0.44	0.12
J	0.82	0.76	0.78	0.72
Imax	0.85	0.81	0.83	0.71

Conclusions: In conclusion, our high-throughput method for the mechanical characterization of murine femora, combined with quantitative trait loci analysis, could help to locate genes directly involved in controlling bone mechanical competence.

Disclosure of Interest: None Declared

P689 - A SUSCEPTIBLE HAPLOTYPE WITHIN APOE GENE INFLUENCES BMD AND INTENSIFIES THE OSTEOPOROSIS RISK IN POSTMENOPAUSAL FEMALES OF NORTHWEST INDIA

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Aims: The association of Apolipoprotein E (APOE) genotypes with bone mineral density and risk of osteoporosis have remained unclear. The influence of APOE gene polymorphisms on BMD as genetic mediators of osteoporosis risk needs to be explored in Indian postmenopausal females where this disease is rising rampantly.
Methods: The present study investigated the role and relevance of four pertinent APOE single nucleotide polymorphisms (SNPs): 5'UTR G/C (rs440446), Int2 G/A (rs769450), Exon4 T/C (rs429358), Exon4 C/T (rs7412) in DXA verified 133 osteoporotic, 57 osteopenic and 83 normal postmenopausal females of India, who were not taking hormone replacement therapy (HRT).
Results: Minor allele frequencies of rs440446 and rs429358 were observed to be higher in osteoporotic females (0.31, 0.18) than osteopenic (0.29, 0.15) and females having normal bone mass (0.16, 0.07). Disease association analysis revealed a susceptibility haplotype CGTC (in order of rs440446, rs769450, rs429358, rs7412) and the carriers of this haplotype has higher risk of osteopenia (OR 3.53, 95%CI 1.21-11.0, P=0.017) and osteoporosis (OR 3.61, 95%CI 1.53-9.48, P=0.002) after adjusting the confounding effect of age, BMI and years since menopause. Females who possess either one copy or two copies of the haplotype have lesser BMD values of lumbar spine (0.88g/cm^2, 0.85 g/cm^2) and femoral neck (0.84 g/cm^2, 0.82 g/cm^2) than those females who possess zero copy (0.9 g/cm^2 and 0.87 g/cm^2 respectively) suggestive of its haplotype dose effect.
Conclusions: The present study exposed a susceptibility haplotype CGTC, within APOE gene, which was found to be associated with BMD and risk of osteopenia and osteoporosis in postmenopausal females of India.
Acknowledgement: The financial support of the DST project (SR/WOS-A/LS-225/2007) to MS is highly acknowledged.

Disclosure of Interest: None Declared

P690 - HAPLOTYPES WITHIN THE TNFRSF11B (OSTEOPROTEGERIN) GENE AND BONE MINERAL DENSITY (BMD) IN MALTESE POSTMENOPAUSAL WOMEN

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Aims: Osteoprotegerin (OPG) is a key negative regulator of osteoclastogenesis which acts by blocking the interaction of RANKL with RANK found on osteoclast progenitors. Polymorphisms found within the TNFRSF11b gene, encoding for osteoprotegerin, were associated with an increased risk of osteoporosis. A previous study in Maltese postmenopausal women showed positive association of low BMD with a polymorphism found within the promoter region of this gene (T950C). Further studies on this gene have been carried out.
Methods: All five exons and promoter region of the TNFRSF11b gene, from 10 patients with low BMD and 10 postmenopausal women with normal BMD, were sequenced and tested for linkage disequilibrium. Polymorphisms that were in linkage disequilibrium with the T950C polymorphism were further analysed in the postmenopausal population, haplotypes were constructed and tested for association.
Results: Twelve variants were identified: A163G (rs3102725), T149C (rs3134071), G209A, T245G, T950C (rs2073617) and a C/T transition in the promoter region, and G1181C (rs2073618) found in exon 1 (signal peptide), C445T (rs1565858), a C/T transition in intron 2 (rs4876869), del(CT) (rs10554146), A6833G (rs2228568) and A6890C (rs7844539). Linkage was observed between C445T, delCT, A6833G and A6890C polymorphisms. Another two polymorphisms linked together were T149C and T245G. Strong linkage was observed between T950C, G1181C and rs4876869. Since T950C was previously associated with disease, genotyping of rs4876869 was performed in 104 postmenopausal women. Genotype frequencies observed were 19.2% CC, 53.8% CT and 26.9% TT and were in Hardy-Weinberg equilib-

rium ($\chi 2$=0.722, p=0.395, df=1). The distribution of genotype frequencies between women with low lumbar BMD (T-score <-1.0) and normal individuals, did not differ significantly ($\chi 2$=0.34, p=0.843, df=2), showing that on its own rs4876869 does not affect BMD. When constructing haplotypes for T950C, G1181C and rs4876869, 42.4% of postmenopausal women carried haplotype C-C-C, 38.5% carried the T-G-T haplotype and 7% haplotype C-G-T. Statistical significance was reached ($\chi 2$=18.42, p=0.010, df=7) when comparing haplotypes between normal postmenopausal women and those with low BMD, with C-G-T and C-C-C haplotypes having a protective effect while T-G-T increases the risk (35.9% of normal vs. 41.0% of women with low BMD).
Conclusions: Further studies are required to investigate the functional roles of both T950C and rs4876869.

Disclosure of Interest: None Declared

P691 - THE RELATIONSHIP BETWEEN VISFATIN, RESISTIN AND ADIPONECTIN GENE POLYMORPHISMS WITH BONE MINERAL DENSITY IN A KOREAN POPULATION

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Aims: Adipokines have been proposed as link molecules between adiposity and osteoporosis, but the relationship between novel adipokine gene polymorphisms and bone metabolism in human is not clear. The aim of this study was to investigate the relationship between visfatin, resistin and adiponectin gene polymorphisms and bone mineral density in a Korean population.
Methods: In 256 Korean (mean age 67.6±7.8 years; male frequency 50%), lumbar spine, femoral neck, trochanter and total femur BMDs were examined by dual energy X-ray absorptiometry. Genotyping of visfatin 1535 T>C, resistin 420 C>G and adiponectin 45 T>G gene polymorphisms were performed by allelic discrimination using the 5' nuclease polymerase chain reaction assay.
Results: Allele frequencies of visfatin 1535 T>C were 0.58 for T allele and 0.42 for C allele; of resistin 420 C>G were 0.67 for C allele and 0.33 for G allele; of adiponectin 45 T>G were 0.68 for T allele and 0.32 for G allele. All the frequencies of the genotypes were in compliance with Hardy-Weinberg equilibrium. Mean BMD of total femur was significantly higher in TT genotype compared with TC and CC genotypes of visfatin 1535 T>C ($p<0.05$). Mean BMDs of lumbar spine, femoral neck, trochanter and total femur were significantly higher in CC genotype compared with CG and GG genotypes of resistin 420 C>G ($p<0.05$). There were no differences in mean values for BMDs among different genotypes of adiponectin 45 T>G.
Conclusions: Visfatin 1535 T>C and resistin 420 C>G gene polymorphisms were associated with BMDs in a Korean population. Thus, we can guess that some adipokines gene may influences on the bone mass, but it remains unclear whether the polymorphisms in the adipokines gene have a direct functional impact on the bone metabolism.

Disclosure of Interest: None Declared

P692 - CORRELATION BETWEEN BODY MASS INDEX, BONE MINERAL DENSITY AND FSH LEVEL IN POSTEMENOPAUSAL OSTEOPOROTIC WOMEN

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Aims: Osteoporosis is a systemic disease characterized by reduced bone mass and changes microarchitecture of bone tissue. In menopausal women, the reduction of ovarian functions leads to loss of bone tissue, and, therefore, the majority of women meet the criterion of OP before 70 years of age. The estrogen has a major role in osteoporosis. In addition, FSH has been proved to enhance the osteoclasts formation and function and suggest that elevated FSH contributes to the genesis of postmenopausal osteoporosis.
Objective: To correlate bone mineral density (BMD) and body mass index (BMI) with FSH levels in osteoporotic postmenopausal women.
Methods: In 38 women, mean age 60 years old (49-77) who were verified for osteoporosis by bone mass density (measured by in proximal femur and lumbar spine by dual-energy X ray absorptiometry -DXA) the level of FSH in blood was determined by RIA. BMI was determined and women were classified as follows: low weight <20;normal 20-25; overweight, 25-30; obese>30.
Results: There was a positive correlation between BMD and BMI (p=0,025) as well as between BMD and FSH (p=0.50). Negative correlation between BMI and FSH values (p=0,027) was found.
Conclusions: Although the rise of FSH was not confirmed to be in correlation with women's menopause osteoporosis, our opinion is that a larger number of subjects would corroborate our statement.

Disclosure of Interest: None Declared

P693 - INFLUENCE OF SOME OSTEOTROPIC FACTORS ON MODULATION OF THE RANKL2 ISOFORM

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Aims: Bone homeostasis is controlled by some members of the TNF family, of which RANKL is an essential factor for mediating bone resorption. Our group recently showed [1] that human normal and osteoarthritic subchondral bone osteoblasts differentially express membranous RANKL as well as RANKL1 and RANKL3 isoforms, and that they were differentially regulated by some osteotropic factors. In that study, specific human RANKL2

cDNA primers could not be reliably designed. Here, we investigated the RANKL2 protein modulation upon treatment with the osteotropic factors through a mechanistic model.
Methods: Human embryonic kidney 293 cells, which do not express RANKL, were stably transfected with the cDNA encoding the transmembranous and extracellular domain of murine RANKL2 (293 RANKL2). Semi-quantitative PCR and Western Blot were used to determine the level of RANKL2. For the modulation experiments, the 293 RANKL2 cells were incubated for 72 hours with TNF-α (5 ng/ml), vitamin D_3 (50 nM), or PTH (100 nM). For protein stability determination, cells were pretreated with or without actinomycin D (5 μg/ml) for 1 hour and then incubated (0-24 hours) with the above factors. The production of RANKL2 protein was determined in the cell lysates by a specific ELISA.
Results: Expression and production analyses confirmed that the 293 RANKL2 cells strongly expressed and produced RANKL2. Data showed that TNF-α significantly increased ($p<0.03$) RANKL2 production, but vitamin D_3 and PTH had no effect. Vitamin D_3 and PTH had no effect on the stability of the RANKL2 protein. However, TNF-α increased RANKL2 half-life, and statistically significant difference ($p<0.005$) was reached at a 4-hour incubation period.
Conclusions: Our study brings to light that the RANKL2 isoform could be modulated by TNF-α, a factor highly implicated in some diseases involving bone resorption and RANKL activity, such as rheumatoid arthritis. Interestingly, other osteotropic factors, vitamin D_3 and PTH, did not modulate RANKL2 protein production or its stability/half-life, which could reflect the differential effects of these factors in bone remodelling. These findings in addition to the previous study [1] reveal that all three RANKL isoforms could be modulated, which strongly suggest that modulation of a specific RANKL isoform may be useful for a possible classification of certain osteolytic diseases and/or to assist in identifying specific therapeutic treatments.
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Disclosure of Interest: None Declared

P694 - ROLE OF PPAR-GAMMA IN CARTILAGE GROWTH AND DEVELOPMENT IN VIVO

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Aims: Recent studies suggest that PPARγ, a transcription factor, is involved in the maintenance of bone homeostasis. However, the specific *in vivo* function of PPARγ in chondrogenesis, cartilage growth/development is largely unknown. We then explored the role of PPARγ in cartilage growth/development using cartilage-specific PPARγ knockout (KO) mice.
Methods: Cartilage-specific PPARγ-deficient mice were generated using Lox P/Cre system. Skeletal and histological staining was performed using alcian blue, alizarin red and Safarin O/Fast green staining. Gene expression of markers was determined in chondrocytes isolated from mice by RT-PCR.
Results: We first show that new-born PPARγ KO mice have reduced overall body size and body weight compared to control-littermates. *In vivo* studies show new-born PPARγ KO mice have reduced skeletal growth and length of long bones compared to control mice. Growth plate of long bones from new-born PPARγ KO and heterozygous (Het) mice show reduced chondrocyte cellularity, loss of columnar organization and delayed hypertrophy in a gene-dose dependent manner compared to control mice. Further, PPARγ KO chondrocytes show increased expression of extracellular matrix (ECM) degradation products including MMP-13 and ADAMTS-5, and decreased expression of ECM building products including aggrecan and type-II collagen. These results collectively suggest the potential role of PPARγ in cartilage development. In addition, our results also suggest that PPARγ signaling during cartilage development may be mediated through the phosphatase and tensin homolog (PTEN)/Akt/glycogen synthase kinase (GSK)-3β signaling pathway, as PPARγ KO chondrocytes have reduced PTEN expression and increased phosphorylation of both Akt and GSK-3β. Our ongoing studies are now determining the link between PPARγ and PTEN signaling in cartilage.
Conclusions: These results collectively suggest the potential role of PPARγ in cartilage development *in vivo* and will help us better understand the molecular mechanisms associated with abnormal cartilage-/bone-development related diseases.

Disclosure of Interest: None Declared

P695 - ASSOCIATION BETWEEN BODY MASS INDEX, ABDOMINAL PERIMETER AND OSTEOPOROSIS IN POSTMENOPAUSAL WOMEN.

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Aims: To show the association between body mass index, abdominal perimeter and bone mineral density in postmenopausal women.
Methods: We performed an analytic and retrospective study in 224 postmenopausal women aged from 41 to 60 years. We obtained weight and abdominal perimeter during physical examination in outpatient clinic in our hospital. Blood levels of total cholesterol, low-density lipoproteins, high-density lipoproteins, homocysteine, lipoprotein (a) and C-reactive protein were determined by routine blood tests. Bone mineral density in lumbar spine and proximal femur was measured by dual-energy x-ray absorptiometry (DXA) using LUNAR_.Patients were categorized in three groups according to the WHO classification, values under 2.5 standard deviations were considered osteoporosis, values between -1 and -2.5 standard deviations were considered osteopenia, and values superior to -1 standard were considered normal. Statistic analysis between categories of bone density and means in abdominal perimeter and body mass index was performed by analysis of variances.
Results: Frequencies of bone density in lumbar spine were 25%, 49.1% and 25.9% for normal, osteopenic and osteoporotic wom-

en, respectively. For bone density in femur the frequencies were 25.4%, 60.3% and 14.3%. Means of abdominal perimeter were 96.1 cm, 91.0 cm and 89.2 cm respectively in the previously mentioned groups. Means of the body mass index were 30.0 kg/m^2, 27.4 kg/m^2 and 26.5 kg/m^2 in the same groups. Analysis of variances showed a correlation between bone mineral density in lumbar spine and body mass index (p-value 0.0002) and also between lumbar bone mineral density and abdominal perimeter (p-value 0.0003). The same results were obtained when analysing data from bone mineral density in femur for body mass index (p-value 0.0002) and abdominal perimeter (p-value 0.0008).
Conclusions: Body mass index is in tight relation with bone mineral density. Secondary hyperestrogenism has been suggested as the responsible mechanism. Obviously, overweight is not advisable way of improving bone density, as it can lead to other comorbidities. On the other hand, women with low body mass index are at increased risk of osteoporosis, and a normal weight is a goal in postmenopausal women management. Anyway, as the percentage of osteoporosis is high in the general postmenopausal women, we recommend that even obese patients should be screened for osteoporosis.

Disclosure of Interest: None Declared

P696 - LONG TERM EFFECTS OF INTRAVENOUS BISPHOSPHONATES IN PAGET'S DISEASE OF BONE AND INTERACTION WITH SQSTM1 MUTATIONS

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Aims: Recently, the availability of potent amino-bisphosphonates has improved treatment outcomes in Paget's disease of bone (PDB), allowing a more effective and convenient management of this disorder. In this study we analyzed SQSTM1 mutations in 90 patients with active PDB involved in a comparative trial with intravenous amino-bisphosphonates (JBMR 2007, 22:1510).
Methods: At baseline, patients were randomly assigned to receive pamidronate (30 mg, iv, for 2 consecutive days every 3 months; n=60) or zoledronate (4 mg, iv; n=30). After 6 months, 33/60 patients in pamidronate group did not respond to treatment and were crossed over to zoledronate 4 mg (n=18) or neridronate (100 mg, iv, for 2 consecutive days, n=15). Follow-up analysis has been extended to 36 months in all treatment groups. No bisphosphonate was given during the extension study (12 to 36 months) except in case of relapse.
Results: SQSTM1 gene analysis revealed the presence of 4 different mutations (Y383X, P392L, E396X, M404V) in 18/90 patients. At baseline, patients with SQSTM1 mutation showed an increased severity of disease with a higher number of affected skeletal sites and higher alkaline phosphatase levels than patients without mutation. Interestingly, an increased proportion of patients with SQSTM1 mutation showed resistance to pamidronate at 6 months (11/13, 85% vs. 22/47, 47% in patients without mutation, p=0.02). Conversely there was no significant difference in the response to zoledronate between patients with or without mutation at all time points from 6 to 36 months. Overall, therapeutic response to zoledronate was achieved in 97%, 83% and 69% of patients at 12, 24, and 36 months from infusion, respectively. Patients with recurrence of disease were treated with a new zoledronate 4 mg infusion, and all achieved therapeutic response. Among non-responders patients to pamidronate, 93% in the neridronate group and 94% in the zoledronate group achieved therapeutic response after 6 months from cross-over. Response was maintained in 82%, 53% and 41% of patients with neridronate and in 94%, 83% and 67% of patients with zoledronate at 12, 24 and 30 months from cross-over, respectively. All the 3 patients with SQSTM1 mutation sustained clinical relapse between 24 and 30 months from cross-over to neridronate.
Conclusions: These results suggest that PDB patients with SQSTM1 mutation may require a more aggressive treatment regimen for disease remission.

Disclosure of Interest: None Declared

P697 - PRELIMINARY STUDY OF RELATIONSHIP BETWEEN HEPCIDIN AND BONE METABOLISM

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Aims: To realize the preliminary related impacts and relationships between hepcidin and bone metabolism.
Methods: (1) male SD rats were divided into model group and control group. Rats in test group were administered with tretinoin (70mg/kg/d) continuing 14 days to establish the osteoporotic model. Rats in control group were administered with distilled water. Liver Hepcidin gene expression was measured by PT-PCR. (2) Different concentrations Hepcidin were used to intervene hFOB 1.19 cell. Fluorescence intensity of intra-cellular calcium ion and iron ion was observed by CLSM.
Results: (1) In tretinoin osteoporotic model, changes of the relative amount of liver Hepcidin gene expression in control group appear fluctuation which has no significant difference; Compared with the control group, model group were significantly lower than control group in experimental 8th,9th,10th day and the relative amount was lower than control group in early and late model which has no significant difference. (2) fluorescence intensity of iron ion slow decline both in test group and control group observing at instantaneous (1000s) which has non-significant difference. At a long time (20h), fluorescence intensity of Intracellular iron ion gradually strengthened with hepcidin concentration increasing. when the Hepcidin concentration above 100 nmol / l, Fluorescence intensity of Intracellular iron ion strengthened no longer with the increasing concentration of Hepcidin.(3) fluorescence intensity of Intracellular calcium in test group had a transient calcium wave and calcium fluorescence intensity increased. while fluorescence intensity of calcium showed a slow downward trend In control group. two group had significant differences. With hepcidin concentration increasing, the fluorescence intensity of Intracellular calcium strengthened.

Conclusions: (1) hepcidin had a change In the process of establishment of osteoporosis model, which might explain that there was a relationship between hepcidin and osteoporosis. (2) with hepcidin intervention, there was an impact on the concentration of iron ion and calcium in osteoblast. (3) hepcidin as a iron metabolism influencing factor provide a new idea for future study of bone metabolism.

Disclosure of Interest: None Declared

P698 - CHARACTERIZATION OF OSTEOGENIC CELLS FROM BONE MARROW AND PERIPHERAL BLOOD

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Aims: There is increasing evidence that osteogenic cells are present not only in bone marrow (BM) but also in peripheral blood (PB). Since staining for alkaline phosphatase (AP) identifies an osteoprogenitor population in BM, we sought to further characterize BM versus PB hematopoietic lineage negative (lin-)/AP+ cells.
Methods: lin-/AP+ cells were isolated from Ficoll pre-purified mononuclear cells incubated with biotinylated antibodies to B-, T-cells and erythrocytes and sorted by magnetic activated cell sorting. The lin- cell fraction was costained with an AP antibody. Gene expression analysis of lin-/AP+ BM and PB cells was performed by quantitative real-time PCR.
Results: PB lin-/AP+ cells were smaller in size than their BM counterparts, and both populations were negative for the pan-hematopoietic marker, CD45. BM and PB lin-/AP+ cells were capable of mineralization *in vitro*. A number of osteoblast marker genes (runx2, osterix, osteopontin, OPG, periostin) were expressed at similar levels between the two populations. However, AP, col1α1, and col1α2 mRNA levels were markedly lower in PB as compared to BM cells; by contrast, the PB cells expressed higher levels of OCN, osteonectin, PTHR1, and RANKL. Interestingly, virtually all of the proliferation marker genes assayed were expressed at significantly lower levels in PB as compared to BM cells, consistent with the PB cells being a quiescent cell type. PB cells also expressed significantly higher levels of a number of smooth muscle cell marker genes (αSMA, cald1, calponin1), but generally lower levels of pericyte markers. ICAM-1, which may be critical for the support of osteoclastogenesis and is expressed by quiescent cells lining bone surfaces, was expressed at significantly higher levels by the PB cells. Finally, the PB cells expressed very low levels of the adipocytic gene, adiponectin, with a similar trend for lower expression of PPARγ2 and for the cartilage marker, sox9.
Conclusions: Our work provides insights into the relationship between BM and PB osteoprogenitor populations. Further functional characterization of the PB osteoprogenitor cells will ultimately define the biological importance of this intriguing cell population.

Disclosure of Interest: None Declared

P699 - DEREPRESSION OF MOUSE SFRP-4 GENE EXPRESSION BY OXIDATIVE STRESS: A PLAUSIBLE MECHANISM LEADING TO LOW-TURNOVER OSTEOPOROSIS IN DIABETES AND SENESCENCE

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Aims: We propose that a unique mechanism whereby oxidative stress induced by methylglyoxal (MG) (an intermediate metabolite of glucose that increases in the serum or organs of diabetics) is responsible for depressing the secreted Frizzled-related protein 4 (sFRP-4) gene (one of the soluble Wnt inhibitors) resulting in low-turnover osteoporosis.
Methods: Mouse bone marrow stromal cell line ST2 was subjected to quantitative real-time RT-PCR and DNA microarray. The binding between TATA-box binding protein (TBP) or methylcytosine binding protein 2 (MeCP2) and the 5'-flanking region of the sFRP-4 gene was confirmed by electrophoresis mobility shift assay (EMSA) and chromatin immunoprecipitation (ChIP) assay. Furthermore, we generated sFRP-4 gene knock-out (KO) mice and subjected their femoral and tibial bones to three-dimensional microcomputed tomography (3D-μCT) and bone histomorphometric analysis.
Results: *In vitro* MG treatment of ST2 cells revealed that whereas the expression of several Wnt-targeted genes, including that of osteoprotegerin (OPG), was rapidly suppressed, that of sFRP-4 was significantly enhanced. Sodium bisulfite mapping showed that the sFRP-4 gene had a single highly methylated, 2 tandem CpGs located five bases upstream of TATA-box. The EMSA and ChIP assay revealed that oxidative stress enhanced the binding between TBP and the 5'-flanking region of sFRP-4 gene, whereas it reciprocally attenuated the binding of MeCP2 to the region. *In vivo* analysis of the long bones of 50-week-old sFRP-4 KO mice revealed that bone volume/ tissue volume (BV/ TV) by μCT and osteoblastic surface/ bone surface (Ob.S/ BS) by bone histomorphometry were significantly higher than those of wild type mice, whereas eroded surface/ bone surface (ES/ BS) was comparable in both genotypes.
Conclusions: Since oxidative stress by MG restored the expression of the sFRP-4 gene and rapidly and markedly suppressed that of OPG, a target of Wnt/ β-catenin signaling, we hypothesize that rapid bone loss seen in acute oxidative stress, as in acute periodontitis, is due to a rapid increase in osteoclastogenesis by a shift of the RANKL-OPG axis to bone resorption. Furthermore, under persistent oxidative stress, as in diabetes mellitus and aging, osteopenia and ultimately low-turnover osteoporosis may be partly due to osteoblastic inactivation attributed to suppressed Wnt/ β-catenin signal transduction through redundantly activated sFRP-4 expression.

Disclosure of Interest: None Declared

P700 - MORPHOLOGICAL CHARACTERISTICS OF MANDIBULAR BONE IN OSTEOPOROSIS CASES

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Aims: To determine the effect of osteoporosis on mandibular bone tissue condition.
Methods: Studied were 30 samples of bone tissue of 14 men and 16 women who died of acute myocardial infarction (13 cases), insult (12) and alcohol-related pathology (5). The average age for the moment of death was 69.3±14.3. All past histories revealed that all of them had had at least two risk factors of developing osteoporosis in their lifetimes but had never been diagnosed the disease revealed by a postmortem histology. A comprehensive morphologic examination of bone samples of the mandible (the median third's dense layer), its left and right articular processes, the femoral bone epiphysis, and the right iliac crest was made in the Moscow City Centre for Pathologic Anatomy Studies. The samples were decalcified with Biodeck R, routinely immersed in paraffin, made into histologic sections (no less than 2 per sample) by a Leica microtome, and died with hematoxylin and eosin. The mandibular bone matter was obtained using a specially designed instrument constituting a metal tube 1.5 cm in diameter with one edge sharpened. The samples were obtained from within the oral cavity at the above mentioned sites leaving the skin of the face intact. The morphometric studies aimed at calculating the percentages of the extent and volume of bone tissue matrix, resorption cavities and new osteons (newly formed Haversian systems) were made using an Avtandilov ocular net and Leica DM LB microscope.
Results: The volume of matrix in the mandibular bone samples made 39.9±16.6% and in that of the iliac crest 34.6±7.7% (p=0.146). The shares of resorption cavities and new osteons in the two were, accordingly, 56.7±16.7% and62.5±7.8% (p=0.148), and 2.4±1.7% and 3.8±4.4 (p=0.2). The proportion of the shares of matrix, resorption and new osteons in the osteoporosis-hit mandibular bone has been found to be 0.7: 1: 0.004, the correlation analysis revealing but moderate connection (r=0.3, p=0.0012) between the extent of resorption in the iliac crest and the mandible.
Conclusions: The obtained data testify to a simultaneous rise in the volume of bone resorption both of the peripheral and facial skeletons that confirms the systemic nature of osteoporosis and enables to regard mandibular bone destruction as an osteoporosis marker.

Disclosure of Interest: None Declared

P701 - VITAMIN-D STATUS AND DETERMINANTS OF SERUM 25-HYDROXYVITAMIN D LEVELS IN HEALTHY SAUDI MEN > 50 YEARS OF AGE

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Aims: To determine vitamin-D status and the various determinants of serum 25(OH)D in relation to intact-PTH, bone turnover markers (BTMs) and bone mineral density (BMD) among healthy Saudi men > 50 years of age.
Methods: A total number of 560 healthy Saudi men (age: > 50 years) living in the Jeddah area were randomly selected and studied. Anthropometric parameters, socioeconomic status, sun exposure index together with serum levels of 25(OH)D, intact-PTH, minerals, creatinine, albumin and biochemical BTMs were measured. BMD was measured by a dual energy X-ray absorptiometry.
Results: About 15.5% of all men exhibited severe vitamin-D deficiency (serum 25(OH)D<12.5 nmol/L) and 69.3% of exhibited mild vitamin-D deficiency (serum 25(OH)D<50.0 nmol/L) with only 12.7% of all men were considered with adequate vitamin D status (serum 25(OH)D > 75 nmol/L). Increased serum intact-PTH (> 7.0 pmol/L) were evident in 19.1% in men with serum 25(OH)D<50 nmol/L. Serum 25(OH)D showed significant inverse correlations with serum intact-PTH (r=-0.326; P<0.001) and was lower (P<0.001) and intact-PTH higher (P<0.001) in the upper quintiles of BMI and WHR. Multiple linear regression analysis showed that vitamin-D supplementation, BMI, sun exposure index<0.63, high WHR and dietary calcium intake were independent positive predictors of serum 25(OH)D values (R^2=0.29).
Conclusions: Vitamin-D deficiency is highly prevalent among healthy Saudi men > 50 years of age and largely attributed to modifiable risk factors such as vitamin-D supplementation, obesity, exposure to sunlight, and dietary calcium intake.

Disclosure of Interest: None Declared

P702 - BONE QUANTITATIVE ULTRASOUND DOES HELP TO DETECT PATIENTS WITH FRAGILITY FRACTURES: PRELIMINARY RESULTS OF PROF PROJECT IN SALENTO AREA

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Aims: As the risk of bone fractures increases in the presence of osteoporosis, any preventive strategy has to rely upon an early

recognition of people who carry on such a risk. The opportunity to assess bone mineral density and clinical risk factors in a non invasive and radiation free approach was explored in the PROF (Prevention of Osteoporotic Fractures) project which has fostered a synergic efforts of researchers and clinicians in order to prevent osteoporotic fractures in an area of Southern Apulia (Salento) which is characterized by an increased ageing index, as compared to all other Southern Italian Regions. Aim of this study was to investigate the ability of bone quantitative ultrasound (QUS) to detect patients with fragility fractures in postmenopausal women.
Methods: In year 2009, we have screened 1303 postmenopausal women (mean age 62 years old, ranging from 39 to 86) by QUS both at heel and at phalanx anatomic level. Demographic and anamnestic data were recorded for all the patients, including BMI, nutrition, menopause, physical activity, previous fractures, parental fragility fractures. Three categories were *a priori* identified: a) Demineralization, whenever any T-score <-1.0 SD; b) Severe Demineralization, whenever a T-score <-2.0 was observed, corresponding to a higher risk of fracture; c) Osteoporosis, whenever a T-score <-2.5±0.2 (in case of heel) or T-score <-3.2±0.2 (in case of phalanx). Descriptive statistical analyses have been performed in order to assess the ability of bone quantitative ultrasound to detect patients with fragility fractures (i.e. any osteoporotic fracture occurred).
Results: Out of 1303 women, demineralization was observed in 1115 (86%) with a severe osteopenia or osteoporotic status measured in 734 women (453 were found to be frankly osteoporotic). In total, 320 women reported a clinical history of previous fractures following a low energy trauma and, among them, a demineralization condition - corresponded at least to an osteopenic status - was observed in the great majority (98%), being 313 the affected patients. Within them, a demineralization corresponding to a severe osteopenia or osteoporotic status was found in 250 women out of 320 (78%), with 185 of them being frankly osteoporotic patients (58% of the overall fractured ones).
Conclusions: In the *PROF* dataset, quantitative ultrasound testing (QUS) was able to disclose the anatomo-functional basis to justify the presence of fractures in a clinical setting of postmenopausal women.

Disclosure of Interest: None Declared

P703 - INFLUENCE OF CIRCULATING OSTEOBLASTS ON THE ASSOCIATION BETWEEN AORTIC CALCIFICATIONS AND STIFFNESS IN POSTMENOPAUSAL OSTEOPOROSIS

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Aims: Increased arterial stiffness and ectopic artery calcification, two early markers of atherosclerosis and cardiovascular risk, have been documented in women with postmenopausal osteoporosis. Also, an imbalance in the number of circulating osteoprogenitor cells (OPCs) expressing bone-related proteins has been identified in postmenopausal osteoporotic women. We investigated whether an association exists between aortic calcifications and arterial stiffness and the influence of circulating OPCs on vascular calcification process in postmenopausal osteoporosis.
Methods: The number of circulating OPCs was quantified by FACS analysis in 30 newly diagnosed osteoporotic postmenopausal women, not carrying traditional cardiovascular risk factors except for age. OPCs were defined as CD15 negative/alkaline-phosphatase(AP)+ cells. Participants underwent cardiovascular risk factor assessment, measurement of bone mineral density, aortic pulse wave velocity (PWV) as a measure of arterial stiffness, and aortic calcium score by low dose 64-slice computed tomography.
Results: Among osteoporotic postmenopausal women, aortic PWV was significantly associated with aortic calcium score (rho=0.65, p<0.001). Other significant correlates of aortic calcium score included age (rho=0.74, p<0.001), calcium (rho=0.52, p=0.02), HDL cholesterol (rho=-0.44, p=0.04). Also, the number of CD15 negative/AP+ OPCs was positively associated with aortic calcification score (rho=0.45, p=0.03). In multivariate regression analysis the model including age, calcium, HDL cholesterol levels and the log-transformed number of CD15 negative/AP+ cells explained 72% variability of aortic calcium score (Model R=0.85, p<0.001), being age, HDL cholesterol and OPC's number but not calcium levels significant independent predictors of aortic calcium score.
Conclusions: In women with postmenopausal osteoporosis increased arterial stiffness may be significantly explained by an increased ectopic arterial calcification, which in turn is strongly influenced by aging, low HDL cholesterol and the availability of circulating alkaline phosphatase osteoprogenitor cells.

Disclosure of Interest: None Declared

P704 - REDUCED PHYSICAL ACTIVITY CORRELATES WITH OSTEOPENIC OR OSTEOPOROTIC STATUS IN POSTMENOPAUSAL WOMEN: PRELIMINARY RESULTS FROM THE PROF PROJECT

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Aims: Preventive strategies relies mostly upon early recognition of people at higher risk of fractures and clinical risk factors, being relevant the yearly incidence of about 300.000 osteoporotic fractures in Italy. Within the *PROF* (Prevention of Osteoporotic Fractures), i.e. a synergic effort of researchers and clinicians aimed to prevent osteoporotic fractures in Southern Apulia (Salento) – a region characterized by an increasing number of elderly people – we investigated the correlation between reduced physical activity and osteopenic or osteoporotic status in postmenopausal women.

Methods: During 2009, as many as 1414 postmenopausal women (mean age 62 years old, ranging from 39 to 86) by means of quantitative bone ultrasonic measurements (QUS) at heel and at phalanx anatomical level. Demographic and anamnestic data were recorded for all the patients, including BMI, nutrition, menopause, physical activity, previous fractures, parental fragility fractures. Demineralization Three categories were *a priori* identified: a) Demineralization, whenever any T-score <-1.0 SD; b) Severe Demineralization, whenever a T-score <-2.0 was observed, corresponding to a higher risk of fracture; c) Osteoporosis, whenever a T-score <-2.5±0.2 (in case of heel) or T-score <-3.2±0.2 (in case of phalanx). Descriptive statistical analyses have been performed in order to assess the correlation between low physical activity (patients declaring themselves to be completely sedentary) and the osteopenic or osteoporotic status of the patients.
Results: Out of 1414, demineralization was observed in 1115 patients (79%), being severe osteopenia or osteoporotic status in 734 women (52% of the overall examined subjects) and frank osteoporosis in 453 patients (32%). In total, out of the 666 women with a clinical history of reduced physical activity, 618 (93%) presented a demineralization corresponding at least to an osteopenic status. In addition, a status corresponding to a demineralization typical of severe osteopenia or osteoporosis was diagnosed in 434 "sedentary" patients (65%), being 280 of them (42%) frankly osteoporotic.
Conclusions: In the *PROF* dataset, a lifestyle characterized by sedentary habits, is associated to an increased occurrence of osteopenic or osteoporotic status in postmenopausal women.

Disclosure of Interest: None Declared

P705 - IS CHOLECYSTECTOMY A RISK FACTOR FOR OSTEOPOROSIS?

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Aims: Vitamin D is a fat soluble vitamin. Lipids require bile for emulsification and their subsequent absorption. The hypothesis is that decreased bile production following cholecystectomy adversely affects vitamin D solubility and eventually absorption. The aim of our study was to determine whether cholecystectomy adversely affects vitamin D levels and to identify whether or not it is a contributing factor to the development of osteoporosis.
Methods: This was a retrospective case-control study examining the vitamin D levels in patients presenting to the Bone Health Clinic with osteoporosis having had previous cholecystectomies (at least five years prior to presentation). These vitamin D levels were compared to those of a similar cohort of outpatients, matched for age and gender, without previous cholecystectomy. In this study, we analysed the results of 26 patients with previous cholecystectomy (mean ±SD) (aged 63 ±10.3 yrs, 29 female, 1 male) and no prior vitamin D supplementation. The results were compared to a control group of patients (aged 62.8±11.1 yrs, 29 female, 1 male) without previous cholecystectomy or prior vitamin D supplementation. The clinical parameters of bone mineral density (BMD) of hips and spine as well as levels at presentation of vitamin D, parathyroid hormone (PTH) and corrected calcium were compared to controls.
Results: The results revealed that the vitamin D levels of patients with previous cholecystectomy at presentation (36.4 ±26.8) were significantly lower (p=0.031) than those of controls. However, comparison of clinical parameters between the two groups were not statistically significant - BMD spine (p=0.55), BMD hip (p=0.7), PTH levels (p=0.72) and corrected calcium levels (p=0.45).
Conclusions: Patients presenting with osteoporosis who have had previous cholecystectomy have lower vitamin D levels than age and gender matched controls without previous cholecystectomy. However, this lower vitamin D level does not appear to impact clinically on BMD spine or hips nor on PTH or corrected calcium levels. Cholecystectomy appears to adversely affects vitamin D levels and it may be a contributing factor to the development of osteoporosis. Further studies are required to determine the need for routine vitamin D supplementation post cholecystectomy.

Disclosure of Interest: None Declared

P706 - SEVERE CARDIAC ARRHYTHMIA AS ONSET IN PRIMARY HYPERPARATHYROIDISM: CASE REPORT

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Aims: Primary hyperparathyroidism (HPT) is a disease with an asymptomatic phenotype as registered during the last years. There are still cases with complications and some of them are unusual as atrial fibrillation, especially in a patient with unknown previous cardiac disease. We present a patient with primary HPT manifested as cardiac arrhythmia.
Methods: There is a case study, showing a rare form of clinical presentation of primary hyperparathyroidism. The diagnosis was sustained on the finding of high calcium serum levels concomitant with high PTH blood levels.
Results: 63 ys old female presents recurrent paroxistic atrial fibrillation episodes from the last year, first regarded as a part of a cardiac ischemic disease. A blood ionogram pointed high serum calcium, so she was referred to endocrinology. Persistent increased calcium values are discovered (10.34mg/dL, respective 10.29mg/dL) with very increased PTH levels (1020 pg/mL, normal 10-71) and low serum phosphorus (1.93, respective 1.87mg/dL). Primary HPT is diagnosed. Osteoporosis is also diagnosed. Imagistic findings showed a cervical nodule, a possible parathyroid adenoma of 1.42 by 0.86 cm as ultrasound showed. The Tc 99m scintigram confirmed it. The cardiac complications as class III NYHA cardiac insufficiency (58% ejection fraction) and left ventricular hypertrophy are also presented. The parathyroid adenoma is removed with precaution due to the cardiovascular risk, including hypercalcemia and arrhythmia. The histological exam showed a parathyroid adenoma of 7 grams. Hypoparathyroidism

was diagnosed after surgery and properly treated with calcium and vitamin D. The most interesting aspect is the fact than very soon after surgery; sinusal rhythm was spontaneously registered. This points the role of high serum calcium in cardiac metabolism.

Conclusions: Hypercalcemia induced atrial fibrillation has a good prognosis once the cause is established and treated. Practitioners should be aware about the calcium involvement into the cardiac rhythm. Nevertheless, the symptomatic primary hyperparathyroidism, especially with cardiac complications as dominate element is a rare situation today. Due to the fact that the heart was previously intact, the normalization of cardiac rhythm was registered.

Disclosure of Interest: None Declared

P707 - THE FRAGILITY FRACTURE PHENOTYPE – A 611 OSTEOPOROTIC POSTMENOPAUSAL WOMEN STUDY

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Aims: The fragility fracture in patients with osteoporosis is the main concern, regardless the bone mineral density revealed by DXA exam. In patients with the same values of BMD, some have fractures more frequently, suggesting that there are several factors that also influence this risk as body mass index (BMI), age, years after menopause in women. We studied two groups of osteoporotic postmenopausal women: with and without fragility fractures.

Methods: A retrospective study was performed on 611 postmenopausal women diagnosed with osteoporosis by DXA exam. The patients with secondary causes of osteoporosis were excluded. The group 1 included 202 women with fragility fractures. The group 2 included 409 patients with no fragility fractures known at diagnosis. The serum bone parameters and the clinical phenotype in the two groups were analyzed. The statistical analysis was performed by t student test (statistically significant at $p<0.1$).

Results: All the patients were diagnosed with osteoporosis by DXA. 97% of each group was under antiosteoporotic therapy. 13.63% of patients from the first group were smokers while 18.19% from the second group. The BMD was 0.773±0.09 g/cm^2 vs. 0.796±0.1g/cm^2. The t test was 0.16, meaning that the two groups were not different regarding the BMD. The age at diagnosis was 63.56±9.6 yrs (range between 35 and 88 yrs) vs. 59.75±9 yrs (range between 24 and 84 yrs). The t test between the groups was 0.0001. The average serum total calcium was 9.4 mg/dL±0.6 (normal between 8.5 and 10.2 mg/dL) vs. 9.54 ±0.5 mg/dL, with p=0.2. The average serum phosphor was 3.56 mg/dL±0.9 (normal between 2.5 and 4.5 mg/dL) vs. 3.51 ±0.6 mg/dL, with p=0.15. The 25 $(OH)_2$ vitamin D level was not different between groups (p=0.16), with values of 17.64±7.3 ng/dL vs. 19.75±16.5 ng/dL. The average serum iPTH was not statistically different (p=0.18) 81.38±54.6 pg/mL vs. 91.05 ±73.7 pg/mL. The bone turn-over markers analysis revealed similar values between the studied groups. The postmenopausal years were 14.44±8.4 yrs vs. 18.35±9.2 yrs (p=0.08). The BMI was 24.23±4.16 kg/m^2 vs. 24.94 ±4.21 kg/m^2 (p=0.05).

Conclusions: The most frequent fractures were vertebral (almost one third of the patients). There were no differences related to the BMD, serum calcium and phosphorus, serum 25 $(OH)_2$ vitamin D, or bone turn-over markers between the two groups. The patients with fragility fractures were older, but with lower BMI (statistically significant results).

Disclosure of Interest: None Declared

P708 - ASSOCIATIONS BETWEEN HYPERCHOLESTEROLEMIA AND DECREASED BONE MINERAL DENSITY IN CHILDHOOD OBESITY

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Aims: Potential relationship between obesity and fragility risk has been reported in adults although the results are inconsistent. There are no published data on lipid profile and bone mass during growth. The aim of this cross-sectional study was to investigate associations between serum lipids, bone mass and fractures in obese children and adolescents.

Methods: Body composition, bone mineral content (BMC) and density (BMD) were determined in the total body and lumbar spine region using dual energy X-ray absorptiometry (DXA), and fasting serum cholesterol, LDL, HDL and triglycerides were measured in 164 overweight/obese subjects (88 girls, 76 boys) aged 5.5 – 17.9 years (mean±SD: 12.9±3.1) whose mean body mass index (BMI) was 28.8±5.0 and BMI SDS was 3.79±1.8.

Results: Normal or high bone mass was found in 85% subjects with obesity (Z-score for L1-L4 BMD was +0.32±1.5) of which 56 subjects (34.1% of girls, 34.2% of boys) had sustained at least one low-energy fracture (forearm, wrist, tibia, ankle, humerus). In girls, negative correlations were observed between total cholesterol (mean: 167.8±32.2mg/dl) and lumbar spine BMD Z-scores (r=-0.34, p=0.005). Similar trend occurred for LDL in this group. Obese girls with hypercholesterolemia (i.e. total cholesterol level >160mg/dL) had lower lumbar spine BMD (Z-score: +0.20±1.38) compared to those with normal cholesterol level (Z-score: +1.01±1.34; p=0.03). No such associations were found in boys. Fracture prevalence among obese children was similar to that of general population and was independent of BMD/BMC or serum lipids.

Conclusions: Our data show that obese girls with elevated cholesterol levels are at risk of cardiovascular disease and osteoporosis. Lack of the associations in boys requires further investigation. However, coincidence of high circulating cholesterol and low BMD during growth announces possible associations between atherosclerosis and osteoporosis in later life.

Disclosure of Interest: None Declared

P709 - THE PROTEOMIC ANALYSIS OF PLASMA PROFILES IN CHILDREN WITH RECURRENT BONE FRACTURES – A PILOT SURVEY

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Aims: The aim of the study is to try to explain the aetiopathogenesis of repeated bone fractures based on proteomic plasma protein profile analysis in children with recurrent fractures of unknown aetiology and in patients with recurrent fractures in the course of osteogenesis imperfecta.
Methods: The study involved 16 children: 6 patients with recurrent low-energy fractures and normal bone mass and 10 with osteogenesis imperfecta. In the analysis of the protein profile, the two-dimensional protein electrophoresis was used (Ettan DALT II, Amersham Bioscience). The images of protein gels were compared with controls. The protein spots with changed expression were cut away from gel and amino acid sequence was analyzed with the mass spectrometry method (Q-Tof Premier™ API MASS SPECTROMETR, Waters) for protein identification.
Results: In the studied group of patients proteins were detected whose expression was changed with respect to controls as well as proteins that appeared only in the individuals affected by recurrent fractures. The most prevalent protein with changed expression, with respect to controls, was haptoglobin observed in 6 patients with osteogenesis imperfecta. In one child, peptides corresponding to α-1 acid glycoprotein and serum amyloid P-component, in two – apolipoprotein A-I and in three - transthyretin were detected.
Conclusions: 1. The results show increased expression of some acute-phase proteins which may be suggestive of an inflammatory component taking part in the course of osteogenesis imperfecta.

2. Further studies of patients with increased expression of transthyretin, apolipoprotein A-I and serum amyloid P-component protein must be performed to explain the possible relationship of these proteins with recurrent bone fractures.

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Disclosure of Interest: None Declared

P710 - CIRCULATING VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF) CONCENTRATIONS IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS: CORRELATION BETWEEN VEGF LEVELS, AND BONE MINERAL DENSITY

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Aims: Recently, it has been suggest that vascular endothelial growth factor (VEGF) may can important modulating factor for bone remodelling, VEGF could have a direct effect on osteoprogenitor cells, mainly by promoting the differentiation of osteoblasts. In the present study, our objective was investigate serum VEGF concentrations in patients with postmenopausal osteoporosis (PMO) and correlate with bone mineral density (BMD).
Methods: This study was performed in 35 PMO patients, and age matched 30 healthy controls . Serum VEGF concentrations were measured using a quantitative sandwich enzyme immunoassay technique according to manufacturer's instructions. Bone mineral density was determined by DXA.
Results: Serum VEGF concentrations were statistically significantly lower ($p < 0.01$) in patients with PMO than in controls. A positive correlation was found between serum VEGF concentrations and BMD values ($r=0.63, p<0.01$)
Conclusions: In conclusion, we have demonstrated that VEGF concentrations were decreased in PMO patients and VEGF may play an important role in bone healthy.

Disclosure of Interest: None Declared

P711 - OXIDATIVE STRESS AND RELATION TO BONE MINERAL DENSITY IN POSTMENOPAUSAL OSTEOPOROSIS

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Aims: It has been reported that postmenopausal osteoporosis induces oxidative stress and causes adaptations in antioxidant defences. The aim of the present study was to investigate the serum antioxidant enzymes activities in postmenopausal osteoporosis patients and healthy controls; and to determine the correlation between these enzymes and bone mineral density (BMD).
Methods: The antioxidant enzymatic activities consisting of superoxide dismutase (SOD), glutathione peroxidase (GPX), glutathione S-transferase (GST) and malondialdehyde (MDA) activities were determined as an indicator of antioxidant defences in 35 postmenopausal osteoporosis patients and compared with age matched 30 healthy controls. Antioxidant enzymes levels were measured by spectrophotometer and BMD were measured by DXA. Independent samples t test was used to compare the data between the two groups.
Results: SOD, GPX and GST levels were significantly lower ($p<0,05$, $p<0,01$, $p<0,01$, respectively) but MDA levels were significantly higher in postmenopausal osteoporosis patients than healthy controls. There was no significant correlation between the antioxidant enzymes activities and BMD.
Conclusions: In conclusion, we have demonstrated that oxidative stress markers may be an important indicator for bone loss in postmenopausal osteoporosis patients.

Disclosure of Interest: None Declared

P712 - VITAMIN D LEVELS, CREATININE CLEARANCE AND THEIR ASSOCIATION WITH BALANCE ABILITY AND MUSCLE STRENGTH IN KNEE OSTEOARTHRITIS

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Aims: To examine the affect of serum active vitamin D (1,25 (OH)D) levels and creatinine clearance (CrCl) on balance ability and muscle strength in patients with knee osteoarthritis.
Methods: Twenty-five women with radiographic knee osteoarthritis (OA) (Kellgren-Lawrence grade 2-3) with knee pain (61.7±6.5 years) and 20 healthy women (56.9±5.5 years) enrolled in this study. The intensity of pain was measured by visual analog scale (VAS). Clinical balance tests performed were Berg balance scale (BBS), short physical performance battery test (SPPBT) and tandem walking. Balance ability was also measured by kinesthetic ability trainer 3000 (KAT) with static and dynamic protocols. Isokinetic strength measurements of both knee flexor/extensors (60º and 180º/sec angular velocities) and both ankle dorsiflexor/plantar flexors (30º and 120º/sec angular velocities) were assessed using the Cybex Norm isokinetic dynamometer. 1,25 (OH)D levels and CrCl were determined in all study participants.
Results: In OA group, pain-VAS and tandem walking time were significantly higher than the control group ($p<0.001$ and $p=0.005$, respectively). In OA group, BBS scores ($p<0.001$), SPPBT-scores ($p<0.016$), mean peak torque values of knee extensor ($p=0.043$ for 60º and $p=0.047$ for 180º/sec), knee flexor ($p= 0.033$ for 60º and $p=0.040$ for 180º/sec), ankle dorsiflexor ($p=0.004$ for 30º and $p=0.005$ for 120º/sec) and 1,25 (OH)D levels ($p=0.032$) were significantly lower than the control group. There was positive correlation between 1,25 (OH)D levels and mean peak torque values of knee extensor at 60º/sec ($p=0.045$; $r=0.303$), ankle dorsiflexor at 30º/sec ($p=0.013$; $r=0.371$), and ankle plantar flexor at 30º/sec ($p=0.045$; $r=0.304$). There was no statistically significant correlation between 1,25 (OH)D levels and BBS scores, static and dynamic balance indexes measured on KAT.
Conclusions: Decline in balance ability and muscle strength is common in patients with knee osteoarthritis. Vitamin D deficiency may contribute to decrease in muscle strength seen in osteoarthritis or immobilization as a consequence of knee osteoarthritis. Therefore vitamin D status should be cautiously investigated in patients with knee osteoarthritis.

Disclosure of Interest: None Declared

P713 - RISK FACTORS FOR OSTEOPOROTIC HIP FRACTURES: CYTOKINES, TRACE ELEMENTS AND VIT D

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Aims: In aging men and women with low bone mineral density (BMD) hip fractures occur as the results of osteoporosis. Today, the most important topic is to establish the fracture risks and prevent the hip fractures. The aim of our study was to determine the levels of cytokines, trace elements and vit D for to associate them with hip fracture risk.
Methods: Sixty-two patients with osteoporotic hip fracture (41 female/ 21 male, mean age 76.26±6.65, 77.28±7.32, respectively) were included in the study. All fractures were due to low energy trauma, simple falls. None of the patients had neoplastic pathology of bone, long-term corticosteroid usage, bone metabolism disease or arthritis and any other metabolic disease. BMD measurements were done with Lunar DXA. The measurements were performed on the intact side of the hip and measurements were obtained as femoral neck, wards, trochanteric and total BMD values. Human interleukin-6 (IL-6, pg/mL) was determined by a solid phase sandwich Enzyme Linked-Immuno-Sorbent Assay (ELISA) (BioSource Immunoassay Kit, BioSource International, Inc, California, USA). Human interleukin-1β (IL-1β, pg/mL) was also done by the same method with BioSource Immunoassay Kit (BioSource International, Inc, California, USA). Magnessim (Mg, mmol/L), Copper (Cu, μmol/L), Zinc (Zn, μmol/L) were measured by colorimetric methods with autoanalyzers, 25-OH Vitamin D3 (nmol/L) was by RIA method.
Results: Neck, trochanter and total BMD values were in agreement for osteoporosis. The mean and standard deviation values for IL-6 (68.61±56.41) and Cu (19.13±4.02) levels were higher than the reference intervals, Mg (0.85±0.14), 25-OH Vit D (60.09±78.35) and IL-1β (4.06±0.46) values were in reference interval and Zn (9.29±2.85) level was lower than the expected values.
Conclusions: The increased levels of inflammatory mediators/cytokines such as IL-6 and the trace element, Cu can be determined as a risk factor for hip fractures in which the decreased levels of Zn can indicate an insufficient antioxidant enzyme system and its deficiency can lead to a variety of nutritional and vascular disorders that can also be another risk factor for osteoporotic hip fractures.

Disclosure of Interest: None Declared

P714 - ASSOCIATION BETWEEN HPA AXIS HYPERACTIVITY, OBESITY, LEPTIN AND BONE TISSUE IN STRESSED MOTHERS OFFSPRING

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Aims: To investigate the effect of the maternal stress within early pregnancy on offspring sensitivity to stress in comparison with their nutrition behavior, the visceral adipose tissue formation, the leptin level and remodeling of bone tissue.
Methods: Pregnant Wistar rats (n=60) were randomized into the control group (G-1) and the rats exposed to social stress from the 2nd day up to 8th day of pregnancy (G-2). The female offspring of all mothers' (OG-1, OG-2, accordingly) were studied at the age of 12 months. The weights of body, visceral fat and hips, hormonal levels were measured before and after food deprivation (during 48 h) and immobilization. Food consumption was determined by placing of fodder in the individual home cages and weighting the residual food in 24 h. Hormone concentrations were determined by IFA methods. The histological examinations of the bone were performed using the microscope "Olympus" with a computer of microstructure. All data were estimates by statistical methods, P<0,05 was considered significant.
Results: It has been established that OG-2 were heavier by 20-23± than OG-1 in basal state and their mesenteric fat weighted more by 5-7± though they took the same food for 24 h. The E_2 level in OG-2 and progesterone decreased, testosterone increased, corticosterone (CORT), leptin and insulin were not distinguished from OG-1. The long bones of OG-2 weighed less than OG-1 though their microstructure was not variable. After food deprivation body weights and the leptin level decreased but the concentration CORT increased in both offspring groups. 48 h fast did not influence on OG-1 and OG-2 bones. At the period of the rest after food deprivation the OG-2 leptin as well as the weight of the their fat tissue increased more than in OG-1 (P<0,05). The immobilization caused the profound CORT increase and activated resorption processes, particularly in sponge substance bone. If the immobilization was combined with fast process, CORT increased by 25-30±, fat mass and leptin deponents drop down. Under these conditions there were revealed not only trabecular bone losses in metaphysis but the formation of numerous osteoporotic loci in OG-2 diaphysis hips.
Conclusions: Our findings confirmed that offspring of stressed mothers have an eminent risk of osteopathies, particularly, when the stress is accompanied by the body weight loss and a decrease in the leptin concentration.

Disclosure of Interest: None Declared

P715 - BONE TURNOVER MARKERS, HIP AND SPINE BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN WITH DEFICIENT CALCIUM INTAKE

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Aims: To determine the relationship between calcium (Ca) intake and bone turnover markers, C-terminal telopeptide of type I collagen (CTX) as a bone resorption marker and N-MID Osteocalcin (OC) as a bone formation marker, as well as hip and spine bone mineral density (BMD) in postmenopausal women.
Methods: Postmenopausal women (N=108) were divided in 3 groups according to their Ca intake: 1stgr. with Ca intake <500mg/day, 2ndgr. 500-1000mg/day and 3rdgr. >1000mg/day. CTX and OC were determined by immunoanalytical in vitro method for quantitative hormone determination ECLIA, ECL-technology by Roche Elecsys 1010/2010 analyzer. Spine and hip BMD as well as T-score were determined with dual-energy X-ray absorptiometry (Lunar DPX – NT Madison, USA).
Results: CTX levels were 0.57±0.24 ng/ml in the 1stgr., 0.49±0.21 ng/ml in the 2ndgr. and 0.39±0.21 ng/ml in the 3rdgr., and they were significantly different among the groups (p<0.007). OC levels in the 1stgr were 26.47±10.35 ng/ml, in the 2ndgr. they were 25.2±7.98 ng/ml and in the 3rdgr. 23.23±9.45 ng/ml. There was no significant difference between the groups. Mean hip neck BMD was 0.77±0.09 gr/cm^2 in the 1stgr, 0.81±0.09 gr/cm^2, in the 2ndgr and 0.85±0.13 gr/cm^2 in the 3rdgr (p<0.022). Mean trochanter BMD in the 1stgr was 0.65±0.11 gr/cm^2, 0.69±0.09 gr/cm^2 in the 2nd gr and 0.72±0.12 gr/cm^2 in the 3rdgr (p<0.05). Mean neck T-score was -1.66±0.82 in the 1st gr, -1.39±0.84 in the 2nd gr and -0.98±1.13 in the 3rd gr (p<0.023). Mean± of hip BMD reduction in the 1st gr was 27±11.36%, in the 2ndgr. 19.55±10.63% and in the 3rd gr it was 16.6±11% (p<0.005). Mean spine BMD in the 1stgr was 0.9±0.14, in the 2nd gr 0.94±0.14 and in the 3rdgr 1±0.1 (p<0.05). Mean spine T-score was -2.01±1.17 in the 1stgr, -1.73±1.11 in the 2ndgr, and -1.57±1.3 in the 3rdgr.
Conclusions: Long-term lower Ca intake induces increased bone turnover with significantly higher CTX levels, and not significant OC increase as well as significant hip and spine BMD and T-score lowering. Ca deficit is characterized with higher bone turnover, increased bone resorption and insufficient bone formation, indicating increased bone loss and increased osteoporotic risk. Ca deficit is very important risk factor for osteoporosis development and bone turnover markers disturbance. Bone turnover markers are important in determining of the osteoporotic risk in postmenopausal women with deficient Ca intake.

Disclosure of Interest: None Declared

P716 - OSTEOPROTEGERIN, SOLUBLE RANK LIGAND, IL-17A AND COMP SERUM LEVELS AND THEIR RELATIONSHIP WITH BONE MINERAL DENSITY IN PATIENTS WITH LIMITED AND DIFFUSE SYSTEMIC SCLEROSIS

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Aims: To evaluate a possible relationship between the serum OPG, sRANKL, IL-17A and COMP levels, and bone mineral density (BMD) in patients with limited (lSSc) and diffuse systemic sclerosis (dSSc).
Methods: Forty patients with SSc (38 females, 2 males), age 55.5 yrs (30-79), with lSSc (n=21), dSSc (n=19) and healthy controls (n=40) were analyzed for BMD and T-scores of lumbar spine and total hip by dual energy X-ray absorptiometry (DXA) using Lunar Prodigy device. Serum levels of soluble mediators were determined using ELISA. Statistical data analyses were done using chi-square test, Mann Whitney-U test and Spearman's rank correlation.
Results: The frequency of densitometric osteoporosis/ osteopenia was not significantly different among the patients with lSSc, dSSc and healthy controls (p=0.378). The study groups did not differ with regards to age, gender, duration of menopause and body mass index. The patients with lSSc had longer duration of the disease than those with dSSc (9.8yrs± 6.8 vs. 5.6yrs± 5.7, p=0.019). The lumbar spine and total hip BMD and T-scores were not significantly different among the subsets of SSc patients and controls. Serum OPG levels in dSSc patients (10.1pmol/L± 3.9) were significantly lower than the lSSc patients (11.9pmol/L ±3.1, p=0.019) or healthy controls (11.1pmol/L±2.7, p=0.042). Serum sRANKL and sRANKL/OPG ratio did not differ significantly between dSSc and lSSc patients. However, sRANKL (0.05 pmol/L ±0.08 vs. 0.22±0.35, p=0.022) and sRANKL/OPG ratio (0.005±0.009 vs. 0.02±0.03, p=0.024) in lSSc patients were significantly lower than the controls. Serum IL-17A was markedly lower in patients with dSSc (2.6pg/ml±6.9) and lSSc (8.4pg/ml±20.2) than the controls (57.9 pg/ml±45.9, p=0.000 for both), whereas serum COMP levels were significantly increased (p=0.021 and p=0.000, respectively). We observed a negative correlation between serum IL-17A levels and lumbar spine BMD (Spearman's rs=-0.527, p<0.05) and T-scores (rs=-0.527, p<0.05) in patients with dSSc.
Conclusions: Lumbar spine and total hip BMD and T-score values were not significantly different among SSc patients and healthy controls. IL-17A may be of importance in bone remodelling in patients with diffuse SSc. Decreased serum sRANKL and RANKL/OPG ratio might be involved in protection against bone resorption in patients with limited SSc.

Disclosure of Interest: None Declared

P717 - AGE-RELATED EFFECTS ON BONE MASS AND BONE GEOMETRY IN TREATMENT – NAÏVE POSTMENOPAUSAL WOMEN: A TIBIA PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT) STUDY

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Aims: We assessed the effect of aging on bone mass and geometry in treatment-naïve postmenopausal women, using pQCT of the tibia.
Methods: We examined 219/1239 patients evaluated for osteoporosis between 2004 -2006. Inclusion criteria: 1) Sex (female), 2) menopausal status ≥1y 3) pQCT of the tibia at first visit. Exclusion criteria: 1) Previous use of medications for osteoporosis (except from Calcium/vit. D supplements), 2) Secondary causes of osteoporosis (Hyperthyroidism, Hyperparathyroidism, glucocorticoids per os, rheumatoid arthritis, antiepileptic drugs) 3) Other bone metabolic disorders. Patients were separated in 3 age groups: A=48-59y (N=80), B=60-69y (N=84), C=70-80y (N=55). All underwent tibia pQCT (Stratec XCT-2000 scanner, Stratec Medizintechnik, Pforzheim, Germany) and 3 slices were obtained at the 4% (trabecular bone), 14% (subcortical bone) and 38% (cortical bone) of tibia length sites. We studied 15 variables for each slice, mainly trabecular content (TRB_CNT), trabecular density (TRB_DEN), cortical content (CRT_CNT), cortical density (CRT_DEN), trabecular area (TRB_A), cortical area (CRT_A), mean cortical thickness (CRT_THK), periosteal circumference (Peri- C), endosteal circumference (Endo-C), and tibia length. We performed statistical analysis (t-test, ANCOVA), data is expressed as mean±standard deviation (S.D.) and as percentages.
Results: There were no differences between the 3 age groups concerning tibia length (356.95±17.72 vs. 357.06±18.97 vs356.72±19.41, p=0.208). All parameters of mass and density decreased significantly from group A to group C: TRB_CNT declined 18.87% (87.09±17.24mg/mm vs. 81.70±17.01 vs. 70.65±16.45, p<0.0005), TRB_DEN declined 22.03% (194.81±32.29mg/cm^3 vs. 179.69±34.05 vs. 151.88±30.94, p<0.0005), CRT_CNT declined 14.84% (282.63±38.63mg/mm vs. 270.15±41.77 vs. 240.66±39.62, p<0.0005), CRT_DEN declined 4.19% (1144.62±39.63mg/cm^3 vs. 1128.03±38.22 vs. 1096.61±49.10, p<0.0005). Geometrical parameters also showed significant changes: CRT_THK declined 15.89% (4.53±0.57mm vs. 4.31± 0.65 vs. 3.81± 0.64, p<0.0005), CRT_A declined 11.24% (246.85±32.85mm vs. 239.11±34.07 vs. 218.87±31.35, p<0.005), Peri_C increased 1,58% (68.81±3.88mm vs. 69.31±4.01 vs. 69.90±3.90, p=0.296) while Endo_C increased 13,98% (40.34±4.51 vs. 42.25±5.44 vs. 45.98±6.07, p<0.0005).
Conclusions: Bone mass, density and geometry are significantly altered with age in postmenopausal women. pQCT of the tibia is sensitive in detecting age related changes in the clinical setting.

Disclosure of Interest: None Declared

P718 - VERY LOW-DOSE BIRTH CONTROL PILLS RETARD BONE GROWTH

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Aims: The aim of this study was to evaluate changes of BMD and biochemical markers of bone turnover in healthy adolescents and in users of combined oral contraceptives (COC) with different estrogen content.
Methods: The study involved 82 healthy girls aged 15 – 18 years, a period during which they should be accumulating bone density. Twenty-eight were given no medications and served as controls. The other 54 were randomly assigned to oral contraceptives with either 30 or 15 mcg of ethinyl-estradiol in combination with gestodene in cross-over design of 9 month intervention each in reverse order. BMD measured at the hip, lumbar spine (LS), distal forearm and whole body (DXA), and serum biochemical markers of bone turnover, intact N- terminal propeptide of type I procollagen (PINP), type 1 collagen cross-linked C-telopeptide, and N-MID osteocalcin were assessed at the beginning and at the end of each intervention period.
Results: In healthy COC non-users, BMD increase was observed at all measured locations during 18 months; it reached significance at the LS (2%) and distal radius (3%). In COC users, no significant BMD increase was observed, with the exception of LS BMD in the group using 30 mcg EE ($p<0.05$). In the cross-over design assessment, a significant difference between the low- and very low dose COC users was found in LS BMD changes ($p<0.05$), where BMD increase was prevented to the highest degree in the 15 mcg EE users. Serum E2 was significantly lower in COC users in comparison with the controls ($p<0.05$). Serum markers decreased continuously (PINP by 40%). Increase of BMD at the LS, distal radius and total body was impaired namely in 15 mcg COC users. COC use was associated with a significant decrease in biochemical markers (PINP by 40% during 9 months). However, switching from 30 to 15 mcg after 9 months resulted in a significant increase in biochemical markers of bone turnover (PINP by 20%) and decrease in the LS BMD (by 1%).
Conclusions: Physiological acquisition of LS BMD can be significantly hampered by the use of combined oral contraceptives, especially those with very low dose of ethinyl-estradiol suppressing endogenous estrogen release without fully replacing it.

Disclosure of Interest: None Declared

P719 - IS DAYTIME WORK A RISK FACTOR FOR LOW SERUM VITAMIN D LEVEL?

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Aims: The aim of the study was to evaluate the serum 25 hydroxy vitamin D levels in nurses working at a general public hospital and to point out the factors affecting the serum level.
Methods: A cross-sectional comparative study was conducted at Okmeydanı Training and Research Hospital among nurses. 60 nurses were enrolled;30 from reanimation(RA) clinic, 30 from in-patient(IP) clinics. Demographic and medical history information, feeding and sunbathing habituations, dressing style(veiled or unveiled) and working time(day time or night time) data were recorded. Serum vitamin(vit) D, parathyroid hormone(PTH), routine biochemical parameters were measured. Daily calcium(Ca) and vit D intake quantity by food was calculated by a dietician for each nurse. Parameters between the groups were compared by Pearson's correlation and chi-square test. $p<0.05$ was accepted statistically significant.
Results: RA nurses were working daytime during half of the month and night time during the other half but IP clinic nurses were working day time during the whole month. Demographic and medical history data, body mass index, dressing style and daily vit D amount taken by food were identical between the groups. Sunbathing habituation and daily Ca intake with food was significantly lower in the RA group. But serum vit D levels were lower in the IP group ($p=0.032$). In the RA group serum glucose, total protein, albumin and total Ca levels were significantly lower, creatinine and alanin transaminase(ALT) levels were higher and all the measurements were within the normal range(Table 1).

Table 1: Significantly different parameters regarding two group.

	In-patient group	Reanimation group	p
Ca intake/day	534.17±184.55	419.93±182.28	0.019
Glucose	87.7±10.32	79.77±9.43	0.003
Creatinine	0.72±0.15	0.89±0.15	0.0001
Total protein	7.32±0.43	6.91±0.4	0.0001
Albumin	4.29±0.25	4.03±0.22	0.0001
Ca	9.31±0.53	8.84±0.41	0.0001
ALT	12.87±5.72	18.03±12.64	0.046
Vit D	39.94±19.21	29.85±16.27	0.032

Conclusions: It's known that direct sunlight exposure is the most important source of vit D for the body. In this study the only suggestive variable for significantly lower levels of vit D in the IP clinic nurses was the working time. IP clinic nurses were working always daytime, but RA nurses were working daytime and night time during one month equally. We hypothesize that working in closed buildings is a risk factor for low vit D levels in the serum. But working time of the day can be an additive factor for low vit D in indoor workers.

Disclosure of Interest: None Declared

P720 - LEPTIN LEVEL AMONG POSTMENOPAUSAL OSTEOPOROTIC EGYPTIAN FEMALES

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Aims: To study the association between plasma leptin concentration and osteoporosis among postmenopausal Egyptian females.

Methods: One hundred thirty postmenopausal women were recruited from the Geriatric outpatient clinic for the study, aging 60 years and above. They were 65osteoporotic females with 65 age matched nonosteoporotic females as their control

-The diagnosis of osteoporosis was based on bone mineral density (BMD) measurements. Patients with BMD 2.5 standard deviations below a reference range established by using dual energy X-ray absorptiometry DXA scan (*T-score* less than 2.5) were accepted as having osteoporosis.

Exclusion criteria:

*Patients with established medical conditions known to alter BMD and may cause secondary osteoporosis e.g. patients have hyperthyroidism, hyperparathyroidism, chronic renal insufficiency, chronic liver disease and malignancy.

*Patients receive drugs for treatment of osteoporosis in previous 6 months like bisphosphonates, hormone-replacement therapy (HRT) calcium, vitamin D, calcitonin.

*Any chronic or continued use of drugs that are known to affect bone metabolism e.g. glucocorticoids, heparin, anticonvulsants, diuretics & cytotoxics.

Tools of assessment:

- Comprehensive geriatric assessment was done for each participant including measuring weight, and height and calculating the body mass index(BMI)

- Each participant had bone density measurement by DXA using lunar (DPX MD+) on hip & lumbar spine.

- Plasma leptin concentrations was determined by using the DRG® Leptin enzyme-linked immunosorbent assay (ELISA) kit, provided materials for the quantitative determination of Leptin in serum and plasma.

- After overnight fasting, blood samples was collected, centrifuged and separated until required for the leptin assay. All plasma samples were run in the same assay.

Results: the mean age of the studied group was 65.61±4.37, mean age at menopause was 51.17±3.34, and menopause duration was 14.31±5.22 . The mean level of leptin was 21.53±5.73 with statistically significant difference between non-osteoporotic (23.62±6.18), and osteoporotic (19.44±4.38) (t=4.45, p=0.000). Significant positive correlation was found between leptin and BMI (r=+0.756, p=0.000), lumbar BMD (r=+0.463, p=0.000), and femur BMD (r=+0.646, p=0.000), but not with age (r=-0.162, p=0.066). lower level of leptin is associated with osteoporosis independent of age.

Conclusions: osteoporosis is associated with lower leptin level . Using leptin level as prediction for osteoporosis needs further study.

Disclosure of Interest: None Declared

P721 - POOR MICROARCHITECTURE IN OLDER MEN WITH VITAMIN D DEFICIT AND SECONDARY HYPERPRATHYROIDISM – THE STRAMBO STUDY

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Aims: The aim is to study the relationship of bone microarchitecture with serum levels of parathyroid hormone (PTH) and 25-hydroxycholecalciferol (25OHD) in men.

Methods: We analyzed the association of bone microarchitecture at distal radius and tibia assessed by HR-pQCT with the serum levels of PTH and 25OHD in 1149 men aged 19-85 years.

Results: PTH level was low in young men, increased slightly until 60 years and more rapidly afterwards. The 25OHD level was high and stable until the age of 60 then decreased. Before 60 years of age, highest quartile of PTH was associated with lower cortical thickness (7.3%, 0.33 SD; p<0.01) and lower trabecular volumetric bone mineral density (vBMD) (4.1%, 0.22 SD; p<0.05) in comparison with the lowest quartile at tibia but not at radius (adjusted for age, height, weight and season). The 25OHD concentration was not associated with bone microarchitecture. The men aged 60 years and over in the highest PTH quartile had lower cortical thickness (8.1%, 0.33 SD; p<0.005), but not vBMD, at the tibia and lower trabecular vBMD at both the skeletal sites (trend across quartiles – p<0.001) in comparison with men in the lowest quartile. Lower trabecular vBMD was due to lower trabecular number and thickness (trend – p<0.01-0.005). The men aged 60 years and over in lowest quartile of 25OHD had lower cortical thickness (0.53%, 0.19 SD; p<0.005) at the tibia and lower trabecular vBMD at both the skeletal sites (trend – p<0.01-0.005) compared with the men in the highest quartile. As for the PTH quartiles, trabecular number and thickness decreased across the 25OHD quartiles (trend – p<0.08-0.005). Associations of the trabecular parameters with the PTH and 25OHD levels were similar in the subendocortical and central compartments.

Conclusions: In men aged less than 60, the association of bone microarchitecture with the vitamin D and PTH status is weak. In older men, secondary hyperparathyroidism and, to a lesser extent, vitamin D deficit are associated with poor microarchitecture not only in the cortical but also trabecular compartments independently of confounders. Our data may improve our understanding of the impact of the secondary hyperthyroidism on the increased bone fragility in the elderly men.

Disclosure of Interest: None Declared

P722 - POOR BONE MICROARCHITECTURE IN OLDER MEN WITH FRAGILITY FRACTURES – STRAMBO STUDY

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Aims: To assess the association between fragility fractures and bone microarchitecture in men.

Methods: We analyzed areal bone mineral density (aBMD) and bone microarchitecture at the distal radius and tibia assessed by

HR-pQCT (XtremeCT, Scanco) in 920 men aged 50 and over, of whom 177 had prevalent vertebral (n=100) and low trauma peripheral fractures (n=103). The analyses were adjusted for age, weight and height.
Results: Men with fractures had lower cortical and trabecular volumetric BMD (vBMD), lower cortical thickness, trabecular number and thickness (0.24-0.45 SD, p<0.01-0.001). The differences lost significance after adjustment for aBMD of the radius or total hip (for distal tibia). Deteriorated bone microarchitecture was associated with the presence of fragility fractures (OR= 1.22 to 1.71 per 1 SD, p<0.05-0.001). After further adjustment for aBMD, only cortical thickness and vBMD remained associated with the presence of fracture (OR=1.38, 95%CI: 1.10-1.73, p<0.005 and OR=1.23, 95%CI: 1.01-1.50, p<0.05). Lower cortical thickness as well as lower total and cortical vBMD (at both the skeletal sites) were associated with higher prevalence of vertebral fractures even after adjustment for aBMD (OR=1.40 to 1.63 per 1 SD decrease, p<0.05-0.005). Men with more severe vertebral fractures had greater deterioration of trabecular microarchitecture, e.g. lower trabecular number (trend – p<0.01 at the radius). Total hip aBMD T-score<-2 identified 26% of men with vertebral fractures, whereas the threshold "hip T-score<-2 and/or cortical vBMD T-score<-1.5 at the tibia" identified 36% of them (similarly to cortical thickness). Use of the radius aBMD without or with cortical thickness (or vBMD) identified 33 and 40% of men with vertebral fractures. Peripheral fractures were not related to bone microarchitecture after adjustment for aBMD. Results were similar for the 40 men who had sustained peripheral fractures <10 years prior the recruitment and had no vertebral fractures.
Conclusions: Thus, in men, vertebral fractures were associated with poor cortical bone microarchitecture regardless of BMD. Assessment of the cortical microarchitecture may improve detection of men with vertebral fractures. Self-reported low trauma peripheral fractures were not related to bone microarchitecture when adjusted for BMD.

Disclosure of Interest: None Declared

P723 - MODELING OF THE IMMOBILIZED OSTEOPOROSIS

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Aims: To determine pathogenic factors in formation course of immobilization osteoporosis (IO).
Methods: An IO model for forming femur support inability was created by amputation the right hind shin of 75 male Wistar rats, 25 of them were given hyperbaric oxygen therapy (HBO, n10, P=1,5 ATA) after IO formation. Comparison group included 40 intact rats. Bone tissue osteoporotic changes have been analysed under morphological and radiological control. Evaluation of bone– and muscle homogenates, bone marrow, blood serum, peripheral blood was carried out in all animals by unified methods (analyzers: Specific basic, Microlyte 3+2, Cell Dyn 1300) in dynamics. It were identified bone tissue metabolism markers, bioenergetics, lipid peroxidation, antioxidant protection, macroelements, hematopoiesis indicators. Statistical data manipulation:analysis of variance, regression-, canonical-, discriminate- and density-free analysis ("Statistica 6.1" Program).
Results: Mathematical model of IO was presented as a set of equations: $Y_1 = -1{,}09987F_4 + 0{,}73434F_5 + 0{,}55673F_2 - 0{,}47905F_{12} + 0{,}06531F_1$; $Y_2 = 2{,}187187F_1 - 0{,}209791F_5 + 0{,}180613F_2 - 0{,}136332F_{12} + 0{,}118737F_4$ where, Y_1, Y_2 – canonical roots, and F_1, F_2, F_4, F_5, F_{12} – informative factors, predictors of which are bone calcium-, phosphate-, magnesium levels, calcium homeostasis in combination with markers bioenergetics, activity of hematopoiesis, respectively. Y_1 determines the rats with IO, and Y_2 – animals with HBO-therapy after IO formation. Average correctness of pattern recognition in the training and test samples amounted to 94.9%.
Conclusions: Magnesium deficiency (F_4) showed significant importance in IO pathogenesis (Y_1) that negatively influenced on the ribosomal synthesis, alkaline phosphatase, glycol sis enzymes, camp and Mg-ATP^{2-} Aden late cyclase, however it contributed to the lysosome activating. Ca- and P deficit had less marked effect on IO pathogenesis. Mg deficit in bone tissue made up to 82%, P– 80%, Ca – 45% in regard to the physiological norm ($p \leq 0.05$). HBO influenced first of all on Ca- and P homeostasis.
Acknowledgement: The study was supported by grants RFBR № 07-01-00399; 07-07-00168 NSH2081.2008. We are deeply grateful to Professor S.V.Gyulnazarova for her idea of the osteoporosis model and cooperation in the study.

Disclosure of Interest: None Declared

P724 - PARATHORMONE, BUT NOT ALENDRONATE, IMPROVES OSSEOINTEGRATION OF DENTAL TITANIUM IMPLANTS INTO THE TIBIA IN A RABBIT MODEL OF OVARIECTOMY PLUS GLUCORTICOID-INDUCED OSTEOPOROSIS

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Aims: A decrease in bone mass impairs titanium implant osseointegration. Bone mineral density (BMD) in global knee and knee subchondral bone reflects that of perialveolar mandibular area in our rabbit model of ovariectomy (OVX) plus glucocorticoid-induced osteoporosis (OP). We studied the effect of intermittent treatment with parathyroid hormone (1-34) (PTH) or with alendronate (ALN) on bone response around titanium screws implanted into proximal tibia in OP rabbits.
Methods: 26 skeletally mature female rabbits were divided into 4 groups. OP group (n=7) was OVX and received methylprednisolone hemisuccinate (i.m; 1mg/kg/day during 4 weeks); OP+ALN group (n=6) received ALN (s.c; 0.6 mg/kg/week); OP+PTH group (n=7) received PTH (s.c; 40 μg /day, 5 days weekly) and the sham-operated Control group (n=6). Either ALN or PTH was administered during 12 weeks, starting 10 weeks after OVX. Brånemark System® with TiUnite™ Surface Dental Implants (Nobel Biocare AB, Göteborg, Sweden) were placed in the proxi-

mal metaphysis of the tibia in every group 8 weeks after OVX. The animals were sacrificed 22 weeks after OVX. BMD was assessed with a Hologic® QDR1000 system at peri-implant area, lumbar spine, knee subchondral bone and global knee at baseline, 6 and 22 weeks after OVX. Undecalcified sections were evaluated by light microscopy. Histomorphometric measurements were obtained by a computer-based image analyzer to quantify the bone mass around the implant and the rate of implant-bone contact.

Results: Decreased BMD at peri-implant area was found at week 6 and 22 after OVX in OP rabbits. Similar BMD loss was observed at lumbar spine, knee subchondral bone and global knee in OP. PTH restored BMD to control values at peri-implant area as well as in other localizations, 22 weeks following OVX. ALN did not show significant effect in BMD at peri-implant area, however, it did at other skeletal regions. PTH increased the rate of bone-to-implant contact in comparison to untreated animals (p=0.048) and showed an increasing tendency versus the control group (p=0.063). In contrast, ALN did no increased bone-to-implant contact in comparison with the OP group.

Conclusions: Our data suggest that intermittent PTH improves dental implant osseointegration in OVX plus glucocorticoid-induced OP bone by stimulating formation of newly generated trabeculae around dental implants, which it would not occur with ALN.

Disclosure of Interest: None Declared

P725 - A LOWER OPG/RANKL RATIO IS ASSOCIATED WITH AN INCREASED SUBCHONDRAL BONE REMODELLING IN OSTEOARTHRITIS AGGRAVATED BY PRIOR OSTEOPOROSIS IN RABBITS

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Aims: Prior subchondral bone (SB) osteoporosis (OP) aggravates the cartilage damage in a combined model of OP and osteoarthritis (OA) in rabbits (Osteoarthritis Cartilage 15:69-77, 2007). Here, our aim was to study whether an increased SB remodeling could account for the increased cartilage damage in rabbits with OA aggravated by prior subchondral OP.

Methods: OP was induced in 20 (8 month-old), skeletally mature female NZ rabbits, by ovariectomy (OVX) and intramuscular corticosteroid injections (OP group). Ten age and gender-matched additional animals were used as controls. Surgical OA was simultaneously induced in the left knees of all the rabbits. The animals were sacrificed 22 weeks after OVX. Then, left knees were considered as OA or as OA plus OP (OPOA) and the right knees were used as OP or healthy controls, respectively. The percentage of bone area/tissue area (BAr/TAr) was assessed in the SB of the femurs after sacrifice by micro- Computed Tomography. OPG, RANKL and MMP-9 protein synthesis at the SB were evaluated by western-blot studies.

Results: At sacrifice, the BAr/TAr in the SB was significantly diminished in OP, OA and OPOA knees when compared to healthy knees, although a greater decrease was observed in the OPOA knees (p<0.05 vs. OP and vs. OA). At SB, the OPG/RANKL protein synthesis ratio was significantly diminished in OA, OP and OPOA knees when compared to healthy controls (Healthy: 1.36±0.14; OA: 1±0.02*; OP: 0.91±0.1*; OPOA: 0.7±0.04* arbitrary units; * p<0.05 vs. healthy), although it was significantly lower in OPOA knees when compared to OP or to OA (p<0.05 for both comparisons). MMP-9 protein synthesis in the SB was increased both in OA and in OPOA knees in comparison to healthy knees (Healthy: 100±7; OA: 362±90*; OP: 284±80; OPOA: 690± 180* arbitrary units; * p<0.05 vs. healthy). Furthermore, a greater increase was observed for OPOA knees in comparison to OA knees. We observed a positive correlation between BAr/TAr and OPG /RANKL ratio in the SB of these rabbits (r=0.911; p=0.001).

Conclusions: The remodelling parameters BAr/TAr, OPG/RANKL analysed in the SB were diminished in OA, OP and even more in OPOA. In the same way, the MMP-9 synthesis was greater in OPOA than in OP and OA rabbits. Our results show that an increased SB remodelling can be responsible for the severity of cartilage damage in OA, at least in rabbits with prior OP. This finding can be relevant since these pathologies are frequently found in the same patients, in which OP can precede OA onset.

Disclosure of Interest: None Declared

P726 - THE POSITIVE EFFECT OF MUD-BATHS ON BONE MINERAL DENSITY IN MALE RATS

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Aims: We studied the influence of bath-mud application on subchronic arthritis and bone mineral density on Wistar male rats after 50 days.

Methods: The arthritis was induced by a subplantar injection (100 µl of suspension Freund´s adjuvans with heat-killed *Streptoccocus pyogenes B stock*) into the plantar surface of the right hind paw on 1st and 8th day of experiment. Intact animals were similarly injected with saline solution. The 30 rats were divided into 5 groups. They were 34 bath for 20 minutes 4-5times in week: on dry chippings (21ºC), on hot dry sand (38ºC), and on hot or mild vet mud (38 or 21ºC). **1. group:** intact **(INT)** on dry chippings, **2. group: (CONT)** with arthritis on dry chippings, **3. group: (SAND)** with arthritis on hot dry sand, **4. group: (mud38)** with arthritis on hot vet mud, **5. group: (mud21)** with arthritis on mild vet mud. The rats were sacrificed exsanguination after 50 days. Then *post mortem* bone mineral density (BMD) was measured with dual energy X-ray absorptiometry (DXA) in all rats. The pads for histopathological examination were fixed in 10% buffered formalin with formic acid. We analysed blood cell count in fresh heparinized blood by Abbott CELL-DYN 3200 SL (Abbott, IL, USA). Circulating immune complexes (CIC, unit) were determined in serum. Statistical analyses were performed by software "SigmaStat 3.1" Jandel Scientific©, San Rafael, CA, USA. All the data were expressed as mean±SEM (p<0.05).

Results: The subchronic arthritis led to lower concentration of hemoglobin and lower leukocyte count, and higher neutrophile count. The lower CIC (2 vs., 11 in CONT) and grade of arthritis were in group mud21. The higher BMD in all regions of interest were in group mud38 (spine/femur/tail: 0.227±0.008/ 0.175±0.006/ 0.220±0.004 vs. CONT 0.216±0.006/ 0.150±0.007/ 0.214±0.006).
Conclusions: Our findings suggest that male rats with baths in hot vet mud had higher BMD. Positive effect of mild tempered vet mud was on healing of arthritis and moderately on BMD vs. control group.
Acknowledgement: Study was supported by Spa Ltd. Bohdanec and by grant MZO 00179906.

Disclosure of Interest: None Declared

P727 - THE EFFECT OF HOT SAND AND MUD-BATHS IN FEMALE RATS

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Aims: We studied the influence of 34 bath-mud applications on subchronic arthritis and bone mineral density in Wistar adult female rats.
Methods: The arthritis was induced by subplantar injections (100 µl of suspension Freund´s adjuvans with heat-killed *Streptoccocus pyogenes B stock*) into the plantar surface of right hind paw on 1st and 8th day of experiment. Intact animals were injected by saline solution. The rats were divided into 5 groups (6 in each group) and were 34 baths, 20 minutes 4-5times in week: on dry chippings (21ºC), on hot dry sand (38ºC), and on hot/mild vet mud (38/21ºC). **1. group:** intact **(INT)** on dry chippings, **2. group: (CONT)** with arthritis on dry chippings, **3. group: (SAND)** with arthritis on hot dry sand, **4. group: (MUD38)** with arthritis on hot vet mud, **5. group: (MUD21)** with arthritis on mild vet mud. The rats were sacrificed exsanguination after 50 days. Then *post mortem* bone mineral density (BMD) was measured with dual energy X-ray absorptiometry (DXA). The pads for histopathological examination were fixed in 10% buffered formalin with formic acid. We analysed blood cell count in fresh heparinized blood by Abbott CELL-DYN 3200 SL (IL, USA). We analyzed serum circulating immune complexes (CIC, unit). Statistical analyses were performed by software "SigmaStat 3.1" Jandel Scientific^{O}, San Rafael, CA, USA. The data were expressed as mean±SE ($p<0.05$).
Results: The subchronic arthritis decreased hemoglobin concentration and leukocyte count, but increased neutrophile count. The lower CIC (0.5 vs. 14), better arthritis healing and spine BMD (0.205±0.008 vs. 0.203±0.002) were in group SAND vs. CONT. The lower BMD in spine and femur were in group MUD38 (0.196±0.004/0.119±0.007 vs. CONT 0.203±0.002/0.136±0.006; but no in tail (0.177±0.005 vs. 0.169±0.006).
Conclusions: The group SAND had better healing of arthritis and lower decrease of BMD, mainly in spine. The decrease of BMD was in group MUD38. We suppose positive effect of mild tempered mud on healing of arthritis and BMD rather than hot mud.
Acknowledgement: Study was supported by Spa Ltd. Bohdanec and by grant MZO 00179906

Disclosure of Interest: None Declared

P728 - COMPLICATED CASE OF OSTEOPOROSIS IN A MALE SMOKER WITH HISTIOCYTOSIS X: A LONG-TERM OBSERVATIONAL STUDY

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Aims: Osteoporosis in men is a serious disease with a high risk of fractures. However, compared with women, its pathogenesis differs markedly, with the secondary form being more common in men. The aim of this case study is to demonstrate the complex pathogenesis of severe osteoporosis in a 23 year old male with a history of heavy smoking, histiocytosis X, diabetes insipidus (DI), subclinical hypogonadism and low serum levels of IGF-1.
Methods: Diagnosis of histiocytosis X was confirmed by Bürbeck granules found in bronchial material. Bone mineral density (Z-score), serum levels of sexual steroids, including total and free testosterone and IGF-1 were estimated before and then repeatedly throughout the ten year of vassopresin, calcium, calcipherol and bisphosphonate treatment. At the start of observation bone histomorphometry was also performed.
Results: After spontaneous normalization of sex hormones and IGF-1 levels, vasopressin substitution, cessation of smoking and after long-term anti-resorption therapy, an increase in bone density was observed, but only in the osteopenic hip. Severe osteoporosis of the spine persisted throughout the ten year of observation period.
Conclusions: The permanent osteoporosis of the spine in young men is most probably a consequence of an interaction between nicotinism and multiple hormone insufficiencies during development of peak bone mass. A direct association between histiocytosis X and osteoporosis was not confirmed histomorphometrically in this patient. Causal importance of cytokines produced by Langerhans cells is, for the time being, hypothetical.

Disclosure of Interest: None Declared

P729 - VISCOELASTIC PROPERTIES OF OSTEOPOROTIC BONES: NANOINDENTATION TESTING USING RAT BONES

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Aims: Osteoporosis is a devastating disease which result in increased morbidity and mortality [1]. Bone mineral density (BMD), quantified using standard screening method such as DXA, is the current gold standard to predict fracture risk. However, there may be possible changes in bone tissue not visible to

X-ray methods which could alter bone quality that can be an additional risk factor [2]. Therefore, we proposed viscoelasticity as a new parameter of bone quality that has not been associated with osteoporosis. The purpose of this study is to evaluate the changes in viscoelastic properties of OVX rat femurs by using nanoindentation technique.

Methods: Specimens of rat femurs were obtained from six SD female rats 6 weeks after the OVX surgery (Fig. 1). The nanoindentation tests were conducted to measure elastic indentation modulus (E_s) and the viscosity (η) of rat femoral cortical bone. Creep phenomena were observed as an increase in depth while holding the maximum load. Non-linear regression model was chosen to best fit the creep displacement-time curve using the equation [3] allowing the values of viscosity to be determined. Student's *t*-tests were used to compare values of elastic modulus and viscosity between cancer-induced and sham-operated groups.

Results: As hypothesized, both indentation modulus and indentation viscosity were significantly lower in OVX rat bones as compared to the sham-operated group ($p<0.05$) (Fig. 2). Results showed that there were significant positive correlations between indentation modulus (E_s) and indentation viscosity (η) in OVX and sham rat femurs ($p<0.05$), both still followed the general similar trend of linear progression.

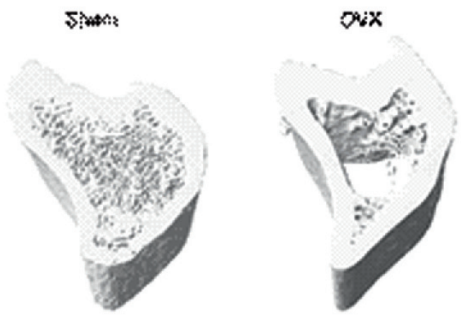

Figure 1 μCT images of Sham and OVX rat femurs

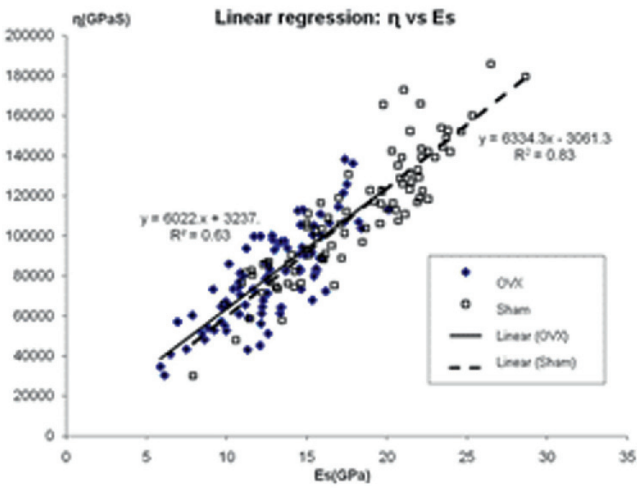

Figure 2 Linear relationship between indentation viscosity (η) versus indentation modulus (Es)

Conclusions: The pilot study showed the new approach of determining bone quality in terms of viscoelastic response in OVX bone. As hypothesized, OVX causes not only the decrease in elastic modulus but also the decrease in bone viscoelasticity. The results could be used directly to determine the quality of bone matrix and also combined with imaging techniques and mechanical model to extrapolate the material and mechanical properties of bones. Current results would be used to further evaluate the response of anti-resorptive and anabolic treatments for predicting risk of fractures in osteoporotic bone specimens.

References: 1. Ozden A et al, Medical hypotheses, 2004;63:1010; 2. Segal E et al, The Israel Medical Association Journal 2007;9:35; 3. Kim DG et al, 54th Annual meeting of the Orthopaedic Research Society, Paper No. 297

Disclosure of Interest: None Declared

P730 - THE FRAX®, EL FRAX® OR IL FRAX®: DIFFERENCES BETWEEN FRACTURE RISK IN A PORTUGUESE POPULATION

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Aims: To determine the differences between Spanish, Italian and British FRAX® algorithms, in the individual risk for bone-fracture in a Portuguese post menopausal women screening population-based sample.

Methods: A structured questionnaire was applied to 744 menopausal women aged 40 years and older. Clinical risk factors were registered to calculate FRAX® from three countries (Spain, Italy and United Kingdom) and access the risk of major OP fracture (>10%) and hip fracture (>3%) in a Portuguese population. Statistical analysis included t-student, chi-square test and Pearson correlation.

Results:

The 744 women mean age was 62,5±6,2years, with mean BMI 29,0±5,1kg/m2 and menopausal age of 48,3±5,4years. The probability risk of major osteoporotic fracture was higher in UK (46%) and Italy's (34%) calculator, than in Spain (10%); and risk of hip fracture was 22%, 24% and 10,6%, respectively. The FRAX®'s relation analysis revealed highly significant values between three versions ($r>0,815$; $p<0,0001$). In the risk intervals classification was observed a higher frequency of hip fracture under the 5% limit and a majority of individuals identified with major OP risk at 5 to 10% with the Italian version, followed by UK and finally Spain.

Table 1. 10-year probability risk of major OP and hip fracture from Spain, Italy and UK FRAX®'s (*p<0,0001).

	FRAX®-Es	FRAX®-Es	FRAX®-It	FRAX®-It	FRAX®-UK	FRAX®-UK
	OP major	hip fracture	OP major	hip fracture	OP major	hip fracture
Probability risk mean	5,4±4,0*	1,4±1,9*	9,2±6,1*	2,4±3,0*	11,2±7,1*	2,2±2,6*
Risk intervals (%)						
<5%	58,5	95,5	28	89,7	16,8	91,1
5-10%	32,9	3,5	41,5	7,8	40,3	7,0
10-15%	5,9	0,7	18,8	1,4	22,0	0,9
15-20%	1,5	0,3	6,2	0,5	11,8	0,7
>20%	1,2	0	5,5	0,5	9,2	0,3
OP probability(%)	10,2	10,6	33,6	23,8	45,7	22

Conclusions: We found significant differences in the three FRAX® algorithms for the same population, with lower risk as expected for the Spanish population. Those differences are related to individual country data regarding prevalence of OP and the fracture risk. Until the Portuguese version of FRAX® is not available, we should decide with the available data which country we shall consider to access our individual patient risk probability. Portuguese genetics and environmental factors are in clinical practice more comparable to Spanish population. For now, the FRAX®'s most adequate version to adopt, either Spanish, Italian or British, remains unclear and the treatment level cut-off may change with "Portuguese FRAX®".

Disclosure of Interest: None Declared

P731 - CALCITIOL ADMINISTRATION IN TYPE 1 DIABETIC ADOLESCENTS: DOES IT IMPROVE OR IMPAIR BONE HEALTH?

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Aims: In recent onset Type 1 Diabetes (T1D), the lack of anabolic effect of insulin may disturb bone remodelling, particularly in puberty. The role of other factors, such as blood glucose control and vitamin D in bone remodelling is not clear. Aims of the study were to determine the effect of metabolic control and 1 year treatment with calcitriol on bone turnover in subjects with T1D by analyzing Osteocalcin (OC) and β-CrossLaps.
Methods: In a double blind study, 25 subjects with recent-onset T1D and baseline C-peptide > 0.25 nM, were randomized to calcitriol at 0.25 μg daily dose or placebo and followed-up for 1 year. OC and β-CrossLaps, were evaluated by ECLIA method at diagnosis and at 1 year follow-up.
Results: At onset, Osteocalcin and β-Cross Laps levels were in the normal range, and remained unmodified after 1 year in placebo group, although improvement in blood glucose control. Conversely, at 1 year follow-up OC and β-CrossLaps dropped by 38.6% and 47.3%, respectively in the calcitriol treated group but their levels were not significantly different compared to diagnosis. No significant differences were also found at 1 year comparing calcitriol vs. the placebo group for both OC (25.1±3.6 (sem) ng/mL vs. 46.1±14.2 (sem) ng/mL; p=0.157) and β-CrossLaps (0.29±0.6 (sem) ng/mL vs. 0.48±0.1 (sem) ng/mL; p=0.151). By stratifying patients according to age, we found that at 1 year follow-up as compared to diagnosis, calcitriol treated patients ≤18 years of age (mean age 16 years±1.46) showed statistically significant 61% drop of OC (68.8±17.6 (sem) ng/mL vs. 26.8±11.5 (sem) ng/mL, respectively, p=0.04) and a 67% reduction in β-CrossLaps (0.92±0.77 (sem) ng/mL vs. 0.31±0.08 (sem) ng/mL, respectively, p=0.09). In this age range, patients on calcitriol therapy vs. placebo showed at 1 year follow-up a trend for lower OC (74.2±23.7 (sem) ng/mL vs. 26.8±4.8 (sem) ng/mL; p=0.08) and significantly lower β-CrossLaps (0.76±0.15 (sem) ng/mL vs. 0.31±0.1 (sem) ng/mL; p=0.03). Differences were not statistically significant in patients >18 years of age.
Conclusions: Improvement in metabolic control is not associated with significant modification in bone turnover. Calcitriol treatment reduces bone markers in the adolescent cohort showing that may contrast the physiological increasing in bone turnover during puberty. At this stage of study, we don't know whether this effect of calcitriol is good to preserve bone mass or in T1D, a condition of anabolic deficiency for the bone, it disturbs pubertal bone mass increment

Disclosure of Interest: None Declared

P732 - BONE TURNOVER MARKERS IN SPANISH MEN OLDER THAN FIFTY: THE CAMARGO COHORT STUDY

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Aims: To determine the reference ranges for two bone turnover markers -aminoterminal propeptide of type I collagen (P1NP) and C-terminal telopeptide of type I collagen (β-CTX) in normal adult Spanish men as determined in serum by automated methods.
Methods: A community-based population of 660 healthy men older than 50 yr was evaluated. Data regarding risk factors for osteoporosis and fractures were collected by means of a structured questionnaire. Fasting serum levels of P1NP, β-CTX, 25-Hydroxivitamin D, and intact parathyroid hormone were measured on the Elecsys 2010 automated analyzer (Roche). BMD at lumbar spine, femoral neck and total hip was determined by DXA.
Results: The mean age of subjects was 65±9. Logarithmic transformation of both markers was performed to allow for normal distributions. Mid-95% ranges for P1NP and β-CTX were 15-78 ng/ml and 0.069-0.760 ng/ml, respectively. Mean values of P1NP (37.1±16.7 ng/ml) were similar to those previously described. β-CTX mean values (0.300±0.171 ng/ml) were also similar to those previously determined by the manufacturers of the assay in men younger than 70 yr, but slightly lower than those reported in subjects older than 70 yr. Both markers were higher among osteoporotic men.

Conclusions: Values obtained from this well-characterized population study provide reference ranges for serum automated P1NP and β-CTX in normal Spanish adult men.
Acknowledgement: This study has been supported by grants from the "Fondo de Investigación Sanitaria", Ministerio de Sanidad y Consumo, Spain (FIS: PI05 0125; PI08 0183), and IFIMAV (API/07/13)

Disclosure of Interest: None Declared

P733 - COMPARISON BETWEEN AUTOMATED ASSAYS OF N-TERMINAL PROPEPTIDE OF TYPE I PROCOLLAGEN (PINP)

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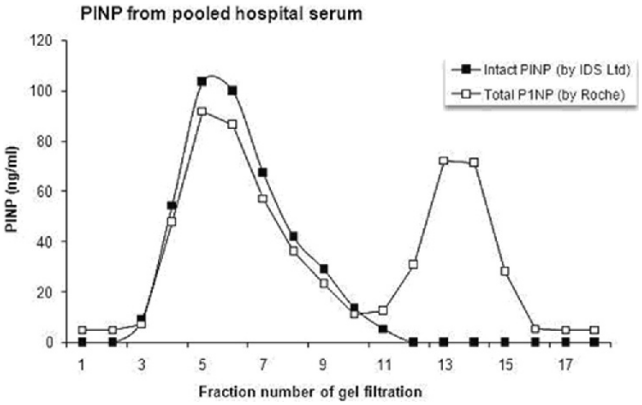
Aims: The N-terminal propeptide of type I procollagen (PINP) reflects the rate of collagen type I synthesis. Automated intact PINP assay (by IDS Ltd) measures trimeric propeptide in serum while automated total P1NP assay (by Roche) measures both trimeric and monomeric forms.
Methods: Sera of a healthy male, pooled hospital patients and a patient treated with haemodialysis were fractioned by gel filtration and analyzed with manual and automated intact and total assays. The sizes of the antigens were determined by western blotting. Intact and total PINP were measured from sera of patients (n=39) with chronic renal failure before and after haemodialysis and with rheumatoid arthritis (RA, n=50) before and after a two year follow-up. The thermal stability of intact and total PINP was tested at +4 °C and room temperature (RT).
Results: In gel filtration studies the automated intact PINP assay hardly measured any monomeric form even though intact PINP was disproportionately increased in haemodialysis patients. Both intact assays (IDS-iSYS and RIA) behaved similarly (r=0.989 in haemodialysis and 0.984 in RA patients). The correlation between intact and total PINP in haemodialysis patients was not linear, i.e. these automated PINP measurements gave significantly different results. Both the intact and total PINP were thermally stable at least 7 days at +4 °C and at RT.



Conclusions: IDS-iSYS intact PINP assay is precise and sensitive. The monomeric PINP antigen in serum was larger than the trimeric PINP antigen, and is not derived from the thermal instability of trimers but acts as a confounding factor in total PINP assays.
Acknowledgement: The authors gratefully acknowledge the expert technical assistance of Ms. Katja Koukkula and Ms. Leena Simolin. This study was supported in part by TYKSLAB (AL) and by Academy of Finland (MKK, Risteli).

Disclosure of Interest: None Declared

P734 - INTEGRATION OF BONE MODELING UNIT IN A MECHANOBIOLOGICAL BONE REMODELLING ALGORITHM

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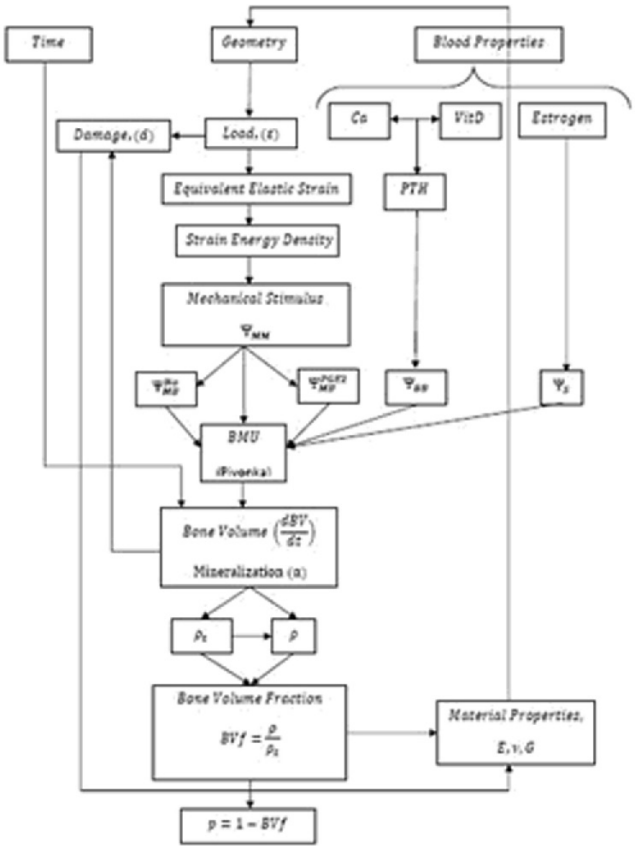
Aims: The aim of this work is to develop and implement a bone remodelling algorithm into a finite element code to describe the coupled effects of biological and mechanical factors on bone responses.
Methods: The first part describes the mechanical behavior of the trabecular bone [1]. The second part introduces a mechanobiological transduction model based on the Osteocytes which senses and transduces the mechanobiological signals sent to BMU [2]. The third part deals with the coupling between the mechanical part and the biological part in bone behavior [3].The fourth part of the developed model consists of describing the bone adaptation rules during remodelling cycles[3-6].
Results: Obtained results show a good qualitative behavior in comparison to clinical observation.



Conclusions: This work describes how bone remodelling process is induced and driven. Coupled with BMU behavior algorithm and implemented in a Finite Element Analysis (FEA) we can observe a bone remodelling process responding to mechanical load and biological concentration.

References: [1]Cowin SC, J Biomechanics 1999;32:217. [2] Liedert A et al, J Biochem Biophys Res Comm 2006;349:1. [3] Pivonka P et al, Bone 2008;43:249. [4] Doblare M, Garcia JM, J Biomechanics 2002;35:1. [5] Hernandez CJ, Bone 2001;29:74. [6] Hambli R et al, Comput Methods Appl Mech Engrg 2009;198:2673.

Disclosure of Interest: None Declared

P735 - CORTICAL POROSITY OF THE MANDIBLE IN AN OSTEOPOROTIC SHEEP MODEL

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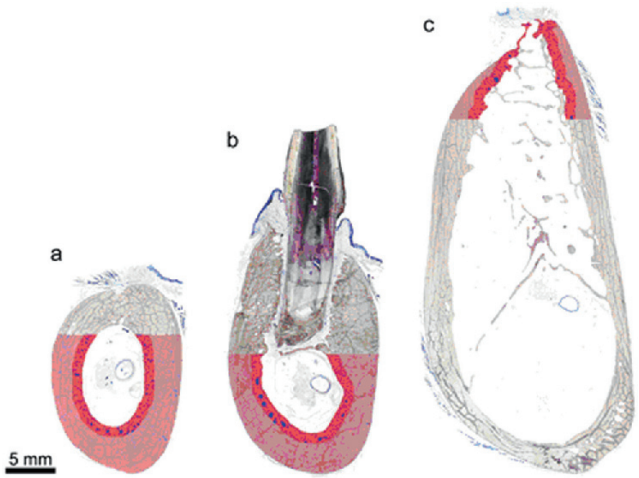
[1]Austrian Cluster for Tissue Regeneration, Ludwig Boltzmann Institute, [2]Department of Oral Surgery, Medical University Vienna, [4]Academy of Oral Implantology, Vienna, Austria, [3]Institute of Biomechanics, ETH Zürich, Zürich, Switzerland

Aims: Cortical porosity of the appendicular skeleton is a predictor for osteoporotic fractures. In the jaw bone, however, cortical porosity and thickness may affect the mechanical stability of dental implants upon insertion. We have shown previously that the jaw bone of geriatric osteoporotic sheep has impaired trabecular structures, but whether catabolic bone turnover also accounts true for the cortical bone remains unknown.

Methods: Mandibular bone specimens from six geriatric sheep subjected to ovariectomy, calcium/vitamin D-restriction and methylprednisolone administration were compared to six healthy adult control sheep. Histological ground sections were prepared from the diastema, 1st and 2nd premolars, and the postmolar region. Cortical porosity and thickness was assessed by histomorphometry.

Results: Cortical porosity is significantly higher in osteoporotic sheep than in adult controls; in the diastema (2.51±1.28% vs. 1.21±0.37%; p=0.04) and in the first and second premolar region (4.26±3.04% vs. 1.49±0.36%, p= 0.02; and 4.75±3.04% and 1.48±0.29%, p= 0.03; respectively). In the postmolar region, the difference failed to reach the level of significance (5.12±2.72% vs. 2.51±1.31%, p=0.08). The changes were even more prominent when histomorphometry was restricted to the inner millimetre of the mandibular cortex. In contrast, osteoporosis induction did not have a discernable effect on cortical thickness.



Conclusions: These results demonstrate that cortical porosity but not cortical thickness of the mandible is more pronounced in geriatric osteoporotic sheep than in adult control sheep.

Disclosure of Interest: None Declared

P736 - EFFECT OF STRONTIUM RANELATE ON SERUM OSTEOPROTEGERIN IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS TREATED OVER THREE YEARS

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Aims: Previous preclinical findings reported that Strontium ranelate increases the secretion of osteoprotegerin (OPG) protein as well as mRNA levels and down-regulates both RANKL protein and mRNA expression in primary human osteoblasts; this increase in the OPG/RANKL ratio is known to negatively affect osteoclastogenesis. The objective of the present study is to assess the effect of strontium ranelate on serum OPG in women with postmenopausal osteoporosis.

Methods: OPG was measured (ELISA, Immundiagnostik, Germany) in 2682 patients from the TROPOS study (randomised placebo-controlled trial that assessed the anti-fracture efficacy of strontium ranelate in postmenopausal women with osteoporosis) who had available blood samples at baseline and after 3, 6, 12, 24 and 36 months. Differences over time in biochemical markers level between the strontium ranelate group and the placebo group were assessed by analysis of variance with baseline biochemical marker level as covariate.
Results: Mean (SD) age of the study population was 76.7 (5.0) years with a body mass index of 25.5 (4.0). Median (min-max) baseline value of OPG was 51.5 (1.36 – 18.99) pmol/L. At baseline, no significant differences were observed between the strontium ranelate group and the placebo group for demographic characteristics and biochemical markers levels. At the third month of therapy, the serum concentration of OPG was higher in the strontium ranelate group than in the placebo group, with a mean (SD) 0.15 (0.03) pmol/L (2.6±) difference between groups ($p<0.001$), and this difference persisted at each evaluation during the three years (all $p<0.001$). After 3 years, a mean (SD) 0.24 (0.05) pmol/L (3.7±) difference between the two groups ($p<0.001$) was observed. The levels of OPG observed in this study remain in normal ranges.
Conclusions: These results are consistent with the involvement of the OPG/RANKL system in the decrease in osteoclast differentiation induced by strontium ranelate in postmenopausal osteoporotic women.

Disclosure of Interest: J. Collette Grant / Research Support from: Centralized analyses, O. Bruyere Consultant / Speaker's bureau / Advisory activities with: Scientific advise, M. Vanoverberghe: None Declared, J. Reginster Consultant / Speaker's bureau / Advisory activities with: Scientific advise

P737 - LONG-TERM EFFECT OF STRONTIUM RANELATE ON SERUM C-TERMINAL PROPEPTIDE OF TYPE I PROCOLLAGEN (PICP) AND URINE CROSS-LINKED N-TELOPEPTIDE (U-NTX) IN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

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Aims: Previous clinical findings reported the increase of bone-specific alkaline phosphatase (BALP) level and the decrease of cross-linked C-telopeptides (S-CTX) level in strontium ranelate-treated osteoporotic women compared to patients receiving placebo.

The objective of the present study is to assess the effect of strontium ranelate on serum C-terminal propeptide of type I procollagen (PICP), a marker of bone formation, and urine cross-linked N-telopeptide of type I collagen (U-NTX), a marker of bone resorption, in women with postmenopausal osteoporosis.
Methods: PICP was assessed (RIA, Orion Diagnostica) and U-NTX was assessed (OsteomarkÒ ELISA) in the TROPOS study, a randomised placebo-controlled trial that assessed the anti-fracture efficacy of strontium ranelate in postmenopausal women with osteoporosis. All markers were measured at baseline and after 3, 6, 12, 24 and 36 months. Differences over time in biochemical markers levels between the strontium ranelate group and the placebo group were assessed by analysis of variance with baseline biochemical markers levels as covariate.
Results: Mean (SD) age of the study population was 76.7 (5.0) years with a body mass index of 25.5 (4.0) Median (min-max) baseline values were 129.4 (48.5 – 1837.4) ng/mL for PICP and 51.2 (3.9 – 473.4) nmol BCE/mmol creatinine for U-NTX. At baseline, no significant differences were observed between the strontium ranelate group and the placebo group for demographic characteristics and biochemical markers levels. At the third month of therapy, the serum concentration of PICP was higher in the strontium ranelate group than in the placebo group, with a mean (SD) 9.20 (1.07) ng/mL (6.6±) difference between groups ($p<0.001$), and this difference persisted at each evaluation during the three years (all $p<0.01$). The concentration of U-NTX was lower in the strontium ranelate group than in the placebo group at month 3, with a mean (SD) 5.00 (0.68) nmol BCE/mmol creatinine (8.9±) difference between the two groups ($p<0.001$), and at each subsequent evaluation during the three years (all $p<0.001$).
Conclusions: These results confirm the dual mode of action of strontium ranelate with an increase of bone formation and a decrease of bone resorption, compared to placebo.

Disclosure of Interest: O. Bruyere Consultant / Speaker's bureau / Advisory activities with: Scientific advise, J. Collette Grant / Research Support from: Centralized analyses, J. Reginster Consultant / Speaker's bureau / Advisory activities with: Scientific advise

P738 - INFLUENCE OF STRONTIUM IONS ON ADIPOSE STEM CELLS

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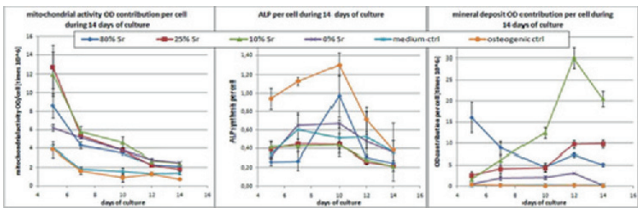
Aims: Strontium received attention as bone forming agent during the last decades, but it's mechanism of action still needs to be elucidated. We investigated the influence of Calcium (Ca) and Strontium (Sr) ions in different ratios on adipose stem cells (ASCs) to identify the potential of Sr to induce and/or differentiate ASCs into osteoblast precursor cells.
Methods: Sr containing apatite-like materials were used to condition cell culture medium so that it contained different ratios of Ca/Sr ions. Unconditioned medium and osteogenic medium (containing L-ascorbic acid, DXAmethasone and β-glycerol phosphate) were used as control. ASCs were incubated with the conditioned and control media at 37°C and 5% CO_2. The metabolic status of the cells was analyzed by mitochondrial activity assay, an indirect alkaline phosphatase (ALP) assay and a mineralization quantification assay (Alizarin Red S staining and destaining). The absolute cell number was also determined. On days 5,7,10,12 and 14 measurements were made, and the results were compared to data obtained from ASCs incubated with osteogenic medium.
Results: Preliminary data show that the normalized mitochondrial activity of cells incubated with conditioned Sr containing media was clearly higher compared to positive control cells (os-

teogenic ctrl). Sr ions clearly increased the mineral deposit of cells from day 7 of culture on, but this mineralization does not go hand in hand with increased ALP levels. ALP levels were rather lowered in cells grown in conditioned media.



Conclusions: In our model Sr conditioned media increased the cell mitochondrial activity and showed an increased response in a mineralization assay. Since these data do not correspond with ALP levels further experiments are necessary to elucidate the mode of action of Sr containing apatite-like materials.

Disclosure of Interest: None Declared

P739 - EXPANDING THE DIAGNOSIS AND THERAPEUTIC HORIZON OF OSTEOPOROSIS IN ANKYLOSING SPONDYLITIS MALE PATIENTS

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Aims: Recent insights in basic bone science have emerged in new definition of immune mechanisms for both Ankylosing Spondylitis (AS) and osteoporosis (OP); moreover decreased bone mineral density (BMD) in AS is thought to be multi-factorial. Main objectives were (i) to establish the prevalence of OP and related-fractures, (ii) to define the most reliable BMD assessment method, (iii) to evaluate effects of anti-TNFs on BMD and bone turnover biomarkers in male with AS.
Methods: 25 consecutive male AS patients (modified New-York criteria) were enrolled in a prospective 12 months observational study. All AS were assessed according to a standard protocol including: (i) AS (activity - BASDAI, functional scores - BASFI), OP-related parameters (BMD by central and peripheral DXA; bone turnover biomarkers – alkaline phosphatase, osteocalcin - ELISA, β-CrossLaps - ECLIA), hormonal profile (25OHD3, PTH and testosterone) at baseline and after 12 months of anti-TNFs. Statistical analysis was done in SPSS-12 (descriptive, non-parametric tests), $p<0.05$.
Results: 80% of AS presented at baseline with decreased lumbar spine and hip BMD, either OP or osteopenia. Statistically significant correlations have been reported at baseline between disease activity and BMD (r_1=-0.76, $p<0.05$), osteocalcin (r_2=0.69, $p<0.05$) and β-CrossLaps level (r_3=-0.72, $p<0.05$) . Moreover, anti-TNFs have resulted in significant increase in BMD after 12 months ($p<0.05$).
Conclusions: optimal diagnostic and therapeutic algorithm of osteoporosis in male with AS could result in a better control of both activity and functional impairment.

Disclosure of Interest: None Declared

P740 - SYSTEMIC MASTOCYTOSIS AS A CAUSE OF SEVERE OSTEOPOROSIS IN A YOUNG WOMAN (CASE REPORT)

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Aims: We report a case of a 46-year old female suffering from a five year premenopausal osteoporosis due to systemic mastocytosis(SM).
Methods: The only clinical symptom was severe back pain and restricted spinal movements resulting from the existing vertebral compression fractures. There were not any skin lesions. Because of the severity of the case, non response to the so far administered treatment and the premenopausal initiation of her osteoporosis a further investigation for an underlying cause was accomplished.
Results: Laboratory evaluations excluded metabolic or endocrinological abnormalities. Urinary excretion of N-methylhistamine was elevated (356 ug/g creatinine, normal range 30-200), and serum tryptase (a marker for mast cell activation) level was slightly elevated (12.8 μg/l, normal<11.4 μg/l). The c-kit Asp816Val somatic activating mutation associated with SM was not detected in the patient. A diagnostic bone marrow biopsy specimen was done, after which tryptase immunohistochemistry (anti-CD117, anti-CD25, anti-CD2) confirmed the presence of mast cell infiltrates forming small aggregates. Within these infiltrates of >15 mast cells (major SM criterion), a significant percentage of the mast cells showed prominent spindling (minor criterion). Thus, the diagnostic criteria for SM were fulfilled and the diagnosis was confirmed. There was no evidence for an associated non-mast cell lineage hematological malignancy.
Conclusions: In conclusion, we report a case of severe osteoporosis as a manifestation of systemic mastocytosis which should be suspected even when there are not skin abnormalities and when there is suspicion of secondary osteoporosis. Serum tryptase and urine histamine metabolites should be measured in order to facilitate the diagnosis, and then a bone marrow biopsy should be considered. Systemic mastocytosis should be included in the differential diagnosis due to its significant morbidity and the helpful treatment options.

Disclosure of Interest: None Declared

P741 - STUDY THE BONE MINERAL DENSITY AND THE BIOCHEMICAL MARKERS OF BONE TURNOVER IN HYPOGONADISM HYPERGONADOTROPH

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Aims: Hypergonadotroph hypogonadism cases include gonadal disgenesis (Turner syndrome female, Klinefelter syndrome) and premature ovarian failure (poor ovaries). Gonadal disgenesias means perturbation of entire body function, but the main damaged process is sexualization. The absence or the deficit of oestrogens, progesterone or androgens, will lead to hypogonadal sexoidoprive osteoporosis. The premature ovarian failure (the poor ovaries' syndrome) is characterized by the ovaries' failure to normally sexualize, due to a poor sexooidogenetic follicular set (low gonocyte population).The dysfunction of the ovarian hormones controlling the bone homeostasis alters the bone formation/resorption ratio, leading to reduced bone mass and onset of osteoporosis.
Methods: We studied 16 cases of gonadal disgenesis (Turner syndrome women-11 cases, Klinefelter syndrome-5 cases and premature ovarian failure-35 cases). Bone mineral density (BMD) was assessed by dual X-ray absorption (DXA). As biochemical markers of bone turnover we assessed: serum CrossLaps and osteocalcin by means of ELISA method.
Results: Osteoporosis was confirmed by DXA at: 8 cases with Turner syndrome female, 4 cases with Klinefelter syndrome and 18 cases with premature ovarian failure. In cases with osteoporosis d osteocalcin and CrossLaps values are comparable to postmenopausal women, ranging 28,6-113,5 ng / ml Osteocalcin and 0,178-1,83 ng / ml for CrossLaps.
Conclusions: a) Early diagnosis of gonadal disgenesis is a must for initiating treatment to increase bone mass and reduce fracture incidence,

b) In premature ovarian failure, evaluation of biochemical markers of bone turnover must be done regularly (2 times year) so as to identify patients who lose bone rapidly and head to increased risk of osteoporosis,

c) therapeutic solution for all hypergonadotrop hypogonadism cases associates oestro-progestive/androgenic substitution with specific drugs for bone remineralization (bisphosphonates, calcium products and vitamin D derivates).

Disclosure of Interest: None Declared

P742 - BONE MICROARCHITECTURE AND DEGREE OF SECONDARY MINERALIZATION ARE DRAMATICALLY IMPAIRED IN RENAL OSTEODYSTROPHY BUT DO NOT PREDICT BONE FRAGILITY: A SYNCHROTRON RADIATION MICROTOMOGRAPHY AND FINITE ELEMENTS ANALYSIS

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Aims: Stage 5 Chronic Kidney Disease (CKD5) increases bone fragility whose pathophysiological mechanisms are likely different from those of primary osteoporosis (OP). Bone strength depends on Bone Volume, microarchitecture and on Degree of secondary Mineralization (DMB), all parameters directly influenced by the level of bone turnover. We hypothesized that CKD5 would affect these parameters according to the underlying histological bone disease.
Methods: Iliac crest bone biopsies were obtained from 16 OP patients without renal disease and 30 hemodialyzed patients (mean age 55±18). The bone samples were imaged at high spatial resolution (voxel size:10μm) using Synchrotron Radiation Microtomography (ESRF, Grenoble, France) for quantification of microarchitecture parameters and mean DMB (g/cm3) in both trabecular (Tb) and cortical (Ct) envelopes. Bone samples were then analyzed by quantitative histomorphometry and classified into secondary hyperparathyroidism (HPT, n=15), adynamic bone disease (ABD, n=8), mixed lesions (n=5) or normal turnover (n=2) based on the Bone Formation Rate (BFR/BS) and primary mineralization parameters (Osteoid Volume/Thickness and Mineralization Lag Time). Finite Elements Analysis (FEA) was used to compare bone mechanical properties of OP and CKD5 patients. Finally, correlations between FEA and bone structural parameters were analyzed.
Results: We found a negative relationship between DMB and BFR for both Ct and Tb envelopes ($r2=0.46$, $p<0.001$). DMB values in OP patients were significantly lower than ABD but higher than HPT values (Ct DMB: 0.87±0.01 vs. 0.91±0.01 and 0.82±0.01, respectively, $p<0.01$) and much less scattered than in CKD5. Ct microarchitecture parameters were significantly different between HPT and ABD while those of Tb microarchitecture were not. Unlike in the OP group, neither bone structural parameters nor DMB in CKD5 patients correlated with bone mechanical properties evaluated with FEA.
Conclusions: CKD5 dramatically affected DMB, HPT bone being hypo mineralized and ABD bone hyper mineralized, as compared to primary OP. Unexpectedly, microarchitectural parameters in HPT were not different from those in ABD but were globally more deteriorated than in OP patients. Bone volume, microarchitecture and DMB did not predict bone fragility in CKD5 patients, confirming our hypothesis that the mechanisms underlying bone fragility in CKD5 are different from those of primary OP.
Acknowledgement: Dr Mac-Way received a post-doctoral fellowship grant from the Kidney Foundation of Canada

Disclosure of Interest: None Declared

P743 - COMPARISON FUNCTIONING QUALITY OF LIFE OF PATIENTS WITH OSTEOARTHRITIS OF HIP AND OF POLYARTHRITIS RHEUMATOID

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Aims: In chronic rheumatic diseases, traditional epidemiological measures of disease outcome reflect only the physical dimension of the disease and neglect the mental and social aspects. In recent years, there has been a great interest in quality of life measures that reflect physical, mental and social, dimensions together. This study was designed to compare quality of life status of patients with rheumatoid arthritis and osteoarthritis.
Methods: For this purpose, Arthritis Impact Measurement Scales health Status Questionnaire (AIMS) was evaluated in 140 subjects: 23 with coxita of polyarthritis rheumatoid and 117 with osteoarthritis of hip. Quality of life was assessed using the 9 different subscales of AIMS. The mean age of patients with rheumatoid arthritis was 62,0±7,5 years (range 39-82), while the mean age of patients with osteoarthritis was 62,7±7,3 ani years (range 25-82). The results point out that among these two patient groups, those with rheumatoid arthritis suffer greater impact on the quality of life . The original AIMS questionnaire contained 45 items grouped into 9 scales. Statistical analysis: Differences between the patients with rheumatoid arthritis and osteoarthritis of all assessed variables were examined by using the ANOVA test.
Results: The mean scores for rheumatoid arthritis and osteoarthritis subjects differed substantially except for the expected poorer scores functional disability levels and work in the osteoarthritis group.
Conclusions: RA of OA this quality of life study showed that depends on gender, age and clinical variables.

Disclosure of Interest: None Declared

P744 - ZOLEDRONIC ACID INCREASES BMD IN PRIMARY HYPERPARATHYROIDISM

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Aims: Primary hyperparathyroidism (PHPT) is often associated with reduced bone mineral density (BMD). An open-labeled, prospective trial was conducted to determine whether zoledronic acid (ZOL) 5 mg, given annually as a 15-min iv infusion in 100 ml 0.9% NaCl, maintains or improves BMD in patients with PHPT.
Methods: Seven patients had symptomatic PHPT and met surgical guidelines however refused surgery, and twelve patients had mild PHPT, asymptomatic except low BMD. The primary outcome index, BMD, was measured at the lumbar spine (LS) and femoral neck (FN) after 6 and 12 months by dual-energy x-ray absorptiometry. Serum calcium, phosphorous and PTH, and urinary calcium excretion were monitored every 3 months.
Results: Treatment with zoledronic acid was associated with a significant (5.3±0.4%; $p<0.01$) increase in LS BMD after 12 months in comparison with baseline. FN BMD increased significantly at 12 months with ZOL by 2.5%±0.7 ($p<0.01$) from baseline. Serum calcium, phosphorus and PTH, and urine calcium excretion did not change significantly with ZOL therapy.
Conclusions: In PHPT, zoledronic acid 5 mg iv. significantly increases BMD at the LS and FN at 12 months from baseline values with stable serum calcium and PTH levels. Zoledronic acid may be a useful alternative to parathyroidectomy in PHPT among those with low BMD, who are candidates for surgery but either decline or for whom surgery is contraindicated.

Disclosure of Interest: None Declared

P745 - STUDYING THE DIFFERENCES IN THE FOREARM BONE MINERALIZATION OF PATIENTS WITH HEMIPLEGIA AFTER STROKE

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Aims: The data in the existing literature describes the existence of bone demineralization of the plaegic limbs, due on the one hand to the lack of mobility and on the other hand to the onset of localized osteoporosis as part of the Complex Regional Pain Syndrome Type I, common among hemiplegic patients(shoulder-hand syndrome Steinbroker) .The purpose of the study is the observation of differences in the forearm bone mineralization compared to the healthy limb of stroke patients.
Methods: We aimed to do a prospective study on subjects admitted to the National Institute of Physical Medicine and Rehabilitation, III-rd Clinical Department, with hemiplegia after ischemic or hemorrhagic stroke, included on the basis of clinical criteria, after obtaining an informed consent. The study included 20 patients, males, with stroke, occurred more than one year earlier, with sechelar motor deficit, with an average age of over 60 years, hospitalized in the III-rd Clinic of Rehabilitation, between February and September of 2009. All patients were examined clinically and by the osteodensitometric DXA method in both forearms.
Results: It was found that differences arise between limbs evaluated by bone mineral density, expressed in g / cm ² and T-score (DXA method). The decrease in the affected forearm was found to be statistically significant, in correlation with the duration of the motor deficit.
Conclusions: The following study confirms pre-existing research data, according to which, one of the redoubtable complications of a patient with hemiplegia is segmental osteoporosis, due to the lack of mobility, with clinical and therapeutic consequences that are needed to be taken in account. The need for periodic clinical and paraclinical evaluation of hemiplegia patients is evident, in order to follow their evolution after the staged and individualized rehabilitation programs.

Disclosure of Interest: None Declared

P746 - BONE MINERAL DENSITY PROFILE IN MALE PATIENTS WITH ANKYLOSING SPONDYLITIS UNDER BIOLOGICAL THERAPY

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Aims: The decrease in bone mineral density (BMD) in ankylosing spondylitis (AS) patients is due to disease activity – inflammation, age, disease duration, weight and medication. To this point, BMD profile in men with AS undergoing biological therapy was insufficiently profiled. The aim of the study was to assess the BMD using DXA performed at the hip level in male patients with AS at baseline and repeated at 24 months of biological therapy with TNFα blockers and to identify possible correlations with disease activity and other risk factors.
Methods: The study group included 32 male patients with AS, mean age 48±2.2 years, mean disease duration of 6.8±1.2 and a mean BASDAI of 7.8±0.6 at baseline. Anti-TNF therapy was started (14 patients etanercept, 10 patients adalimumab and 8 patients infliximab), none of the patients received DMARDS or glucocorticoids from this moment. BMD was evaluated at the hip level at baseline and after 24 months of therapy.
Results: At baseline low values of mean BMD were associated with longer disease duration, higher BASDAI values, low weight and smoking status, while the pattern of axial or peripheral involvement had no influence on BMD values. At 24 months of treatment with TNFα blockers we found a significant increase in mean BMD ($p<0.05$) at the hip level well correlated with significant decrease in mean BASDAI value ($p<0.05$).
Conclusions: BMD profile in AS in men is linked to the degree of disease activity, as well as to the presence of risk factors such as disease duration, low BMI, smoking, with TNFα blockers having a favorable impact on disease activity and BMD. In this respect we suggest the importance of DXA monitoring in men with active AS, especially in smokers.

Disclosure of Interest: None Declared

P747 - POST PARTAL OSTEOPOROSIS ASSOCIATED WITH PREGNANCY AND LACTATION – CASE REPORT

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Aims: To represent a patient with osteoporosis that is a result of pregnancy and lactation in which we found a loss of BMD by conveying densitometry.
Methods: Patient 24 years of age, mother of a 15 month old child, with a normal and regular menstrual cycle. No information of use of meds that elevate the risk for osteoporosis. The patient has a family member, her mother that has a repeated fracture of forearm. Patient's body-weight 51kg and height 147.8cm (in two year the patient lost 10 cm in height). She nursed a total of 8 months and there is a report of a reduced intake of calcium through food. She is a non-smoker, does not consume alcohol and is physically active. Reason for consult: Pain and curvature in the thoracic spine, bone and joints pain. DXA examination was done on the lumber spine L1-L4 and to both femurs (Lunar DPX-Pro).
Results: On the first DXA examination the results were: L1-L4 with BMD 0.725g/cm^2 and Z-score -3.3 SD, Left femur total with BMD 0.725g/cm^2 and Z-score -2.0 SD, Right femur total with BMD 0.693g/cm^2 and Z-score -2.3 SD. Laboratory tests:Ca+1.14mmol/l, (osteocalcin, calcitonin, PTH, pirilinks D, ALP, 24h calciuria all were normal). Patient was treated with Ca 1000mg daily, Vit. D 800 IU daily and advised for adequate intake of food rich with Ca and Vit.D and regular physically activity. After two years DXA examination results were: L1-L4 with BMD 0.957g/cm^2 and Z-score -1.6 SD, Left femur total with BMD 0.783g/cm^2 and Z-score -1.6 SD, Right femur total with BMD 0.748g/cm^2 and Z-score -2.1 SD.
Conclusions: Post partial osteoporosis is a rear complication of pregnancy that appears in the third trimester and post partum and after lactation with a tendency to be temporary and not to repeat it's self. After treatment the BMD does not reach normal values for related age.

Disclosure of Interest: None Declared

P748 - KLINEFELTER'S SYNDROME AND THE INCREASED RISK OF OSTEOPOROSIS – CASE REPORT

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Aims: The aim of this study is to portray a case of a patient with Klinefelter's Syndrome, where by conveying densitometry, we proved that there was a loss of BMD (age-matched osteoporosis) by following the results with therapy after 6 and 18 months.
Methods: Patient at the age of 44 with height/weight 194,5cm/90kg accordingly. Due to thrombocytopenia, the patient has been treated with 5mg of corticosteroids, for more than 8 months and this is why the patient was sent to the osteoporosis clinic. Due to DXA analysis(Lunar DPX-Pro) and the anamnestic fact that the patient was married for 3 years and had no children, lab analysis were made.
Results: DXA results at first doctor's check: total L1-L4 with BMD 0,862g/cm^2 and Z-score -3,0 SD, Right femur total with BMD 0.744g/cm^2 and Z-score -2,6 SD and Left femur total with BMD 0.723g/cm^2 and Z-score -2,8 SD and testosterone level lower than 0.069mm/l. After six month therapy with amp.Testosteron and tabl.Ca 1000mg+Vit.D 800IU following results were archived: total L1-L4 with BMD 0,889g/cm^2 and Z-score -2,8 SD, Right femur total with BMD 0.746g/cm^2 and Z-score -2,6 SD and Left femur total with BMD 0.732g/cm^2 and Z-score -2,6 SD and testosterone level lower than 0.21mm/l .At the second check that took place after 12 months with identical therapy, the following results were established: total L1-L4 with BMD 0.934g/cm^2 and Z-score -2.8 SD, Right femur total with BMD 0.772g/cm^2 and Z-score -2,4 SD and Left femur total with BMD 0.766g/cm^2 and Z-score -2,5 SD and testosterone level lower than 0.32mm/l.
Conclusions: The level of risk for osteoporosis at male patients with Klinefelter's syndrome is similar to the risk of osteoporosis

at women patients. By administering androgens, only the signs of hypogonadism can be improved, and by administering Calcium and Vitamin D, the risk for osteoporosis and osteoporotic fractures is diminished.

Disclosure of Interest: None Declared

P749 - EVALUATION OF BONE MINERAL DENSITY IN THE LUMBAR SPINE AND FEMORAL NECK IN RHEUMATOID ARTHRITIS AND GOUT PATIENTS WITH GLUCOCORTICOID TREATMENT

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Aims: The objective of this study was to determine bone mineral density (BMD) and prevalence of osteoporosis in lumbar spine and femoral neck of rheumatoid arthritis and gout patients with glucocorticoid treatment.
Methods: This was a cross-sectional and prospective study.
Subjects: The study consisted of 232 patients with rheumatoid arthritis or gout treated in the Department of Rheumatology, Bach Mai Hospital from October 2007 to October 2008, including 118 patients with glucocorticoid treatment and 114 age, disease and disease duration-matched control subjects who had never used glucocorticoid.
Results: In the glucocorticoid group, the mean BMD and the rate of osteoporosis in the spine was 0.696±0.164 and 64.4%, respectively; and in the femoral neck was 0.639±0.145 and 59.3%, respectively. The glucocorticoid group had an osteoporosis risk of 4.44 fold (in the spine) and 9.62 fold (in the femoral neck) higher than the control group ($p<0.001$). Patients with rheumatoid arthritis had a higher rate of osteoporosis than gout patients ($p<0.05$).
Conclusions: at both sites of measurement, the mean BMD in the glucocorticoid group is significantly lower than in the control group ($p<0.001$) and rheumatoid arthritis patients are more likely than gout patients to develop osteoporosis ($p<0.05$).
References: 1. Cortet B et al, Clin Exper Rheum 2000;18:683; 2. Delmas PD (1999) "Glucocorticoid induced osteoporosis", The second international training course on osteoporosis for industry, specialists and general practitioners. Pathophysiology of osteoporosis and bone disease, 1-2, pp. 1530-1600; 3. Nordin BEC et al, J Clin Endocrinol Metab 1990;70:83; 4. Saag KG et al, NEJM 1998;399:292; 5. Sinigaglia L et al, J Rheumat 2000;27:2582.

Disclosure of Interest: None Declared

P750 - RELATION BETWEEN SECONDARY OSTEOPOROSIS AND PERIODONTITIS

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Aims: There is increasing evidence on the association of osteoporosis with the onset and progression of periodontal disease in humans. The aim of this study was to evaluate the dental clinical findings of patients with secondary osteoporosis.
Methods: Thirteen patients with secondary osteoporosis who have not received treatment, and 26 age matched control subjects, seen in the outpatient clinic between December 2005 and January 2010 were included. Bone mineral density, serum calcium, phosphate, creatinine, alkaline phosphatase, bone specific alkaline phosphatase, free T3-T4, TSH, 25-hydroxy vitamin D, parathormone, type 1 collagen propeptide, type-1 collagen carboxyterminal telopeptide, osteocalcin levels and urine deoxypyridinoline, daily calcium and phosphate excretion were measured. For the periodontal assessment; plaque index, gingival index, probing pocket depth, attachment level, bleeding time, tooth number measurements were evaluated.
Results: The patients with secondary osteoporosis consisted of 2 men and 11 women aged 18-43, mean age 31.0±8.7 yr and the control group consisted of 26 women aged 18-46, mean age 35.3±7.5 yr. The body mass index of the subjects in the control group were significantly higher than those of the osteoporotic patients ($P= 0.004$). Bone specific alkaline phosphatase, type-1 collagen carboxyterminal telopeptide and daily phosphate excretion were higher in the osteoporotic group ($P= 0.0001$, $P= 0.016$, $P= 0.019$ respectively). Also, the plaque index, gingival index and bleeding time were higher in the osteoporotic patients ($P= 0.007$, $P= 0.015$, $P= 0.0001$ respectively).
Conclusions: The results of this study support an association of secondary osteoporosis with periodontal disease. Hormones, heredity, and other host factors may influence both periodontal disease and osteoporosis incidence and severity. Understanding the association between these diseases and the mechanisms underlying those associations will aid health professionals in prevention, diagnosis and treatment of them.

Disclosure of Interest: None Declared

P751 - BONE MINERAL DENSITY IN YOUNG MALE PATIENTS WITH POSTOPERATIVE HYPOPARATHYROIDISM AFTER THYROIDECTOMY

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Aims: This article aims represents the results of the research in the features of bone mineral density (BMD) in young men who had thyroidectomy because of thyroid cancer with postoperative hypoparathyroidism.

Methods: There were 86 young male patients at the age of 20-38 years old in the research group. All the patients had thyroidectomy because of differentiated thyroid cancer when they were 7-33 years old. The measurements of BMD were done in the lumbar spine (LS), femoral neck (FN) and one-third radius (R) by DXA (Lunar Prodigy, GE, USA). The evaluation of parathyroid glands functioning was proved by the testing of calcium and parathyroid hormone levels (PTH). The statistical analyses were conducted by SAS 9.3.1.program.
Results: 11 patients were included into the group of patients with postoperative hypoparathyroidism (PTH=10,2 (2,0-18,9) ng/ml, Ca=2,04 (1,94-2,24) mmol/l). 75 patients were included into the group of patients with normal function of parathyroid glands (PTH=25,0 (16,6-34,7) ng/ml, Ca=2,31 (2,26-2,40)) mmol/l, p<0,05). When we compared BMD in different sites, we discovered much higher figures in the group of patients with postoperative hypoparathyroidism in LS and FN (LS=1,383±0,045 vs. 1,248±0,018 g/cm^2, p=0,011; FN=1,259±0,057 vs. 1,132±0,017 g/cm^2, p=0,002; R=0,950±0,021 vs. 0,954±0,009 g/cm^2, p=0,643). To examine the influence of calcium and vitamin D_3 supplementation over the BMD, we divided all our patients into 2 groups depending on the amount of calcium intake: a group of patients who took not more than 500 mg of calcium a day and a group of patients who took more than 500 mg of calcium a day. At the end of the research, the results showed no statistically significant difference in BMD in these groups.
Conclusions: Young men with postoperative hypoparathyroidism have higher results of BMD in comparison with the patients with normal level of PTH. It can be explained by the features of bone metabolism in the period of forming the peak bone mass with parathyroid hormone deficiency. This process is also influenced by the need of constant intake of calcium and vitamin D3, which are vital for maintaining a normal range of calcium in the blood.

Disclosure of Interest: None Declared

P752 - FETAL ORIGINS OF OSTEOPOROSIS

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Aims: To correlate vitamin D deficiency Rickets with Osteoporosis.
Methods: Majority of women are given calcium with vitamin D during antenatal period. in spite of this, women give birth to the babies born with vitamin D deficiency rickets. These children grow up to suffer from osteoporosis later in life. Both of these deficiency diseases have osteopenia and both can be treated with calcium and vitamin D, even though vitamin D deficiency rickets is seen in children and osteoporosis in elderly. The etiology of both is same. However, in my study the full term, normal newborns (< 2.5 kg) had rickety rosary and low 25 (OH) D at birth suggestive of vitamin D deficiency rickets apart from premature, low birth weight, small for dates, twins etc. All the newborns in the study were treated with one α drops and were followed for six month to two years. To prevent vitamin D deficiency rickets at birth in children and osteoporosis in adults, all have to take supplementary calcium with vitamin D, throughout their lives, besides exposure to sunlight and exercise, change in life style and taking vitamin D with calcium rich diet. The daily requirement of vitamin D can be increased to 1000-1200 mg from the present 400 mg.
Results: 75 newborns out of 858 full term, normal delivery and weighing more than 2.5 kg were born with rachitic rosary. 25-hydroxycholecaciferol was lower than normal in 56 newborns (mean: 12.5; range: 3-22 nmol/L) and normal (>25nmol/L). Calcium concentration was within the normal range in all 56 newborns (2.2-2.6 mmol/L). Plasma phosphatase concentration was significantly higher in all the newborns (mean: 1.7; range: 1.6-1.8 mmol/L) and normal (mean: 1.5; range: 0.81-1.58 mmol/L). Plasma alkaline phosphatase was higher than normal in 26 newborns (mean: 195; range: 170-220 u/L) and normal (mean: 195; range 170-220 u/L) for our laboratory. Fourteen newborns had the radiological changes, early flaring, widening, and cupping seen in the wrist x-ray.
Conclusions: 25 (OH) D can be used as a screening test for the early diagnosis of rickets and osteoporosis at any age.

Disclosure of Interest: None Declared

P753 - PREVALENCE OF OSTEOPOROSIS IN PATIENTS AFFECTED BY MASTOCYTOSIS

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Aims: Mastocytosis is a clonal myeloproliferative disorder characterised by the proliferation and accumulation of mast cells within various organs, most commonly the skin and the bone marrow. Osteoporosis has been reported in patients with Mastocytosis: the prevalence of these manifestations is unknown since so far only single cases or small groups of patients have been reported. Objective of this study was to investigate the real prevalence in a large group of patients using Dual Energy X-ray Absorptiometry (DXA).
Methods: From January 2006 until June 2009 we studied 62 consecutive patients (25 women and 37 men, mean age=48 years) affected by mastocytosis, referred to the Multidisciplinary outpatients clinic for Mastocytosis of the University Hospital of Verona. The diagnostic procedures included medical history, the measurement of serum levels of tryptase, complete blood cell count, bone marrow biopsy, flow cytometric analysis, and detection of KIT mutation in mononuclear cells. Bone Mineral Density (BMD) was measured by DXA at the spine (L1-L4) and the proximal hip. The results are reported as Z-score (SDs below the age and gender matched mean reference value). Patients were classified with "Mastocytosis-related osteoporosis" if their Z-score at either the spine or the total hip was <-2 and/or they had a history of vertebral fragility fracture.
Results: Three patients were not included in this analysis for the presence of anorexia, rheumatoid arthritis and long history of glucocorticoids assumption, respectively. "Mastocytosis-related osteoporosis" was found in 14% of the women and 27% of

male patients. The BMD values were generally lower at the spine than at the hip, suggesting a prevalent involvement of trabecular bone. One or more severe vertebral fractures (semi-quantitative Genant's method) were found in 5 patients.
Conclusions: These results indicate that a DXA examination is warranted in all patients with mastocytosis. Osteoporosis is more frequent in males than in females and is affecting prevalently the spine.

Disclosure of Interest: None Declared

P754 - IS THERE A RELATIONSHIP BETWEEN BODY MASS INDEX (BMI) AND VITAMIND D LEVELS?

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Aims: There are contradicting reports regarding the association between Vitamin D levels and obesity. This study was carried out with an objective to evaluate the relationship between vitamin D level and Body Mass Index (BMI) among Saudi Arabian citizens.
Methods: Four hundred healthy individuals aged ≥ 25 years (200 males and 200 females) were included in this cross sectional study. Clinical evaluation was carried out and BMI was calculated. Serum 25 hydroxy vitamin D (25OHD) in addition to serum PTH levels and calcium chemistry were measured for all subjects. Males and females were divided into 3 groups based on the 25OHD level (sufficiency, insufficiency and deficiency). Data was entered in the database and analyzed using SPSS Inc Version 14.
Results: The mean age was 46.5±14.6 years for males and 42.6±15.9 years for females (P value 0.01). Mean BMI was similar in both sexes and the difference in the Level of serum 25OHD just reached statistically significant (p=0.04). Male subjects with vitamin D deficiency were found to be older (p =0.03) and having higher BMI (p=0.01) compared to males with normal 25OHD. Although female subjects with hypovitaminosis D were also older than subjects with normal vitamin D level (p =0.01), BMI was significantly lower in females with vitamin D deficiency (p= 0.001).
Conclusions: Obese males are at higher risk of having low 25OHD levels while obesity in females appears to be protective against vitamin D deficiency in the population studied. We believe that obese male and thin female patients should be appropriately investigated and treated for vitamin D deficiency.
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Disclosure of Interest: None Declared

P755 - BONE MINERAL DENSITY IS DIRECTLY RELATED TO FAT MASS, BUT NOT TO LEAN MASS OR HORMONES IN HIV VERTICALLY-INFECTED ADOLESCENTS

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Aims: to evaluate bone density and its association with body composition and biochemical parameters in a group of HIV vertically-infected young patients maintained on HAART.
Methods: forty-seven patients of both genders, ages 13.8 to 21.2 yrs, HIV-positive since birth and followed at the University Hospital were studied. Bone density, at lumbar spine and total body (LSBMD, TBBMD), and body composition were evaluated by DXA (Prodigy Advanced Plus, GE) simultaneously with evaluation of serum calcium, phosphorus, total alkaline phosphatase, 25-hydroxyvitamin D (25OHD), parathyroid hormone (PTH), sex hormone-binding globulin (SHBG), cortisol and insulin-like growth factor 1 (IGF-1). Mann-Whitney test and Pearson's coefficient correlation were used. The level of significance was $p<0.05$. Analyses were conducted with SPSS 13.0.
Results: males and females did not differ in relation to age (17.4±1.6 vs. 17.4±2 yrs), weight (55.9±8.5 vs. 51.4±8 kg), BMI (20±2 vs. 21.3±3.4 kg/m^2) and Z-scores (LS: -1.7±1.1 vs. -1.5±1.1 and TB: -1.2±1.1 vs. -1.0±1.1) but males were taller (1.67±0.08 vs. 1.55±0.05 m), had more lean mass (46.7±6.8 vs. 33.6±3.2 kg) and less± body fat (11.9±4.3 vs. 28.6±7.5%). Low BMD (Z-score at or below -2 DP) at LS/TB was found in 38.3%, but no patient referred fragility fractures, bone pain or deformities. No correlation was found between densitometric and biochemical parameters. Correlations were found between LS and TB BMD, respectively, with weight (r=0.41, p=0.004; r=0.45, p=0.001), BMI (r=0.37, p=0.011; r=0.38, p=0.009) and fat mass (r=0.32, p=0.027; r=0.29, p=0.048), and also between: weight and SHBG (r=- 0.38, p=0.013), weight and 25OHD (r=- 0.32, p=0.038), height and SHBG (r=- 0.40, p=0.009), fat mass and cortisol (r=0.41, p=0.029), lean mass and SHBG (r=- 0.46, p=0.002).
Conclusions: we found a high prevalence of low BMD among vertically HIV-infected adolescents on HAART. Weight, BMI and fat mass were positive influences on BMD. Lean mass and biochemical parameters had no direct effect on bone, but cortisol was positively associated with fat mass. Otherwise, SHBG and 25OHD were negative influences to weight, height and lean body mass.

Disclosure of Interest: None Declared

P756 - VITAMIN D STATUS, CALCIUM INTAKE AND BONE DENSITY IN YOUNG HIV INFECTED ISRAELI WOMEN

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Aims: To assess sun exposure, clothing habits, vitamin D status and BMD in young HIV infected Israeli women of Ethiopian (ET) and Caucasian (CA) origin. Decreased bone mineral density

(BMD) was reported in HIV infected patients(pts). Mechanisms leading to this decrease are poorly understood.
Methods: 75 HIV infected women aged 34.5±8.5 years with regular menses who were followed up at the Institute of Allergy, Clinical Immunology & AIDS. Data about the HIV status and treatment was collected from pts' charts; the pts filled a questionnaire about sun exposure, daily calcium intake and dress habits. Laboratory evaluation: routine chemistry, 25(OH)D by ^{125}I- radioimmunoassay, PTH (Intact) by STAT; plasma total procollagen type1amino-terminal peptide (P1NP) and collagen β cross-laps (CTX). BMD of the lumbar spine (LS), femoral neck (FN) and total hip (TH) by Lunar DPX scanner BMD results were expressed in Z-scores
Results: 43 (57.3%) pts were Ethiopian (ET) and 32 (42.6%) Caucasian (CA). There were no significant differences in demographics, actual and past HIV status, antiretroviral treatment and bone turnover markers between the groups. 25(OH)D serum levels<10 ng/ml (severe vitamin D deficiency),were observed in 28(66.7%) of ET vs. 2 (6.5%) of CA, p =0.001. Plasma PTH was72.14±57.37 ng/l (normal 12-65), in ET vs. 31.23±14.21 in CA, p<0.001. 17 (40.4%) of the ET had sun exposure <1 hour/day, vs. 6 (19.4%) of CA pts, p= 0.07; daily calcium intake was 514 vs. 164 mg, p=0.001. Avoidance of sun exposure was observed in 21 (67.7%) ET, vs. 16 (39%) CA, p= 0.019. Z-scores in ET and CA were: at LS -1.8±1.1 vs. -0.79±0.88, respectively, p=0.001; at FN -1.12±1.1 vs. -0.59±0.87, p=0.02, at TH -0.94±1.1 vs. -0.25±1.1, p=0.007. BMD Z scores<-1 at LS were observed in 26 (89.7%) vs. 20 (48.8%), p<0.01, at FN- 20(69%) vs. 17 (41.5%), p<0.03, at TH 17 (58.6%) vs. 9 (22%), p<0.001 of severely vitamin D deficient pts vs. pts with 25(OH)D >10 ng/ml respectively. Logistic regression: risk for LS Z-scores <-1 SD was 5.74-fold higher in pts with vitamin D levels <10 ng/ml.
Conclusions: Osteopenia is frequent in young HIV infected women. Vitamin D deficiency, low calcium intake, limited sun exposure and clothing habits might affect BMD in this group of pts. Significantly lower BMD in dark skinned pts might be at least partially explained by their poorer vitamin D status.

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P757 - OSTEOPOROSIS AND GALACTORRHEA IN A YOUNG MAN SECONDARY TO A SYNDROME OF EMPTY SELLA (CASE REPORT)

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Aims: The case presents a 35-year-old man with galactorrhea due to empty sella syndrome associated with more pronounced osteoporosis in the lumbar spine. Hyperprolactinemia, clinically manifested by galactorrhea, is due to pituitary stalk compression by arahnoidian hernia in "sella turcica" with increasing dopamine. Hyperprolactinemia induces hypogonadism manifested by low levels of testosterone. Decreasing in conversion of testosterone explains the reduce estrogen values.
Methods: We measure the level of prolactin, testosterone, estradiol from blood samples, after that we perform a cranial MRI and DXA to lumbar spine and hip. We re-evaluate this investigation after 1 year of treatment with cabergoline and risedronate.
Results: In addition to galactorrhea our patient had bone pain in the legs and spine, erectile dysfunction and low levels of testosterone (103ng/dl) and estradiol (9pg/ml). Making the lumbar spine and hip DXA found osteoporosis (T-score -2.6 to the lumbar spine and -2.1 at hip).
Conclusions: Treatment with cabergolinum, drug restraining PRL secretion, and bisphosphonates improved DXA parameters after one year of therapy, without androgen administration. The particularity of the case is that it present a rare situation of hypogonadism by empty sella syndrome, complicated with severe osteoporosis in a young man with good response to etiologic treatment.

Disclosure of Interest: None Declared

P758 - BONE MINERAL DENSITY OF THE LUMBAR SPINE AND FEMUR IN ACROMEGALY

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Aims: Acromegaly is a state of hypersomatotropism with high bone turnover. While many studies describe increased cortical bone mass in acromegaly, data regarding trabecular bone are conflicting. To elucidate further the effect of acromegaly on bone metabolism, we have evaluated the bone mineral density (BMD) of acromegaly patients in Mashhad, north eastern Iran.
Methods: In this cross-sectional study from a series of 82 acromegalic patients, 38 eugonadal patients (12 women and 26 men) with mean age of 40.5±12.4 years were selected. Blood samples were drawn after an overnight fast for IGF-1 and GH and after 100 gram glucose intake for GH. Then bone mineral densitometry measured with Dual-Energy X-ray Absorptiometry and the results interpreted according to WHO guidelines. For control group, we used the results of bone densitometry for the entire normal population of Mashhad.
Results: Osteopenia detected in 7 patients (18.4%). Osteopenia of spine detected in 3 women (25%) and 2 men (7.6%) and osteopenia of femoral neck detected in 2 women (16.6%) and 4 men (15.3%) .None of the patients had osteoporosis. Osteoporosis occurred lesser in patients group. Osteopenia also occurred significantly lesser in male patients. In women patients, osteopenia occurred in femoral neck lesser and in spinal area more than control group. In 18 men in 5th decade of life only 2 men (11.11%) had osteopenia in both spine and femoral neck area that was significantly lesser than control group with similar age.
Conclusions: Our study demonstrates that eugonadal acromegalic patients have increased BMD compared to general population.

Disclosure of Interest: None Declared

P759 - THE STATE OF BONE MINERAL DENSITY IN MALE PATIENTS WITH TYPE 2 DIABETES MELLITUS AND ANDROGEN DEFICIENCY

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Aims: The aim of the study was to evaluate the influence of type 2 diabetes mellitus (T2DM) on the bone mineral density (BMD) in aging male
Methods: We studied 166 men, aged 50-65 years old. BMD was measured using dual energy X-ray densitometry in both lumbar spine (L_1-L_4) and left/right hip (LH/RH). Total testosterone (TT), HbA_{1c} were assessed, free testosterone (FT) was calculated. Bone mass index (BMI), waist circumference (WC) were measured. All of men were treated with oral antidiabetic drugs or insulin. Patients were divided into two groups: 18 with HbA_{1c} <6.5%, 148 with HbA_{1c} ≥6.5%
Results: The mean age was 54.07±4.81 years, duration of diabetes was 8.02±5.74 years, weight was 92.72±19.48 kg, BMI was 29.70±5.24 kg/m^2, WC was 100.73±14.57 cm. There was not significant correlation between the HbA_{1c} and BMD, but TT and FT negative correlated with HbA_{1c} (r=-0.23, p<0.05, r=-0.21, p<0.05, respectively) and with BMD L_1-L_4, T-score L_1-L_4, T-score RF (TT: 0.35, 0.46, 0.23, FT: 0.37, 0.46, 0.27, respectively). Dividing patient into 2 groups we showed, that in HbA_{1c} <6.5% group T-score RF was significant higher (0,396±1,206) than in HbA_{1c} ≥6.5% group (-0.139±0.919), (p=0.04), T-score LF (1.038±0.231 vs. -0.228±0.809, p=0.01, respectively). However, BMD L_1-L_4 was higher in eugonadal patients with TT>12 nmol/l (1.239±0.159 g/cm^2) versus hypogonadal patients with TT<12 nmol/l (1.120±0.196 g/cm^2), (p<0.001), T-score L_1-L_4 was 0.567±1.208 vs. -0.443±1.348, respectively (p=0.001)
Conclusions: This data demonstrate the influence of poor glycemic control and androgen deficiency on the BMD

Disclosure of Interest: None Declared

P760 - EFFECT ON BONE MINERAL DENSITY OF ORAL BISPHOSPHONATES IN WOMEN WITH OSTEOPOROSIS AND BREAST CANCER TREATED WITH AROMATASE INHIBITORS: ARE BONE TURNOVER MARKERS USEFUL IN THESE PATIENTS?

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Aims: To evaluate the effect on bone mineral density (BMD) of 2-years treatment of oral bisphosphonates in women with osteoporosis and breast cancer treated with aromatase inhibitors (AI). To evaluate the effect on bone resorption of this treatment measuring the urinary cross-linked N-telopeptides of type I collagen (u-NTX).
Methods: Longitudinal study. Period of inclusion September 2005-July 2008. All women with osteoporosis (T-score ≤-2.5 in lumbar spine (LS) and/or femoral neck (FN)) by bone densitometry (Hologic), who had started in the previous 12 months treatment with AI received treatment with oral BP and were followed for 2 years. Thoracic and lumbar spine X-ray was performed in all patients at inclusion and after 2 years of BP therapy to assess the presence of vertebral fractures. The presence of non-vertebral fractures during the follow-up was assessed by reviewing medical history. All patients underwent determination of NTX (ELISA, n<65 nmol/mmol) before and after 6 months of BP.
Results: 55 women were included. Mean age 63.1±8 years (49-80). Baseline BMD was 0.744±0.099 g/cm2 (T-score -2.7±0.7) at LS, and 0.671±0.090 g/cm2 (T-score 2,1±0.9) at FN. 16.6% of patients had suffered one or more non-vertebral fractures and 19% had at least one morphometric vertebral fracture (deformity> 20%) before the inclusion. After 2 years of treatment, BMD increased by 5.5% (0.785±0.102 g/cm2) in LS and decreased by 3.9% (0.645±0.085 g/cm2) in FN. Only one patient with 2 previous vertebral fractures suffered 2 new vertebral fractures during the 2-years of follow-up. We didn't observed any new non-vertebral fracture in any patient. The mean baseline u-NTX was 80.0±38.8 nmol/mmol. 62.2% of patients had a high bone resorption (increased levels of u-NTX). After 6 months of treatment the mean u-NTX decreased by 36.4%, and only 21% of patients maintained levels of u-NTX above the normal range. Patients who maintained a high resorption after 6 months of treatment with BP BMD increased by only 2.8% in lumbar spine and decreased by 6.3% in femoral neck.
Conclusions: Treatment with oral BP in women with osteoporosis and breast cancer treated with aromatase inhibitors seems able to increase BMD in cancellous bone, but not in cortical bone. BP are also able to maintain at 6 months, a low bone turnover in almost 80% of patients. Patients who do not achieve a normal u-NTX after 6 months of treatment fail to increase BMD at lumbar spine and femoral neck.

Disclosure of Interest: None Declared

P761 - FACTORS ASSOCIATED WITH THE LOSS OF BONE MASS IN PATIENTS WITH RHEUMATOID ARTHRITIS

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Aims: Osteoporosis is frequent between patients with rheumatoid arthritis (RA), but there are many factors which influence the loss of bone mass. We proposed to find factors associated with the loss of bone mass in patients with rheumatoid arthritis.
Methods: The study included 20 patients with rheumatoid arthritis diagnosed using the ACR criteria, with the mean age 53,7±5.08 years. In each RA patient we evaluated the body mass index, with a mean value of 28,00, the clinical and serological activity of the disease, with a mean value of CRP of 32.9 mm/1h, the mean value of RF of 58,2 U/l and the bone mineral density (BMD) using dual X-ray absorptiometry (DXA) in the lumbar spine, in anterior-posterior view at the levels L2–L4. The total dose accumulated of glucocorticoids had a mean value of 17.75± 10.7 gr

Results: The prevalence of osteoporosis was higher in those patients with higher disease activity and with lower BMI (P<0,05). The high total dose accumulated of glucocorticoids correlates with a low bone mass. We didn't find a significant correlation between ESR and BMD (p>0.05). The highest prevalence was in patients with high disease activity, low BMI and high glucocorticoids dose.
Conclusions: The probability of losing bone mass in the patients with rheumatoid arthritis increases with the low BMI, high activity disease and with glucocorticoids intake, so, these patients should be examined by dual energy *x* ray absorptiometry

Disclosure of Interest: None Declared

P762 - BONE LOSS IN PATIENTS WITH RHEUMATOID ARTHRITIS: ANTI-TNF AND METHOTREXATE COMPARED WITH METHOTREXATE TREATMENT ALONE

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Aims: To study the effect of anti TNF plus methotrexate (MTX) compared with MTX alone on bone loss in patients with rheumatoid arthritis (RA).
Methods: The study included 28 patients with active RA, diagnosed using the ACR criteria 14 patients being treated with anti TNFa (9 patients on Etanercept and 5 patients on Adalimumab) and 14 patients with MTX alone. The groups were age matched. In each RA patient we evaluated the bone mineral density (BMD) by dual energy *x*-ray absorptiometry at baseline and after 12 months, at the lumbar spine level (L2–L4) and hip. The treatment included only occasional NSAID and analgesics
Results: Bone mass loss was significantly lower in the group of patients treated with antiTNF, with a tendency to be lower in the ETN vs. ADA, compared with the MTX alone group at the total hip (p<0.01) and at the spine level (p <0.05). Progression in bone erosions was independently associated with increased bone mass loss in the hip but not in the spine, after 1 year.
Conclusions: Those results are providing a strong prove of a link between the RA activity and the bone loss and thus between the inflammation and osteoporosis in patients with RA.

Disclosure of Interest: None Declared

P763 - CORRELATION BETWEEN THE HIGH PDS SCORE AND THE RISK OF OSTEOPOROSIS IN RHEUMATOID ARTHRITIS PATIENTS

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Aims: To study the correlation between the high PDS score and the risk of osteoporosis in RA patients
Methods: The study included 12 patients with RA, diagnosed using the ACR criteria, in which We carried out a combined two planes grey scale and power Doppler study at baseline knee site with a high resolution US machine ALOKA α 7, with a 5-13 MHz linear transducer and we evaluated the bone mineral density (BMD) by dual energy *x*-ray absorptiometry at baseline and after 12 months. The ultrasound observer was not aware of the DXA findings in the patients.
Results: PDS signal was scored from 0 to 3 according to the overall expression of PDS findings at the knees, the score of 0 meaning the absence of PDS signal and the score of 3 meaning marked hyperemia. BMD loss was significantly higher in the group of patients with a PDS high score at baseline (p <0.05) and significantly higher in those patients with a constant PDS score of 2-3 during follow-up (p<0.01).
Conclusions: This study demonstrates the link between the high activity of the disease, despite the treatment, and the bone mass loss. Those results suggest that the RA patients with high activity on PDS should be monitored and treated if needed for secondary osteoporosis.

Disclosure of Interest: None Declared

P764 - UTILITY OF LABORATORY TESTS IN EVALUATION OF FRACTURE RISK AND IN DIFFERENTIAL DIAGNOSTICS OF LOW BONE MASS IN ASYMPTOMATIC POSTMENOPAUSAL WOMEN

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Aims: Until now, there are no specific guidelines for laboratory evaluation in asymptomatic people with low bone mineral density (BMD). The aim of the study was to estimate the utility of laboratory tests in evaluation of fracture risk and in differential diagnostics of low bone mass in asymptomatic postmenopausal women.
Methods: That was a retrospective study of 207 women. The results of laboratory investigations, densitometry and thoracic-lumbar X-rays were analyzed. The relationship between BMD, vertebral fractures and abnormal lab tests was investigated. In patients with low BMD, reasons of this pathology was determined and costs of differential diagnostics were estimated.
Results: There were no differences in prevalence of abnormal lab tests in women with BMD that met and didn't meet densitometry criteria of osteoporosis (85,05% vs. 82,00%). Similarly, in people with and without vertebral fractures (84,44% vs. 86,27%). There was no relationship between osteoporosis and abnormal tests

except of high PTH in group with vertebral fractures. In 64± of women, the cause of low BMD was asymptomatic pathology other then primary osteoporosis – most often vitamin D deficiency (52,0%). Costs of lab tests used in differential diagnostics were between 45 and 153 PLN for one person and 182,5 - 409,1 PLN for one diagnosis.

Conclusions: 1. Laboratory tests aren't useful to assess fracture risk.

2. In 64% of asymptomatic postmenopausal women with low BMD, the cause of this abnormality may by pathology that coexists with primary osteoporosis.

3. To assess the cause of low BMD, except basic lab tests, 25(OH)D should be tested.

Disclosure of Interest: None Declared

P765 - INFLUENCE OF WEIGHT REDUCTION ON LEPTIN CONCENTRATION AND BONE MINERAL DENSITY IN PATIENTS WITH MORBID OBESITY BEFORE AND 6 MONTHS AFTER BARIATRIC SURGERY

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Aims: Leptin is considered to exert dual effect on bone metabolism: anabolic (through peripheral pathways) and antiosteogenic (through central nervous system). The total leptin's effect on bone is not known. The aim of the study was to examine bone metabolism and leptin concentration in patients with morbid obesity before and after bariatric surgery (BS).

Methods: 41 patients with morbid obesity selected for BS were included in the prospective study. BMI, serum leptin, parathyroid hormone (PTH), 25-hydroxyvitaminD (25OHD) concentrations and bone mineral density (BMD) in the lumbar spine (LS) and proximal femur (PF) were examined before and 6 months after BS.

Results: Before operation (mean BMI 44,0 kg/m^2): mean leptin and PTH concentration was increased (accordingly 37,1 ng/ml and 82,7 pg/ml), mean 25OHD concentration was decreased to 4,3 ng/ml. Mean BMD was within the upper limit of the population reference range. Leptin concentration was positively correlated with BMI. There was no correlation of leptin with BMD (in LS and PF), PTH and 25(OH)D.

Following the operation (mean BMI 31,8 kg/m^2): mean leptin concentration decreased by 30,6 ng/ml ($p<0,001$), PTH decreased by 38,9 pg/ml ($p<0,001$), 25(OH)D increased by 2,1 ng/ml (NS). Mean BMD in LS increased by 0,067 g/cm^2 ($p< 0,005$), in PF decreased by 0,044 g/cm^2 ($p<0,02$). Leptin was positively correlated with BMI but not with BMD (in both sites), PTH, 25(OH)D.

Conclusions: Weight loss in patients with morbid obesity after BS leads to decrease in serum leptin, increase in BMD in LS and decrease in PF. These changes are accompanied by regression of hyperparathyroidism, which is probably secondary to vitamin D deficiency.

Disclosure of Interest: None Declared

P766 - CLINICAL ANALYSIS OF 4 PATIENTS WITH PREGNANCY AND LACTATION-ASSOCIATED OSTEOPOROSIS

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Aims: Pregnancy and lactation-associated osteoporosis (PLO) is an uncommon condition characterized by the occurrence of fracture(s) during late pregnancy or the puerperium, especially in the early stage of lactation. The aetiology is uncertain, and its management and natural history are poorly defined

Methods: we analysed 4 cases of patients with PLO

Results: The PLO all occurred during their first pregnancy or/and lactation in these 4 patients. X-ray examinations showed multiple vertebral fractures from thoracic to lumbar.3 of 4 patients had positive family history of osteoporosis or low trauma fractures. Of them 3 patients stopped lactation after the diagnosis were made, and were administered medication. After these management, no new fractures were reported and their BMD was increased markedly.

Conclusions: Women with positive family history of osteoporosis or low trauma fractures may be susceptible for PLO and lumbago or back pain in the period of pregnancy and lactation is a diagnostic clue of PLO. Supplement Calcium and active vitamin D and anti-resorptive treatment (calcitonin or bisphosphonate) may effective to manage PLO

Disclosure of Interest: None Declared

P767 - INCREASED INTRACELLULAR IRON AND MINERALIZATION OF CULTURED HFOB 1.19 CELLS FOLLOWING HEPCIDIN ACTIVATION THROUGH FERROPORTIN-1

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Aims: Hepcidin is the principle regulator of systematic iron homeostasis. The present study addresses whether hepcidin functions in bone metabolism in addition to its major target of small intestine.

Methods: A confocal laser scanning microscope (CLSM) for the fluorescence intensity related to intracellular iron concentration in hFOB 1.19;reverse transcriptase-polymerase chain reaction(RT-PCR) for the positive expression of ferroportin-1 (Fpn-1) in spleen tissue and osteoblasts;3-(4, 5- dimethylthiazol-2-yl) -2-5-diphenyltetrazolium bromide (MTT) assay for the influence of hepcidin on cell proliferation; Von Kossa staining for mineralization in cultured hFOB 1.19 cells.

Results: Using hFOB 1.19 cells, an osteoblast cell line, the present study revealed a high level expression of ferroportin-1(Fpn-1) in the cultured osteoblast and further demonstrated the increased

intracellular iron and mineralization of these cells by hepcidin activation. The mineralization in hFOB 1.19 cells was featured with a dose-dependent formation of calcified nodules.
Conclusions: In conclusion, the hepcidin-ferroportin signal pathway functions in the osteoblast cell line of hFOB 1.19 cells. Our data also suggest that a cross-talk between iron and calcium homeostasis may play a role in bone metabolism in responding to hepcidin activation. The potential involvement of hepcidin in osteoporosis warrants further investigation.

Disclosure of Interest: None Declared

P768 - OSTEOPROTEGERIN AND RANKL SERUM LEVELS IN YOUNG TYPE 1 DIABETIC PATIENTS

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Aims: Alterations of the nuclear factor-kB ligand (RANKL)/osteoprotegerin (OPG) system have been implicated in several metabolic bone diseases characterized by increased osteoclasts differentiation and activation and enhanced bone resorption. Also it has been recognized that the balance between the levels of OPG and RANKL (ratio RANKL/OPG) may have an important role in bone metabolism: increase of ratio RANKL/OPG may support osteoclasts differentiation and activation; after the osteoclasts differentiation is over ratio RANKL/OPG decreases. At the same time it is well known that patients with type 1 diabetes mellitus (DM) show impairment of bone metabolism. Therefore the aim of our study was to assess the levels of OPG, RANKL, ratio RANKL/OPG in young type 1 diabetic patients.
Methods: We have examined 56 patients with type 1 DM (age 34,5 [27-44,5] yrs; duration of disease 13 [9-20,5] yrs; body mass index (BMI) 24,65±3,67 kg/m^2; waist 83,65±10,54 cm; HbA1c 9,57 ±1,51%; levels of urea 5,8 [4,3-7,0] mmol/l; creatinine 73,0 [64,0-85,5] umol/l; GFR 90,27±62,25 ml/min; cholesterol 5,2 [4,5-5,8] mmol/l; triglyceride 1,00 [0,81-1,52] mmol/l). The control group consisted of 25 normal age-, sex- and BMI-matched subjects. There have been measured levels of osteoprotegerin (OPG), RANKL, ratio RANKL/OPG in serum in both groups. There has been assessed bone mineral density (BMD) at spine (L_1-L_4) and at femoral neck using DXA.
Results: OPG level was higher in diabetic patients in comparison with controls (5,08 [3,67-6,30] vs. 3,1[2,39-3,75] pmol/l, p<0,001). RANKL level was not statistically significant in diabetic patients and control subjects (0,16[0,09-0,22] vs. 0,12[0,10-0,20] pmol/l, p=0,637). Ratio RANKL/OPG was lower in diabetic patients than in control group (0,03 [0,02-0,05] vs. 0,04 [0,03-0,07], p=0,009). The OPG level positively correlated with BMD at spine (r=0,27, p=0,048), age of diabetic patients (r=0,4, p=0,002), duration of DM (r=0,46, p=0,0005), waist (r=0,36, p=0,029), level of cholesterol (r=0,34, p= 0,038) and triglyceride (r=0,35, p=0,049), urea (r=0,4, p=0,017) and creatinine (r=0,35, p=0,03) in plasma.
Conclusions: Type 1 diabetic patients have increase of OPG level and decrease of ratio RANKL/OPG that may be explained as a compensatory mechanism preventing from the development of bone disorder. Age of patients, duration of DM, waist, lipid metabolism may affect OPG level in type 1 diabetic patients

Disclosure of Interest: None Declared

P769 - PREDICTORS OF BONE MINERAL DENSITY IN YOUNG TYPE 1 DIABETIC MEN

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Aims: Previously there has been reported a high frequency of secondary osteoporosis in young men as the main cause of men's osteoporosis. At the same time, it is well-known fact that type 1 diabetes mellitus may lead to impairment of bone metabolism and recently there has been reported a high prevalence of osteopenia in type 1 diabetic patients. There are a lot of factors that contribute to diabetes-associated bone mass loss, but additional studies are needed to investigate the predictors of bone mineral density in diabetic patients that can prognosticate bone alteration in future. Therefore the aim of study was to assess bone mineral density (BMD) and its predictors in young type 1 diabetic men.
Methods: We examined 105 type 1 diabetic men (mean age-34 [27-40] yrs; duration of diabetes mellitus -10 [5-20] yrs; age of manifestation-19[13-28] yrs; weight-75[65-83] kg; height – 1,77(±0,07) m; BMI – 23,57[21,13-25,83] kg/m^2; GFR-84,5(±20,35) ml/min per 1,73 cm^2). Glomerular filtration rate (GFR) was calculated with formula MDRD for men. BMD was measured by DXA at spine (L_2-L_4) and femoral neck. All the findings were compared with 43 normal age-, sex- and body mass index-matched control subjects.
Results: BMD was statistically lower in diabetic men both at spine (1,08 [0,98-1,198]) vs. 1,23[1,19-1,32] g/см^2, p=0,000) and at femoral neck (0,89 [0,83-0,98] vs. 1,025[0,96-1,04] g/см^2, p=0,000) in comparison with controls. BMD was lower at spine than at femoral neck (Z-score -0,28 (±0,09) vs. 0,9 (±0,14), p=0,001) in diabetic men. Using multiply linear regression analysis with the following predictors (height, weight, GFR, doses of regular and prolonged insulin) there was obtained the next formula for the BMD at femoral neck: BMD, g/см^2=0,39 + 0,004 x weight + 0,002 x GFR (R=0,6, adjusted R=0,34, p=0,000).
Conclusions: There has been confirmed the bone mass loss in young type 1 diabetic men, predominantly at spine. Weight and kidney's function influence on BMD at femoral neck in young type 1 diabetic men.

Disclosure of Interest: None Declared

P770 - SUCCESSFUL MANAGEMENT WITH ZOLEDRONIC ACID OF A PATIENT WITH PAGET'S DISEASE OF BONE

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Aims: Paget's disease is characterized by localized intense bone remodeling caused by increased activity of abnormal osteoclasts. The whole process results in the production of abnormal, thickened and weakened bone. The aim was to present the case of a patient with Paget's disease of bone, who was successfully managed by the administration of zoledronic acid.
Methods: A male patient, aged 76 years presented with increased levels of alkaline phosphatase. Alkaline phosphatase levels were 1931 U/l (normal values <120 U/l). The patient did not have any specific signs or symptoms. In a radiographic evaluation of the head and long bones osteolytic and osteosclerotic areas were found in the calvarium and thickening and increased osteosclerosis of the right sciatic, sacral and pubic bone. In the area of the pelvis osteolytic areas were observed. These findings were compatible with Paget's disease of the bone with multiple bone involvement, localized mainly in the calvarium and the pelvis.
Results: Risedronate 30 mg daily was administered for a period of 12 months. After 12 months alkaline phosphatase levels were extremely high and risedronate was discontinued. Zoledronic acid was administered intravenously. Six months later the laboratory evaluation revealed normal alkaline phosphatase levels.
Conclusions: Zoledronic acid, a modern bisphosphonate, proved to be therapy of choice for the management of Paget's disease of bone.

Disclosure of Interest: None Declared

P771 - COMPLICATED CASE OF OSTEOPOROSIS IN A YOUNG MALE SMOKER WITH HISTIOCYTOSIS X: A LONG-TERM OBSERVATIONAL STUDY

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Aims: Osteoporosis in men is a serious disease with a high risk of fractures. However, compared with women, its pathogenesis differs markedly, with the secondary form being more common in men. The aim of this case study is to demonstrate the complex pathogenesis of severe osteoporosis in a 23 year old male with a history of heavy smoking, histiocytosis X, diabetes insipidus (DI), subclinical hypogonadism and low serum levels of IGF-1.
Methods: Diagnosis of histiocytosis X was confirmed by cells producing antibody against protein 100, found in bronchial material. Bone mineral density (Z-score), serum levels of sexual steroids, including total and free testosterone and IGF-1 were estimated before and then repeatedly throughout the ten year of vassopresin, calcium, calcipherol and bisphosphonate treatment. At the start of observation bone histomorphometry was also performed.
Results: After spontaneous normalization of sex hormones and IGF-1 levels, vasopressin substitution, cessation of smoking and after long-term anti-resorption therapy, an increase in bone density was observed, but only in the osteopenic hip. Severe osteoporosis of the spine persisted throughout the ten year of observation period.
Conclusions: The permanent osteoporosis of the spine in young men is most probably a consequence of an interaction between nicotinism and multiple hormone insufficiencies during development of peak bone mass. A direct association between histiocytosis X and osteoporosis was not confirmed histomorphometrically in this patient. Causal importance of cytokines produced by Langerhans cells is, for the time being, hypothetical.
Acknowledgement: The study was supported by grant IGA NS/9831-4 from Ministry of Health of the Czech Republic.

Disclosure of Interest: None Declared

P772 - SAFETY AND EFFICACY OF CLODRONATE IV IN RELIEVING PAIN ASSOCIATED WITH KNEE OSTEOARTHRITIS

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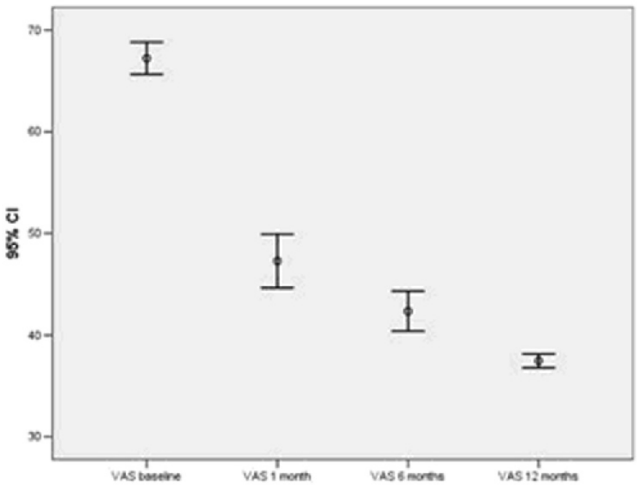
Aims: To assess the clinical effects of intravenous courses of clodronate in established knee osteoarthritis (OA) resistant to common treatment with non-steroidal anti-inflammatory drugs or local corticosteroids
Methods: Subjects aged 40 to 80 years with knee OA (diagnosed according to the clinical and radiological criteria of the American College of Rheumatology) from moderate to severe were recruited into the trial. The subjects were treated with a 10 days course of clodronate i.v. 300mg/die every 3-6 months for 1 year. Patients were followed-up every 3 months. At each visit, pain scores (100 mm visual analogue scale [VAS]), Lequesne index scores, NSAID intake, physician and patient global assessments scores were recorded. Adverse events (AEs) were recorded throughout the study.
Results: 122 patients (females 107, males 15; mean age 74.3±5.1) were enrolled (Kellgren-Lawrence grade II or III). Statistically significant reductions in VAS pain scores, Lequesne index scores and NSAID usage were reported at all time-points (baseline VAS 67.02±10.4, 1 month VAS 46.5±15.3, 6 months VAS 41.7±11.3, 12 months 37.2±4.3 $p<0.01$). No systemic, serious or severe side effects were observed.



Conclusions: This study supports the safety, tolerability and effectiveness of Clodronate in the treatment of symptomatic knee OA. Clodronate may also offer economic benefits due to a reduction in NSAID usage and the resultant reduction in management costs of NSAID related side-effects.

Disclosure of Interest: None Declared

P773 - IMPROVEMENT IN HEALTH-RELATED QUALITY OF LIFE IN OSTEOPOROSIS PATIENTS TREATED WITH PARATHYROID HORMONE 1-84

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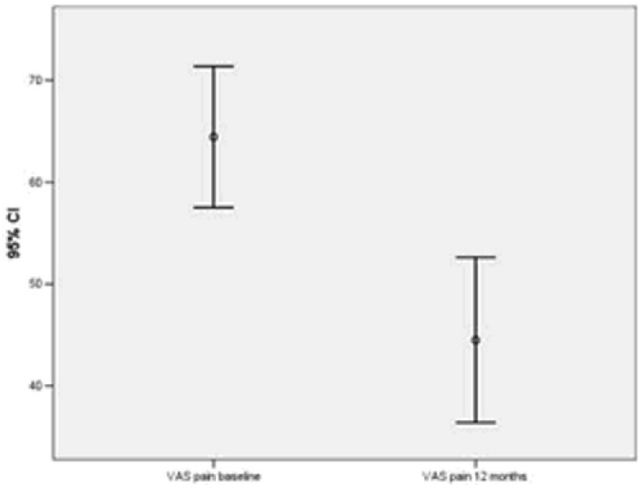
Aims: Individuals with osteoporosis and vertebral fractures suffer from low back pain and impaired health-related quality of life (HRQL). To determine whether patients with osteoporosis treated with parathyroid hormone PTH 1-84 experienced improvement in HRQL and pain symptoms after several months of therapy.
Methods: We prospectively studied a sample of osteoporosis patients treated with PTH 1-84 in an Italian rheumatology practice. All patients enrolled had previously sustained two or more prior vertebral fracture and take NSAID or acetaminophen to reduce pain kept at a stable dose for at least 9 weeks prior to inclusion. Outcomes of interest included pain evaluation via visual analog scale (0-100 mm VAS) and number of days per month assuming analgesics. Follow-up data was measured at 3, 6 and 12 months. We used a paired Student's t-test or ANOVA one way to compare baseline and follow-up measurements.
Results: 23 patients were included in the study. The mean age was 64.7 years (standard deviation 11.3 years). At baseline about 67% (15/23) of individuals were taking pain medications for more than 15 days/month. At follow-up, significant improvement were observed in the VAS (baseline 63.17±16.4 mm vs. 1 year 44.5±18.3 mm, $p<0.01$) and patients also reported a decrease in need for analgesics (baseline 19.5±5.3 days/month assuming NSAID vs. 1 year 12±4.1 days/month assuming NSAID, $p<0.01$) with 0/23 patients taking NSAID for more than 15 days/month.



Conclusions: Parathyroid hormone PTH 1-84 use may be associated with improvements in HRQL in osteoporosis patients, in particular this study suggests its efficacy in relieving pain and in reducing daily NSAIDs intake. These findings should be confirmed in larger prospective studies with a suitable control group.

Disclosure of Interest: None Declared

P774 - EFFECTS OF HEPCIDIN ON EXPRESSIONS OF OSTEOPROTEGRIN AND OSTEOCALCIN GENES IN OSTEOBLASTS

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Aims: To examine the effects of hepcidin on osteoprotegerin (OPG) and osteocalcin (BGP) gene expressions in osteoblast cells (MC3T3-E1 and hFOB 1.19) .
Methods: (1) MC3T3-E1 cells were cultured with different concentrations of hepcidin for 72 h, and then the semi- quantitative RT-PCR was performed to detect the mRNA expressions of OPG and BGP in osteoblast cells (2) hFOB 1.19 cells were cultured with different concentrations of hepcidin for 72 h, and then the semi- quantitative RT-PCR was performed to detect the mRNA expressions of OPG and BGP in osteoblast cells.
Results: (1) OPG mRNA and BGP mRNA expressions were distinguished up-regulated by hepcidin in MC3T3-E1 cells and the increases had dose correlated. (2) OPG mRNA and BGP mRNA expressions were distinguished up-regulated by hepcidin in hFOB 1.19 cells and the increases had dose correlated.
Conclusions: (1) Hepcidin promotes OPG and BGP mRNA expression in MC3T3-E1 cells accordingly promoting bone formation and inhibiting bone resorption. (2) Hepcidin promotes OPG and BGP mRNA expression in hFOB 1.19 cells accordingly promoting bone formation and inhibiting bone resorption.(3) hepcidin as a iron metabolism influencing factor provide a new idea for future study of bone metabolism.

Disclosure of Interest: None Declared

P775 - MALE OSTEOPOROSIS REVERSED

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Aims: The skeleton remains dynamic throughout life, constantly remodeling itself according to the stresses placed upon it and replacing itself completely every seven years. Present teaching has it that we maximize our skeletal bone density at around age thirty and after that the laying down and subsequent mineralization of the matrix does not keep pace with the removal of the not-needed bone which leads, in turn, to progressive demineralization with age.
Methods: This demineralization is painless but problematic as it leads to structural weakening of the bones and an increased risk of skeletal fracture. This has become a public health problem, particularly in the higher latitudes.
Results: Correction of demineralization has logically focused on providing the physiological needs of the skeleton and on molecules that affect the remodeling cycle of bone. Well recognized is the need for calcium, magnesium and phosphates in the mineralization of bone. Also accepted is the need for vitamin D, although there is much discussion about how much is required for optimal skeletal health. There remains no consensus on vitamin D requirements.
Conclusions: Presented here is the case of a male who, at age 54, was found to have osteoporosis in the spine (T-score L1-L4=-2.8). At age 67 he was found to have normal bone density (T-score L1-L4=-0.5), representing a highly significant increase in bone density. The single intervention was the ingestion of 5000 IU of vitamin D daily. The data are presented.

Disclosure of Interest: None Declared

P776 - A COMPARATIVE REVIEW OF ORAL VITAMIN D REPLACEMENT FOLLOWING HIP FRACTURE

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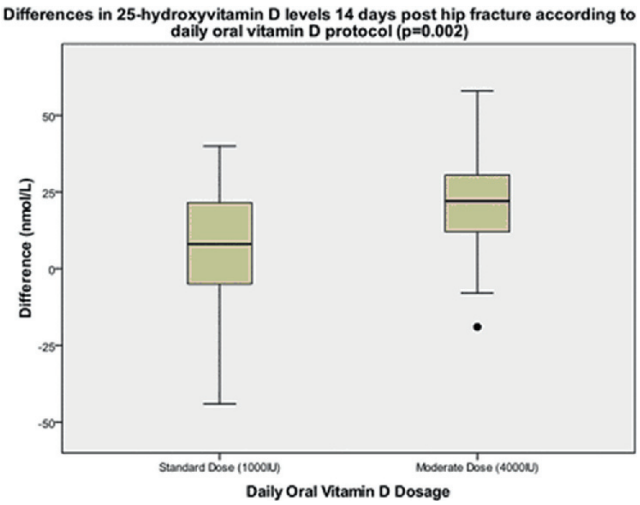
Aims: Hypovitaminosis D is highly prevalent in patients presenting with a hip fracture. We investigate the effectiveness of moderate-dose oral vitamin D replacement in improving 25-hydroxyvitamin D (25OHD) levels and rehabilitation outcomes following hip fracture surgery.
Methods: Patients admitted with a hip fracture were reviewed comparing two oral vitamin D replacement regimens, moderate-dose (MD): 4000IU and usual-care (UC): 1000IU daily commenced on admission for 14-days.
Results: Results: One-hundred-and-twenty-four elderly patients were studied (mean age 80.3±8.6, 75.8% females, 74.2% from home). Vitamin D deficiency was prevalent in 76.7% of participants, with a mean 25OHD of 44.1±23.2 nmol/L (range 10-131): severe (<12.5 nmol/L) in 4 participants (3.3%), moderate (12.5–24 nmol/L) in 18 (15%), and mild (25–49 nmol/L) in 70 (58.3%). Thirty-two percent had secondary hyperparathyroidism [PTH>5.25pmol/L in the presence of hypovitaminosis D]. Participants in the MD group were slightly older (81.9 vs. 78.9, p=.045). At 14 days (table 1), in a sub-group (n=66) serum 25OHD levels showed greater gains (22.4±18.3 vs. 7.5±19.6 nmol/L, p=.002) in the MD compared to UC group and were slightly more likely to improve (88.9% vs. 62.5%, p=.05), less likely to worsen (11.1% vs. 37.5%, p=.05). There were no significant differences in terms of time-to-mobilisation, change in mobility and ADL status, discharge destination, rehabilitation and total length of stay, inpatient and 6-month post-discharge mortality.



Conclusions: The MD replacement approach can significantly improve 25OHD levels within 2 weeks after a hip fracture, which could facilitate subsequent intravenous bisphosphonate treatment. However, this did not translate into detectable improvements in rehabilitation outcomes which may have been insufficient responsiveness of these outcome measures. We describe the study protocol for a proposed new study, REVITAHIP, which addresses these issues.

Disclosure of Interest: None Declared

P777 - MISSED OPPORTUNITIES FOR OSTEOPOROSIS MANAGEMENT IN OLDER PATIENTS: A LITERATURE REVIEW

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Aims: This review examines the current body of literature regarding the investigation of osteoporosis and prescribing of secondary bone prevention medication in older patients following fragility fractures.
Methods: A standard Boolean Search Framework was used to find all pertinent studies on the literature review question. A further valuable set of results was obtained using a 'snowballing' technique by pursuing references of the initial studies and reviews found. Papers were included if they were not part of recent reviews conducted in 2004 and 2006, to determine if there had been

changes in the prescription rates specifically in elderly patients since education and published guidance has increased.
Results: See table. Examination of the nine papers obtained revealed several consistent themes. All of the studies assessed the treatment outcomes in patients following a fragility fracture, but six of the nine studies further reported the rates of investigation in the affected patients, and several additionally commented on the influence of age and gender on prescribing patterns. All of the studies concluded that there continues to be a lack of active therapeutic intervention for osteoporosis in elderly people.

Table 3: Summary of the papers used

Paper and Year	Country of studt	Participants	Method	Prescribing rate of anti-resorptive therapy	DEXA results (if applicable)
Suhm et al 2008	Switzerland	870 M and 2797 F	Consecutively recruited patients over 8 -16 months, used patient records	19.7%	31.4%
Freedman et al 2008	USA	267 M and F	Retrospective study using X-rays and patient records	28%	39%
Bessette et al 2008	Canada	903 F	Prospective cohort study using phone interviews	15.4%	52%
Gehlbach et al 2007	USA	9700 F	Interviews from a national health survey	32%	-
Papaioannou et al 2008	Canada	2187 M	Prospective recruitment over 5 years, interviewer led questionnaire	9.5%	-
Hooven et al 2005	USA	381 F	Mail survey over 2 year period	33%	38%
Perreault et al 2005	Canada	Ranging from of 1370 to 1883 F	Database information used over 5 years	25%	20.4% in 1995 to 41.1% in 2000

Conclusions: As envisaged, the consistently low intervention rates reported in all the studies appraised provide evidence that elderly individuals in who experience fragility fractures are still not receiving adequate investigation or treatment for osteoporosis. Furthermore, this review has identified the possibility for future research endeavours into large scale studies to evaluate the true extent of the deficiency of care in the United Kingdom.

Disclosure of Interest: None Declared

P778 - EFFECT OF THYROID DYSFUNCTION IN THE TREATMENT OF THE OSTEOPOROSIS

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Aims: The aim of this Study has been to evaluate the incidence of thyroid dysfunction in a Spanish group of osteoporotic patients and to evaluate in these patients, with o without thyroid dysfunction, the effect of different drugs for the treatment of Osteoporosis.
Methods: We have studied 272 patients with Osteoporosis who come to our medical office from November 2007 until March 2008 and we found that 50 patients (18%), have some kind of thyroid dysfunction (85% hypothyroidism and 15% hyperthyroidism). Bone mineral density (BMD) was measured, by dual energy X-ray (DXA Hologic® QDR 4500) (*c.v. in vivo* 1,2%), at lumbar spine (L2-L4) (LS), femoral neck (FN) and total hip (TH), over 1 year of treatments in non thyroid patients, Group 2, and in patients with thyroid dysfunction (Group 1). Treatment evaluated were alendronate, risedronate or raloxifene. We also separated the results of different treatments
Results: Average of age, weight and height of our patients were 67.8 years, 60.9 KGs and 155.5 cm. in Group 1 and 66.9 years, 62.5 KGs and 156.6 cm, in Group 2. Initially BMD in both groups were similar. Group 1: TH: 0.773 gr/cm2, FN: 0.631 gr/cm2 and LS: 0.700 gr/cm2. Group 2: TH: 0.773 gr/cm2; FN: 0.621 gr/cm2 and LS: 0.699 gr/cm2. BMD after one year of treatment with alendronate, show a statistically significant increase in LS and TH in the whole population (BMD LS: 0.764 gr/cm2 p=0.004 and BMD TH: 0.683 gr/cm2 p=0.01. These differences appear also in Group 2 (BMD LS: 0.758 gr/cm2 p=0.001 and BMD TH: 0.678 gr/cm2 p=0.01) but not in Group 1. BMD after one year of treatment with risedronate, show a statistically significant increase in LS in the whole population (BMD LS: 0.775 gr/cm2 p=0.004) There are not difference between Group 1 and Group 2 results. BMD after one year of raloxifene in the three levels, did not change significantly in any of the subgroups.
Conclusions: The prevalence of thyroid dysfunction in our osteoporotic population is higher than expected. This feature and of a specific treatment may be in favour of a screening by a systematic TSH determination in this population. Patients treated with oral bisphosphonates (Alendronate and risedronate) during one year improve bone mass. Only patients treated with alendronate show differences between patients with or without thyroid dysfunction.

Disclosure of Interest: None Declared

P779 - PAMIDRONATE TREATMENT IN A PATIENT WITH FIBROUS DYSPLASIA OF THE JAW AND FGF-23 MUTATION

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[1]Internal Medicine, [2]Pathophysiology, [3]Immunoallergology, University, Florence, Italy

Aims: Fibrous dysplasia is a rare benign bone disease caused by replacement of normal bone with fibro-osseous connective tissue often associated with bony deformities. Diagnosis is based on clinical, radiographic, and histological findings. The Pamidronate, a potent osteoclast inhibitor, can produce increases in the lesion density and delay the spread of the lesions into surrounding bones. The aim of this study is to evaluate the efficacy of the treatment with i.v. Pamidronate in a patient with the monostotic fibrous dysplasia of the jaw.
Methods: A 30-year-old girl (AL) was referred to our service in the 1999 with diagnosis of monostotic fibrous dysplasia of the left jaw, associated to recurring swellings of the bone and increase in inflammatory indexes. At the age of 10 years AL was underwent a right parotidectomy and in the 1992 an osteosynthesis of the right jaw without resolution of symptomatology. Subsequently, multiple cystic areas, osteosclerosis, leontiasis and condyle hyperplasia in the left jaw were observed. The biopsy of the left jaw showed a picture of osteofibrous dysplasia. Bone scintigraphy evidenced marked hyperactivity next to emi-jaw left. Lumbar and femoral bone densities were normal. Bone alkaline phosphatase and urine pyridinoline were in the upper-normal range; serum

calcium, phosphorus, PTH, and urine calcium and phosphorus were in the normal range. A polymorphism in exon 3, C to T nucleotide variation at codon 239 (T239M) in the coding sequence of FGF-23 gene, not previously reported in fibrous dysplasia, was detected.

Results: In the 1999 the patient started Pamidronate therapy (90 mg i.v.) followed by 11 cycle of Pamidronate (1 mg/Kg i.v. over 3 days from 1999 to 2005). Supplements of calcium and vitamin D were associated. The patient was followed up with clinical examinations, radiographs and biochemical indexes of bone turnover for 11 years. After the first Pamidronate administration, the panoramic radiograph significantly improved: a bone homogeneous structure on the left without osteolytic areas and with reduction of osteosclerosis became evident. At three year from the last pamidronate infusion (2008), the radiological picture remained unchanged, with an almost complete remission of the radiological signs of fibrous dysplasia; the patient is still free of symptoms.

Conclusions: Pamidronate treatment of fibrous dysplasia has been very efficacious in resolving functional and aesthetic problems of this patient without adverse effects.

Disclosure of Interest: None Declared

P780 - CHANGES IN SERUM CALCIUM AND PTH LEVELS DURING THE FIRST 6 MONTHS, IN PATIENTS INCLUDED IN THE STEP STUDY (STUDY OF IMAGING TECHNIQUES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS TREATED WITH PTH 1-84)

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Aims: The STEP study is a multi-centre phase IV clinical trial, which is ongoing in 9 centres in Spain. All patients will be assessed with two imaging techniques (ImaTx and DXA) at baseline and at month 18. After a 4-week run-in phase, subjects receive a daily subcutaneous injection of PTH (1-84), 100 mg, plus calcium and vitamin D supplementation. Planned final sample size is 85 patients.

Methods: As of the end of December 2009, 70 patients have been included. An interim statistical analysis of the available data has been done, to obtain demographical data and evolution of predose serum calcium (s-calcium) and serum PTH (s-PTH), to a maximum treatment length of 24 weeks.

Results: A total of 57 patients were suitable for analysis. Mean age: 70.3 years (65-81); mean BMI: 27.7 kg/m^2·SD (3.8), mean t-score lumbar spine: -3.54, SD (0.49), mean t-score total hip: -1.82, SD (0.68). Six patients (10.5%) reported at least one adverse event after treatment was started (constipation (4), nausea (2), rectal haemorrhage (2), back pain (1), headache (1), malaise (1), pallor (1)). Mean s-PTH levels decreased from baseline in each single visit to week 24 (51.4 to 24.3 pg/ml, mean change: -33.63, SD: 22.8). On the other hand, s-calcium mean values increased in parallel from 9.56 to 9.71 mg/dl (mean change: 0.16, SD: 0.45) during the first 24 weeks of treatment. Nine patients showed at least one s-calcium measurement >10.5 mg/dl, but after discontinuation of calcium and vitamin D supplements, s-calcium values returned to normal range.

Conclusions: Patients included in the STEP study seemed to be representative of the population usually prescribed PTH 1-84 in clinical practice. Adverse events reported so far have already been described in previous studies. Pre-dose s-PTH levels decreased during the first 24 weeks, and s-calcium increased in parallel. Only 16± of patients showed s-calcium levels over the upper limit considered in the study, which rapidly returned to normal range after discontinuation of calcium and vitamin D supplements.

Disclosure of Interest: G. Martínez: None Declared, S. Palacios: None Declared, E. Martínez Employee of: Nycomed, A. Pérez-Abela: None Declared, A. Díez-Pérez: None Declared, J. Pérez-Castrillón: None Declared

P781 - EFFECT OF LOW INTENSITY PULSE MAGNETIC FIELD IN THE PREVENTION OF SPINAL CORD INJURY INDUCED OSTEOPOROSIS IN RATS

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Aims: To determine the effect of low intensity PMF in the prevention of SCI induced osteoporosis. SCI leads to a significant decline in sub-lesional bone mass. The management of which is unsatisfactory. PMF therapy has been reported to significantly promote peripheral nerve regeneration and osteogenesis; besides, sparing of peripheral white matter, smaller lesion volume. Therefore PMF appears to have greater potential in the promotion of recovery from SCI.

Methods: The present study was designed to investigate the effect of low intensity pulse magnetic field (PMF) on bone mineral contents (BMC), density (BMD) and biochemical status of the sublesional bones (femur and tibia) in rat following spinal cord injury (SCI). Male adult Wistar rats (n=24) were equally divided into control, SCI and SCI+PMF groups. Complete transection of spinal cord (T11 vertebra) was surgically performed in Ketamine anesthetized. At the end of the study (8 weeks) BMD, BMC (Calcium, Phosphorus, Carbon) biochemical status (Osteocalcin, OC; Collagen I; Alkaline Phosphatase, ALP) were determined. SCI+PMF group of rats received magnetic field (17.96 μT and 50 Hz) for 2 h / d x 8 weeks.

Results: In SCI rats, there was a statistically significant decrease in BMC, BMD in both the bones as compared to control group, while there was no statistically significant decrement in SCI+PMF rat group except the Carbon content. The OC, Collagen I and ALP in femur significantly decreased (459.74±52.99 mg/g, 213.33±22.73 mg/g, 93.10±11.57 I.U/g) in SCI versus control rat group (790.14±76.71 mg/g, 296.59±34.8 mg/g, 134.67±8.84 I.U/g) respectively which was attenuated in SCI+PMF rat group.

Conclusions: SCI caused loss of BMC, BMD and altered biochemical properties of sub-lesional bones indicative of significant

osteoporosis in our rats which was attenuated by low intensity PMF(17.96 μT and 50 Hz) for 2h/dx8 weeks.

Disclosure of Interest: None Declared

P782 - COMPLIANCE WITH ORAL OSTEOPOROSIS DRUGS

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Aims: To investigate drug compliance of first time oral osteoporosis drug users and to identify factors associated with compliance.
Methods: Women with postmenopausal osteoporosis, who initiated treatment between Jan 2005 and Dec 2006 were included. All new user were followed up every 3 months twice then every 6 months thrice then yearly. Clinical data, including demographic data, drug use profile, previous use of hormone therapy for menopausal symptoms, concomitant use of other medications and DXA results, were obtained from their computerised clinical records.
Results: The study sample included 213 women. Their mean age was 57.5±6.0 years old (range: 41 - 74) and their mean menopausal age was 48.6±4.5 years old (range: 33-60). Drugs used included weekly bisphosphonates (72.3%) and daily raloxifene (27.7%). Up till January 2010, 32.9% patients continued with the drug, 25.8% discontinued and 23.5% defaulted. 10.3% changed to other drug(s) and continued with that, 4.7% changed drug but eventually discontinued and 2.8% changed drug and eventually defaulted. Treatment compliance was related to whether side effects were experienced ($p<0.001$), the drug used ($p=0.002$) and DXA reassessment result ($p<0.001$). There was no association with family income (below vs. above median household income of Hong Kong, $p=0.086$), education (illiterate & primary education vs. secondary & higher education, $p= 0.846$), previous use of hormone therapy for menopausal symptoms ($p=0.130$), concomitant use of medication(s) for treating other chronic illness(es) ($p=0.069$), personal history of fracture ($p=0.867$) and family history of osteoporosis ($p=0.611$). The main reasons for changing from raloxifene to other drugs were side effects (hot flush, cramps) intolerable (25%), decreased bone mineral density (BMD) on reassessment (25%) and no significant increase in BMD on reassessment (20%). 72.2% patients requested change from weekly bisphosphonates to other drugs because they could not tolerate the side effects, mainly gastrointestinal upset and musculoskeletal pain.

	Change drug	Continue	Default	Discontinue	Total
Weekly Bisphosphonates	18	55	39	42	154
Raloxifene	20	15	11	13	59
Total	38	70	50	55	213

Conclusions: While weekly bisphosphonate takers were more compliant to treatment than daily raloxifene takers, the overall compliance with osteoporosis treatment was still unsatisfactory. Allowing drug changes at follow up visits retained more than half of the patients. Compliance was mainly affected by the characteristics of the drug used.

Disclosure of Interest: None Declared

P783 - A COMPARISON OF CASE-FINDING STRATEGIES FOR THE MANAGEMENT OF OSTEOPOROSIS

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Aims: The aim of this study was to compare the effectiveness of the Royal College of Physicians (RCP) case-finding strategy previously used in the UK and the updated guideline published by the National Osteoporosis Guideline Group (NOGG), which incorporates the FRAX® tool to calculate fracture probability.
Methods: Comparisons were made by simulating population samples of 1000 women at ages ranging from 50 to 85 years, using age-specific prevalence of risk factor and UK-derived rates for fracture and mortality. Comparators comprised the number of women identified at high risk, the incidence of hip fracture and the femoral neck bone mineral density (BMD) in those identified, the number of BMD tests required to identify a prospective hip fracture case, the acquisition cost and the cost per hip fracture averted.
Results: Compared with the RCP strategy, NOGG identified similar or slightly reduced numbers of women at high risk (average 34.6% vs. 35.7% across all ages), but with lower numbers of scans required at each age. For example, NOGG required only 3.5 scans at the age of 50 years to identify one case of hip fracture, whereas RCP required 13.9. At the age of 75 years, the corresponding numbers needed to scan were 0.9 and 1.5. The lower number of BMD tests meant that the acquisition costs for identifying a hip fracture case and the total costs (acquisition and treatment) per hip fracture averted were also lower.
Conclusions: Compared to the RCP strategy, the FRAX®-based NOGG strategy makes more efficient use of BMD resources with lower acquisition costs and lower costs per hip fracture averted.

Disclosure of Interest: None Declared

P784 - A TRANSLATIONAL APPROACH TO CLINICAL GUIDELINE DEVELOPMENT WITH FRAX® BASED ON THE GUIDELINES FOR SWEDEN

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Aims: FRAX® is a computer based algorithm that provides models for estimating the probability of fracture in men and women, and is freely available on the internet (www.shef.ac.uk/FRAX®). Given its ease of use, the FRAX® tool is increasingly used by clinicians which has created a need for clinical guidelines to incorporate fracture probability into clinical management algorithms. Intervention thresholds (the fracture probabilities at which treatment is recommended) can either be fixed (e.g. a probability of 15% or more) or developed from existing guidelines (a 'translational' approach). The aim of this study was to develop a translational approach derived from current clinical guidelines in Sweden provided by the Medical Products Agency.
Methods: Under this guidance, women are considered as candidates for treatment on the basis of BMD and clinical risk factors for osteoporosis. More specifically, they are considered for treatment when they have a BMD T-score of<-2.0 SD and a previous fracture or a BMD T-score of<-2.5 SD and at least one strong risk factor (high age, glucocorticoids, family history of fracture) or at least two weak risk factors (low body mass index (BMI), smoking, early menopause). These indications were converted to probabilities of a major osteoporotic fracture using the Swedish FRAX®-model.
Results: Mean probabilities increased with age, from 13% at the age of 50 years in women and rose to 34% at the age of 80 years. The use of fracture probabilities permitted women at high risk to be considered for treatment who would not be otherwise eligible. For example, a women aged 65 years with a T-score of -2.0 SD having family history, corticosteroid treatment and smoking, has a 10 year probability of 33% that greatly exceeds the intervention threshold for that age (22%). In contrast, she would not be currently considered for treatment since she has a T-score above -2.5 SD.
Conclusions: The evolution of guidelines relying on BMD-based intervention (thresholds towards a fracture risk continuum based on the 10-year probability of any major osteoporotic fracture may contribute to improved identification of patients at increased risk of fracture.

Disclosure of Interest: None Declared

P785 - NECK SPARING TOTAL HIP ARTHROPLASTY – LESSONS LEARNED

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Aims: Architectural changes occur in the proximal femur after THA and can lead to implant loosening and or breakage of the implant. Previous surgeon designers (Freeman, Townley, Whiteside and Pipino) have advocated the concept of neck sparing stems. However, to-date most neck sparing stems have had disappointing results with regard to maintaining proximal bone mineral density. Our aim was to identify design features that would improve proximal load transfer, simplify surgical technique and be cost effective by inventory size and cost.
Methods: Review of previous published work was evaluated along with new FEA modeling providing for a new approach to neck sparing short curved stem design. Three hundred radiographs were evaluated for sizing and twenty intra-operative trial implantations for the development of simplified, and reproducible surgical instrumentation. All surgical approaches were utilized. The review process provided for a novel new design that was validate by the fabrication and implantation of five custom stems with post-operative follow-up between twenty and twenty nine months. The proximal stem design has a novel conical flair shape that stimulates and transfer hoop tension into compress forces to the retained femoral neck. A modular neck provides for fine-tuning joint mechanics without disruption of implant to bone interfaces and a sagittal slot reduces chances of lateral cortex perforations. In case of stem removal a threaded hole is provided for a solid lock with a slap hammer for direct axial removal.
Results: Radiographic review clearly demonstrates the need for 20° of internal rotation for proper measurement of femoral offset and medial neck curve. Surgical intra-operative evaluations demonstrated any standard conventional or small incisions works with this stem. The anterior single incision is especially attractive since the curvature of the stem reduces the need for as much femoral mobilization required by a straighter stem design. FEA modeling demonstrated improved proximal strain patterns to the retained femoral neck. Fatigue FEA modeling showed reduced implant strains in the modular neck as a result of a shorter bending moment by design use of neck sparing feature.
Conclusions: We are encouraged with FEA modeling and short-term clinical/surgical results to-date and believe there are significant advantages in the concept of neck sparing stems. Additional mechanical and clinical /surgical evaluations are underway (twenty stems implanted to-date).

Disclosure of Interest: T. Mctighe Grant / Research Support from: Orthopaedic Industry, Consultant / Speaker's bureau / Advisory activities with: Orthopaedic Industry, Board member of: JISRF & CDD, LLC, Stock ownership or royalties of: Orthopaedic Industry, Patent licensing of: TSI™ Implant, A. Turnbull Grant / Research Support from: JISRF, Global Orthopaedic, Stryker Orthopaedics, Consultant / Speaker's bureau / Advisory activities with: JISRF & Orthopaedic Industry, Board member of: Advisory Board JISRF, Institutional support, Stock ownership or royalties of: Orthopaedic Industry & CDD, LLC, J. Keggi Grant / Research Support from: JISRF, Consultant / Speaker's bureau / Advisory activities with: JISRF, Orthopaedic Industry, Board member of: Clinical Research Advisory Board, Stock ownership or royalties of: Omnilife Science & CDD, LLC, K. Keggi Grant / Research Support from: Keggi Orthopaedic Foundation, Consultant / Speaker's bureau / Advisory activities with: Orthopaedic Industry, Board member of: Keggi, Orthopaedic Foundation, & J ISRF, Stock ownership or royalties of: Omnilife Science & CDD, LLC, R. Kennon: None Declared, S. D. Stulberg Grant / Research Support from: Orthopaedic Industry, Consultant / Speaker's bureau / Advisory activities with: Orthopaedic Industry, Stock ownership or royalties of: Orthopaedic Industry, L. Rubin: None Declared, I. Woodgate Consultant / Speaker's bureau / Advisory activities with: Global Orthopaedics, Stock ownership or royalties of: Global Orthopaedics, J. Harrison Grant / Research Support from: JISRF receives institute support from Orthopaedic Industry, Board member of: JISRF, Stock ownership or royalties of: CDD,LLC, A. Van Der Rijt: None Declared, D. Brazil Grant / Research Support from: Orthopaedic Industry, Consultant / Speaker's bureau / Advisory activities with: Orthopaedic Industry, Stock ownership or royalties of: Orthopaedic Industry and Signature Orthopaedics

P786 - PHYSICAL THERAPY MANAGEMENT OF THE PATIENT WITH OSTEOPOROSIS – FOCUS ON THE SPINOMED III ORTHOSIS

S. M. Meeks [1,*]
[1]Sara Meeks Seminars, Gainesville, United States

Aims: This highly interactive presentation will focus on a comprehensive, 12-point physical therapy management approach to the patient with osteoporosis and compression fracture with an emphasis on bracing with the Spinomed III spinal orthosis. Participants will learn concepts such as the "Abet Soup of the Skeleton" and to move "From and For The Bones." Included is a detailed description of each point of The Meeks Method 12-point intervention approach along with a discussion of the study of the Spinomed orthosis and how the results impact physical therapy management.

Methods: Sara M. Meeks, PT. MS, GCS is a physical therapist with nearly 50 years of experience who has spent the past 25 years focusing on the unique management implications of the patient with osteoporosis.

Results: She is an author, seminar leader and international presenter who, in addition to the conferences listed below, has presented for both annual conferences of the American Physical Therapy Association, at many U.S. state chapter meetings, and teaches her seminar OSTEOPOROSIS: A Comprehensive Treatment Strategy Levels 1-3, around the U. S. and Canada. She is a physical therapy consultant for Osteoporosis Canada.

Conclusions: Presenter 4th Symposium on "New Therapeutic Aspects for Osteoporotic Vertebral Fractures." September 2009. Begur, Spain. Sponsored by medi GmbH & Co. Germany.

References: Plenary Presenter WCPT AWP & IPA Congress. Membai India. January 2009.

Exercise and Movement Guidelines for the Physically Frail. Home Health Section CSM 08.

Keynote Speaker International Private Practitioners Association, WCPT, Melbourne, Australia. October 2005

SAFE Yoga for Skeletal Health-Section on Geriatrics CSM 07, Management of Compression Fractures - Section on Orthopedics CSM 05, Osteoporosis: The Case for UN-Loading - Section on Orthopedics, CSM 04, Osteoporosis: Prevention of Sequelae in a Younger Population – Section on Women's Health CSM 04., Spinal Stenosis vs. Osteoporosis: The Treatment Dilemma. Section on Orthopedics CSM 03.

Development of a Senior Exercise Class Safe for Persons With, or at risk for Osteoporosis. APTA Annual Conference. Pre-Conference Course June 2002.

The Challenge of Osteoporosis: Recognizing the First Signs and Risk Factors in the Physical Therapy Clinic Population – Section on Geriatrics CSM 02., Treatment of Compression Fractures Acute-Chronic Care, PT01 Anaheim, CA., Exercise Guidelines for the Healthy Elderly, PT00 Indianapolis, IN

Disclosure of Interest: None Declared

P787 - SAFE, THERAPEUTIC MOVEMENT & EXERCISE FOR BONE HEALTH

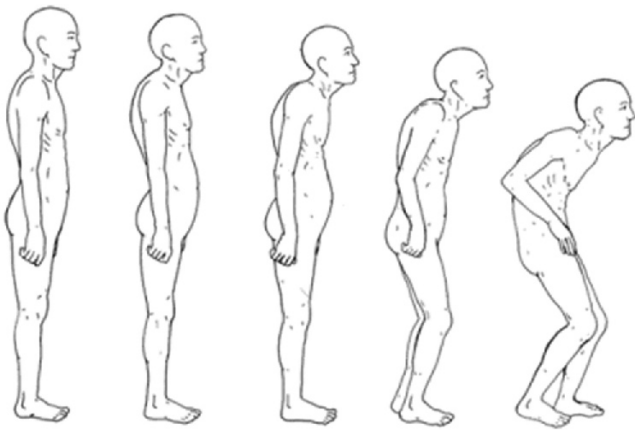
S. M. Meeks [1,*]
[1]Sara Meeks Seminars, Gainesville, United States

Aims: This highly experiential, participatory session will focus on movement and exercise to prevent, arrest and/or reverse the common Patterns of Postural Change (Figure 1 below) associated with the ageing process. With the intent of improvement in body

alignment to maximize both the weight-bearing forces and the force of muscle contraction on bone, participants will leave with practical and easy ideas to implement in their own private lives as well as in their own practice.

Methods: Included will be instruction in The Perch Posture (seating to strengthen the back,) Sit-To-Stand exercises with The Hip Hinge, how to move with spinal elongation, functional and practical Balance Exercises, Principles of Movement for Activities of Daily Living and Weight-Bearing Exercise, and discussions of bracing with the Spinomed III spinal orthosis, as well as other aspects of the comprehensive Meeks Method for management of the patient with osteoporosis.

Results: -



Conclusions: Sara M. Meeks, PT, MS, GCS has been practicing physical therapy for nearly 50 years and has spent the past 25 years specializing in the unique management implications of patients with low bone mass. An international seminar leader and speaker, she has presented her work at the following conferences:

References: 1. Presenter 4th Symposium on "New Therapeutic Aspects for Osteoporotic Vertebral Fractures." September 2009. Begur, Spain. Sponsored by medi GmbH & Co. Germany. September 2009

2. Plenary Presenter WCPT AWP & IPA Congress. Membai India. January 2009.

3. Keynote Speaker International Private Practitioners Association, WCPT, Melbourne, Australia. October 2005

4. Seminar OSTEOPOROSIS: A Comprehensive Treatment Strategy presented at both annual conferences of the American Physical Therapy Associated, many state chapter conferences, as well as at multiple locations around the United States and Canada since 1997. Physical Therapy consultant for Osteoporosis Canada.

Disclosure of Interest: None Declared

P788 - PHARMACOKINETIC CLINICAL STUDIES OF AN ORALLY DELIVERED RECOMBINANT PTH ANALOG

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Aims: Parathyroid hormone (PTH), when given intermittently, has an anabolic effect on bone. An oral tablet formulation of this PTH analog was developed and initially optimized in a dog model. Two clinical pharmacokinetic (PK) studies were performed to determine the plasma levels and variability of the PK response, as well as the safety of this oral formulation.

Methods: A recombinant PTH analog was produced in *E. coli* at levels exceeding 1 g/litre. An initial rising dose study in postmenopausal women examined the plasma levels following administration of tablets containing 2, 4, 6 and 8 mg of this recombinant analog. A second study was designed to evaluate the safety as well as the inter- and intra-subject PK variability of two dosing regimens in an open label, two-period replicate dose study in postmenopausal women: a) a single 6 mg tablet given to each subject at period 1 and at period 2, with a 48 hour interval between each period. b) two tablets of 4 mg each given simultaneously to each subject during period 1 and period 2, with a 48 hour interval between each period. Blood samples were collected over a 6 hour period following dosing and PTH levels were quantified using a sandwich ELISA.

Results: In the first study, a linear dose-dependent response was seen at the three higher doses. In the second study, the C_{max} values with both the 6 mg and 2x4 mg tablets were in the 200 to 300 pg/mL range, and hence achieved or exceeded blood levels that have been shown to be anabolic with an existing injectable formulation. A few transient adverse events were seen at the higher exposures, and these were mostly the known class effects of PTH such as light headedness, diaphoresis and nausea. There were no serious adverse events reported during the study and no clinically significant changes in serum calcium, phosphate, magnesium or endogenous PTH activity were observed.

Conclusions: The PK profiles were consistent with the requirement for bone anabolic activity. Both the inter- and intra-subject variability was deemed to be acceptable with the 6 mg dose. Further clinical studies to investigate the longer term safety and efficacy of this orally delivered PTH analog have been initiated.

Acknowledgement: The clinical development of this PTH analog is a collaborative project with GlaxoSmithKline.

Disclosure of Interest: None Declared

P789 - EFFICACY OF AQUATIC REHABILITATION FOR CHRONIC AND RECURRENT BACK PAIN

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Aims: The conservative treatment of low back pain includes balneophysical therapy; the chronicity of the condition and the sever-

ity of symptoms influence the outcome of therapy. The aim was to determine the effectiveness of aquatic rehabilitation for outpatients with chronic or recurrent back pain for a period of 6 weeks in Medical Rehabilitation Hospital Felix Spa. Design: randomized, controlled observational study. Setting: outpatient setting.
Methods: A total of 102 patients with recurrent or chronic back pain, were randomized in control (n=50) and study group (n=52). Interventions: the control group: complex rehabilitation treatment, 3 times weekly for 6 weeks, including physiotherapy, massage and pain relief medication. Study group: the same program applied completed with exercise and hydrokinetotherapy in oligomineral thermal waters. Outcome measures: Disability measured using the Roland Morris Disability Questionnaire. Assessments: at baseline, at the end of the treatment and after 3 months. Data analysis: Paired t – Student test, effect size for the Roland Morris Score to describe the magnitude of the clinical changes.
Results: Little change occurred in Roland Disability Score in the control group. Significant reductions took place for all interventions for Roland Disability Score in the study group at the end of the treatment. The study group had better values 3 month after the end of rehabilitation compared to baseline whereas the control group had already declined to values.
Conclusions: The rehabilitation program including hydrokinetotherapy in oligomineral thermal water induce beneficial long-term effects in low back pain although the underlying mechanisms are not yet fully understood.
References: 1. De Lisa JA. Physical medicine and rehabilitation – principles and practice, 4th Edition, Lippincott Williams and Wilkins, 2005; 2. Goldby L et al, Spine 2006;31:1083; 3. Hayden J et al, Ann Intern Med 2005;142:765; 4. Lie-Chien Hsieh L et al, BMJ 2006;332:696; 5. Waddell G, Aylward M, Sawney P. Back pain, incapacity for work and social security benefits; an international literature review and analysis. London: Royal Society of Medicine Press 2002.

Disclosure of Interest: None Declared

P790 - WAYS OF MANAGEMENT IN AN SEVERE POSMENOPAUSAL OSTEOPOROSIS WOMAN

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[1]ASPOR, o, [2]Physical Rehabilitation Clinic Felix Spa, Felix Spa, [3]University of Oradea Faculty of Medicine, [4]ASPOR, Oradea, [5]ASPOR, Targu Mures, Romania

Aims: we studied a case of a postmenopausal woman with a severe form of osteoporosis with multiple spine fractures regarding the optimal therapeutic approach.
Methods: We examined the case of a 50 years old woman who presented the following risk factors of osteoporosis: early menopause at 38 years, etiology not specified (Hormone replacement therapy from 38 to 40 years), low body mass index and former smoker. The first symptom of osteoporosis occurred in the context of ordinary domestic activities in December 2007 and consisted in a flare of extremely severe low back pain leading to marked disability. In early April 2008, during a consult in neurosurgery and a RM examination revealed a total of two severe fractures and a moderate number of three dorsal vertebral fractures, and the diagnose of osteoporosis is established. Given the state of the patient, the number and severity of the vertebral fractures, an intervention Kyphoplastia was recommended and performed. Next month an antiosteoporotic bisphosphonates treatment was initiated and an addition of calcium and vitamin D. We also mention that neither the hospital nor the family doctor have made recommendations on a rehabilitation program or a lifestyle change. The patient loses her independence and the family contacts a rehabilitation service: Physical Rehabilitation Clinic Felix Spa, Romania where the patient was admitted three months after the surgery. We used QUALEFFO 41 Index to assess the quality of life of our patient.
Results: We continued the antiosteoporotic therapy and started a complex rehabilitation program focusing on individual specific physical therapy, hydrokinetotherapy, massage, counselling and occupational therapy and physiotherapy. The patient increased her weight, the depression symptoms disappeared, without new fractures clinically shown, with bone mineral density in a stationary phase, with a markedly lowering of pain symptoms and with improvement of spine movement and orthostatic autonomy. All of the above led to a significantly increasing of her quality of life(Qualeffo 41 index).
Conclusions: In case of severe osteoporosis with markedly affected of clinical statement and quality of life the antiosteoporotic therapy and surgical treatment of the vertebral fractures are not enough. The key to improve quality of life of such a patient is a complex rehabilitation management and changing in lifestyle coordinate by a complex rehabilitation team .

Disclosure of Interest: None Declared

P791 - INFLUENCE OF LONG-TERM POSTMENOPAUSAL HORMONE REPLACEMENT THERAPY ON STRUCTURAL BONE STRENGTH AND ITS DETERMINANTS IN BODY WEIGHT-LOADED AND NON-LOADED BONE

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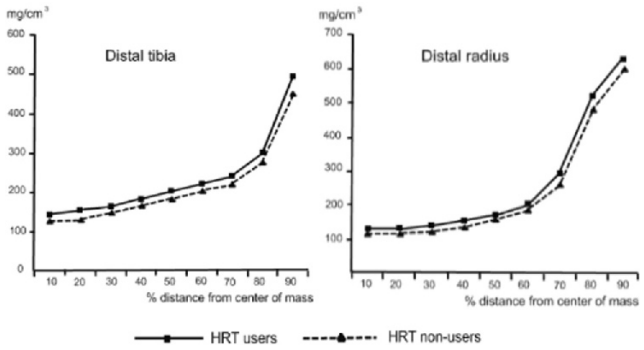
Aims: Although postmenopausal hormone replacement therapy (HRT) is known to prevent fractures, knowledge on the influence of long-term HRT on bone strength and its determinants other than areal bone mineral density is scarce. The aim of this study was to investigate the influence of long-term HRT on bone strength and its determinants in body weight-loaded and non-loaded bone.
Methods: This study had a genetically controlled design with 24 postmenopausal monozygotic female twin pairs (mean age 61 years) discordant for HRT for an average 8 years. Bone strength,

volumetric mineral density, cross-sectional area, bone mineral mass as well as cross-sectional density and mass distributions were assessed in the distal tibia and distal radius with peripheral computed tomography (pQCT).

Results: The HRT users and their non-using co-twins did not differ in body weight or level of physical activity. In the tibia, compressive strength was 24% (95% CI: 9 to 40%) and in the radius 26% (11 to 41%) greater in the HRT users compared to their non-using co-twins. This was due to higher volumetric bone mineral density in the HRT users (mean 11%, 4 to 18%) both in the tibia and radius since no difference between the users and non-users was observed in bone cross-sectional area. The HRT users had higher bone mineral mass than the non-users both in the tibia (10%, 4 to 16%) and radius (12%, 5 to 18%). Volumetric bone mineral density was significantly higher throughout the bone cross-section in the HRT users compared to non-users except in the innermost area and in the trabecular area next to the cortical wall in both bone sites (Figure). Also, bone mineral mass was higher in the HRT users in all directions cross-sectionally except for anterior direction.



Conclusions: In postmenopausal women, long-term HRT preserves strength in epiphyseal bone sites by preventing bone mineral loss independently of the loading environment. The extra mineral preserved in HRT users is distributed evenly within and between bone sites. Thus, long-term HRT prevents adverse effects of menopause on the skeleton which predispose postmenopausal women to fractures.

Disclosure of Interest: None Declared

P792 - SCREENING AND DIAGNOSIS OF OSTEOPOROSIS TO PREVENT FRACTURES AND FACTORS ASSOCIATED WITH ANTI-OSTEOPOROSIS TREATMENT IN OLDER ADULTS

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Aims: To investigate the prevalence of osteoporosis in older adults with fragility fractures and to identify factors associated with screening and pharmacological treatment.

Methods: We analysed 285 post menopausal women and 55 men who underwent to an orthopaedic treatment for low trauma fracture between July 2006 and December 2009. The patients were aged 50 years old and over. For each patient a questionnaire was completed, that included the data about the screening of osteoporosis and the pharmacological prescription before and after the fracture. Moreover, the questionnaire included some characteristics of patients: age, sex, height, weight, BMI, age of menopause, education, family history of fragility fracture, smoking, neurological diseases, rheumatoid arthritis, diabetes, use of glucocorticoid, history of fractures. We calculated the rates of pharmacological therapy. Therefore we stratified the outcome for each of these variables. We performed a Dual Energy X-Ray Absorptiometry (DXA) exam to evaluate osteoporosis and osteopenia following the guidelines of W.H.O. At discharge, we prescribed a therapy for osteoporosis.

Results: 61% of patients had a hip fracture, 14% proximal humerus, 13% wrist, 10% ankle and 2% spine. 36% of patients had fractures before the admission. Only 20% of patients received a screening of osteoporosis, 18% received a diagnosis of osteoporosis. We performed DXA in 75% (n=255) of patients and assessed osteoporosis in 65% (n=166) and osteopenia in 25% (n=64); 25 patients had a normal T-score. 18% of all patients received a medication for osteoporosis before the index fracture and 48% of patients who had a history of fragility fracture received therapy. We prescribed an anti-osteoporotic treatment at 69.8% of patients. At discharge, calcium/vitamin D were prescribed to all patients (vs. 13% before the index fracture), 55± took biphosphonates (vs. 5% before) and 6% took teriparatide after the first fracture with an increase of 17% after previous fractures.

Conclusions: We found an under-diagnosis and an under-treatment of osteoporosis. Female, younger patients, low education, smoking, neurological diseases, glucocorticoid use, hip fracture were associated with a higher treatment rate. Our purpose is to get better the management of osteoporotic fracture by the use of pharmacological treatment to improve the bone quality

Disclosure of Interest: None Declared

P793 - A COMPARATIVE ANALYSIS OF DRUG PRESCRIBING AND COSTS FOR OSTEOPOROSIS AND HYPERCHOLESTEROLAEMIA IN ENGLAND FOR 1998-2008

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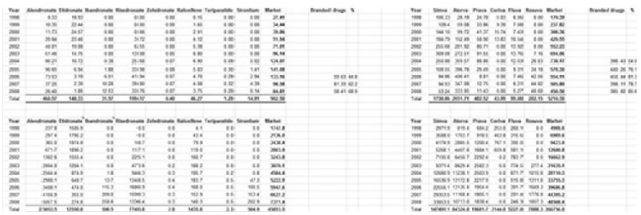
Aims: To compare volume and cost of prescribing of drug treatments for osteoporosis (excluding calcium±vitamin D3 or HRT) and hypercholesterolaemia in England during the period 1998-2008.

Methods: Cost and volume of prescribing was sourced from the annual Prescription Cost Analysis (PCA) reports produced by the NHS Information Centre for health and social care.

Results: Cost of prescribing for osteoporosis treatments peaked in 2005 at £141 million p.a. whilst number of prescription items dispensed peaked in 2008 at 7.3 million. The annual cost of prescribing osteoporosis treatments has reduced by 40% whilst prescribing volume has increased by 39%. Cost of prescribing statins

peaked in 2004 at £738 million p.a. whilst number of items dispensed peaked in 2008 at 48.5 million. The annual cost of prescribing statins has reduced by 39% whilst prescribing volume has increased by 73%. The total cost in 2008 of prescribing osteoporosis treatments other than alendronic acid preparations was £58 million, representing 69% of the total drug spend. The total cost in 2008 of prescribing statins other than simvastatin was £397 million, representing 88% of the total drug spend.



Conclusions: Treatments for hypercholesterolaemia and osteoporosis have been available in England for a similar time period; simvastatin was introduced in 1989 and cyclical etidronate in 1992. Simvastatin and alendronate were the most prescribed products in their drug class prior to the introduction of cheap generic equivalents in 2003 and 2005 respectively. The 5-fold difference between peak annual drug spend on statins and osteoporosis drugs suggests significantly different levels of clinical activity in these two chronic diseases. The substantial difference in current absolute prescribing costs in the two disease areas and the relative proportion of proprietary statins and proprietary osteoporosis drugs is noteworthy. The 2008 NICE Technology Appraisals (TA 160 and 161) on osteoporosis treatments in the UK restrict access to more costly second-line agents other than generic alendronate until BMD is lower, the patient is older or they have more clinical risk factors. This is not the case for second-line statin therapies described in the relevant guidance (NICE TA 94). This inconsistency of recommendations in the two disease areas is surprising given the volume and costs incurred by the prescribing of non-generic statins by the NHS in England compared to that for bone remodelling agents.

Disclosure of Interest: P. Mitchell Consultant / Speaker's bureau / Advisory activities with: Amgen, GSK, MSD-Asia, Novartis, ProStrakan, Roche, Servier

P794 _ ABSTRACT WITHDRAWN

P795 - EFFECT OF ONO-5334, A NOVEL CATHEPSIN K INHIBITOR, ON BONE TURNOVER MARKERS IN CYNOMOLGUS MONKEYS

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Aims: To investigate the effect of ONO-5334 on bone resorption and formation markers in normal and ovariectomized (OVX) cynomolgus monkeys.

Methods: In normal monkey study, female cynomolgus monkeys received doses of vehicle, ONO-5334 0.3, 3 or 30 mg/kg p.o. once daily for 7 days within a cross-over study with 14-day recovery period (6 per group). Serum and urine samples were collected prior to the first administration, on administration day 1, 3 and 7, then 7 and 14 days after the last administration. In the OVX monkey study, female cynomolgus monkeys were assigned to the following 6 groups (20 per group): sham, OVX-control, ONO-5334 1.2, 6 or 30 mg/kg p.o. once daily, or alendronate 0.05 mg/kg i.v. once every 2 weeks. Serum and urine samples were collected prior to OVX and at 0.5, 2, 4, 8, 12 and 16 months after OVX. Serum and urine bone resorption and formation markers were measured in both studies.
Results: In normal monkeys, ONO-5334 decreased bone resorption markers, serum CTX and NTX at doses of 3 mg/kg or higher and urine CTX and NTX at dose of 30 mg/kg on administration 1 or 3 day ($p<0.05$ vs. vehicle). The inhibitory effect of ONO-5334 on bone resorption markers disappeared 7 days (serum NTX, urine CTX and NTX) or 14 days (serum CTX) after withdrawal of administration (no significance vs. vehicle). ONO-5334 did not affect bone formation markers such as serum bone-specific alkaline phosphatase (BSAP) and osteocalcin. In OVX monkeys, serum and urine CTX/NTX, serum BSAP and osteocalcin were elevated from 0.5-4 months after OVX ($p<0.05$ vs. sham). ONO-5334 at 6 and 30 mg/kg inhibited the increase in bone resorption markers to below the sham group level from 0.5 months after OVX ($p<0.05$ vs. OVX). Meanwhile, ONO-5334 inhibited the increase in bone formation markers from 0.5-4 months after OVX ($p<0.05$ vs. OVX), and the level was between sham and OVX-control groups at 16 months. Alendronate inhibited both types of bone turnover marker from 0.5-8 months after OVX ($p<0.05$ vs. OVX, except for urine CTX), and the level was similar to the sham level at 16 months.
Conclusions: In normal and OVX monkeys, ONO-5334 preferentially suppressed bone resorption markers immediately after administration compared with bone formation markers. In addition, the effect of ONO-5334 on bone resorption disappeared rapidly after withdrawal of administration in normal monkeys. ONO-5334 has a unique mechanism of action and may be a new class of anti-resorptive drugs for osteoporosis therapy.

Disclosure of Interest: H. Mori Employee of: Ono Pharmaceutical Co., Ltd., H. Yamada Employee of: Ono Pharmaceutical Co., Ltd., A. Kunishige Employee of: Ono Pharmaceutical Co., Ltd., S. Nishikawa Employee of: Ono Pharmaceutical Co., Ltd., Y. Hashimoto Employee of: Ono Pharmaceutical Co., Ltd., M. Tanaka Employee of: Ono Pharmaceutical Co., Ltd., T. Shiroya Employee of: Ono Pharmaceutical Co., Ltd.

P796 - ORAL BISPHOSPHONATE USE AFTER HIP FRACTURE IS ASSOCIATED WITH REDUCED MORTALITY

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Aims: To determine whether new use of oral bisphosphonates was associated with reductions in mortality or the composite of death or fracture using prospectively collected long-term data from a randomized trial of osteoporosis quality improvement for hip fracture.
Methods: Originally, 220 hip fracture patients were randomized to case manager (n=110) or usual care followed by delayed bone mineral density (BMD) testing (n=110) interventions. All were eligible for bisphosphonate treatment. Post-randomization, we followed patients for 3 years and ascertained bisphosphonate treatment, medication adherence and persistence, all-cause mortality, and new clinical fractures. Proportional hazards analyses with time-varying treatment status were undertaken.
Results: Eleven (5%) patients died or were lost before bisphosphonates could even be prescribed and were excluded. Final study cohort included 209 patients of which 136 (65%) were females, 104 (50%) were older than 75 years, 38 (18%) were underweight, and 90 (43%) had poor self-reported health. 76 (36%) subjects had a previous fracture before hip fracture. 132 (81%) of those tested had low BMD. 101 (47%) patients used oral bisphosphonates and 65 (64%) remained on treatment at the final evaluation. Overall, 24 (11%) patients died, 19 (9%) had new fractures, and 42 (20%) reached the composite endpoint. Compared to no treatment, bisphosphonate exposure was independently associated with reduced mortality (17 [16%] vs. 7 [7%]); adjusted hazard ratio (aHR)=0.92 per month treated; 95% CI 0.88-0.97) and composite endpoints (28 [26%] vs. 5 [15%]; aHR-0.94 per month treated; 95% CI 0.91-0.97).
Conclusions: Our study suggests oral bisphosphonates may be associated with reductions in all-cause mortality and clinical fractures, similar to that reported with use of intravenous bisphosphonate therapy.
Acknowledgement: Our study suggests oral bisphosphonates may be associated with reductions in all-cause mortality and clinical fractures, similar to that reported with the use of intravenous bisphosphonate therapy.

Disclosure of Interest: L. Beaupre: None Declared, D. Morrish Grant / Research Support from: sanofi-aventis, Consultant / Speaker's bureau / Advisory activities with: Amgen, Aventis, D. Hanley Grant / Research Support from: Merck Frosst, Novartis, Proctor and Gamble, Eli Lilly, NPS, Pfizer, Amgen, Wyeth-Ayerst, Roche, Consultant / Speaker's bureau / Advisory activities with: Merck Frosst, Proctor and Gamble, Eli Lilly, Novartis, NPS Pharmaceuticals, Aventis, Pfizer, Amgen, Wyeth-Ayerst, Roche, A. Juby: None Declared, W. Maksymowych: None Declared, N. Bell: None Declared, S. Majumdar: None Declared

P797 - CHANGES ON BONE TURNOVER MARKERS AND BONE MINERAL DENSITY IN WOMEN WITH POSTMENOPAUSICAL OSTEOPOROSIS TREATED WITH STRONTIUM RANELATO. INFLUENCES OF THE TREATMENTS PREVIOUSLY RECEIVED

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Aims: To evaluate the effect of SR on bone turnover markers and bone mineral density as well as to see if this response could be influenced for the previous use of other treatments for the osteoporosis.
Methods: We enrolled 66 postmenopausal women, mean age 68 years (r= 51-87), treated with RE 2 grs/day during 12-24 months. Divided into 2 groups, Group 1: Patients with previous antiresorptive treatments (n=20); Group 2: naive group (n=46). Calcium, phosphorus, and bone turnover markers of formation (P1NP) and resorption (CTX) basal, at 12 and 24 months were measured in serum by the following techniques: CTX by electrochemiluminescence (0,064-0,548 ng/ml) and PINP by RIA (10,4-62 ng/ml). Bone mineral density (BMD) was measured by dual energy X-ray (*c.v. in vivo* 1,2%), at lumbar spine (L2-L4) (LS), femoral neck (FN) and total hip (TH) over 2 years. Statistical analysis was carried out by using descriptive summaries of each variable and Wilcoxon test for comparisons. The Spearman correlation was utilized to relate the bone turnover markers and the values of BMD.
Results: There were no differences in the basal characteristics between groups. The BMI did not vary throughout the study. The treatment with RE did not produce significant variations in serum calcium and phosphorus levels. At 24 months CTX decreased in both groups (17,05% in group 1 and 7.87% in group 2) and P1NP increased in both groups (21.41% in group 1 and 20.73% in group 2), although these values were not statistically significant changes compared to baseline. Globally RE increased the BMD in LS 3.3% at 12 months and 8.2% at 24 months, in CF 1.82% at 12 months and 2.05% at 24 months, and in FT 3.9% at 12 months and 4.1% at 24 months. The gain of BMD at CL and FT were statistically significant. Comparing both groups, we did not find significant differences in any of the variables, including the BMD. We found a powerful correlation between the increase of the P1NP and the BMD in LS (r=0,615) and also between the decrease of the CTX and the BMD in FN (r=-0,560).
Conclusions: In our study we found that the treatment during 12 or 24 months with RE causes a decrease in the bone resorption marker and an increase in the bone formation marker, which magnitude is correlated significantly with the increase in BMD in FN and LS respectively. These effects do not depend on the received previous treatment, so that the use of an antiresorptive therapy before the treatment with RE does not decrease the effectiveness of this drug.

Disclosure of Interest: None Declared

P798 - OSTEOPOROSIS OXYS RATS – CAPABILITY AND PROSPECTS TO EVALUATE THE EFFECTIVENESS OF THERAPY AND PREVENTION

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Aims: Studies of osteoporosis association with many etiological endogenous and environmental factors in humans have been limited to some degree by the tremendous heterogeneity among populations, as well as by multiple genetic and environmental determinants of the bone mineral density (BMD) phenotype. There is a great need to further characterize the available animal models of experimental osteoporosis for better understanding of the pathogenesis of this disease and investigation of new therapies. Our previous studies indicate that senescence-accelerated OXYS may be a valid model of osteoporosis.
Methods: Experiments were performed on 180 male OXYS and Wistar (control) from 10 days to 24 months. Also, at the age from 8 month OXYS and Wistar (2 month) were treated alendronate. We measured BMD (X-ray densitometry), Ca and ALP in serum, Ca content in the bone (SR XFA) in all groups.
Results: We showed, that revealed no differences in BMD in OXYS and Wistar at the aged of 10 days and 3 months, but the activity of ALH – the marker of osteoblast activity - at the age of 10 days in rats OXYS was higher by 40%, than Wistar; but at the age of 3 months in OXYS was lower, than in Wistars. The peak bone mass and BMD in Wistar is formed to the age of 12 months, at OXYS - already by 6, but did not reach the level of Wistar. Similarly change the content of Ca in the blood and bone tissue: in a young age is not difference, but after the 6 months in rats OXYS reduced to the background of enhanced Ca excretion in the urine. However, changing the mineral composition of bone in OXYS not led to a decrease in their strength, as an indicator of the quality of formed bone tissue. At the age of 12 months the femoral strength in OXYS and Wistar was comparable. At the end of the trial, in alendronate group OXYS increased BMD (3.5%) and the femoral diameter.
Conclusions: Thus, our results showed that changes in metabolism in OXYS rats detected in the postnatal period lead to the development of idiopathic osteoporosis in future. The development of osteoporosis in rats OXYS was significantly slower in the group of therapy with alendronate.

Disclosure of Interest: None Declared

P799 - EFFECTS OF THE NOVEL CATHEPSIN K INHIBITOR, ONO-5334, ON BONE TURNOVER MARKERS IN POSTMENOPAUSAL WOMEN: A MULTIPLE DOSE PHASE I STUDY

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Aims: To investigate the effects of ONO-5334 on bone turnover markers in postmenopausal women.
Methods: This was a double-blind, randomised, placebo-controlled, single centre study where ONO-5334 was administered for 15 and 28 days in 72 and 24 postmenopausal women (aged 45-75y), respectively. Postmenopausal status was confirmed by FSH>30IU/L and Estradiol<92pmol/L. In the 15 day cohort, 10, 30, 50, 100, 300 and 600mg QD was given in 6 groups of 12 subjects (9 active, 3 placebo). In the 28 day cohort 100 and 600mg QD was given in 2 groups of 12 subjects (9 active, 3 placebo). Serum (s) CTX and sNTX, and urine (u) CTX, uNTX and uDPD (all adjusted for creatinine) were assessed. Urine samples were obtained 24 hours after administration. In the 28-day cohort, TRAP5b, PINP, osteocalcin (OC) and BSAP were also assessed.
Results: ≥100 mg of ONO-5334 resulted in reduced levels of sCTX/sNTX that were maximal between 4-11 hours after dosing. The levels of uCTX, uNTX and uDPD were also reduced with ≥100mg of ONO-5334. After single dose administration, 100, 300 and 600mg of ONO-5334 reduced uCTX by 1.7±23.2% (n=9), 63.0±6.2% (n=8) and 86.4±2.5% (n=9), and uNTX by 19.2±5.8% (n=9), 48.7±5.3% (n=9) and 72.6±4.2% (n=8), respectively (Mean±SE). Similar but smaller degree of suppression in uDPD was observed. After repeated dosing sustained reduction of both sCTX/sNTX were seen at ≥100 mg. After repeated dosing with the highest doses, 300 and 600 mg, suppression of sCTX/sNTX was maintained throughout the study period until the follow-up visit 5-7 days after the last dose. 24 hours after the last dose in the 15 day dosing cohort, 100, 300 and 600mg of ONO-5334 reduced uCTX by 44.9±13.6%, 84.5±4.4%, 92.5±1.3%, uNTX by 38.0±4.7%, 67.0±6.2%, 84.4±2.1% and uDPD by 2.3±4.4%, 31.5±4.5%, 35.4±5.3%, respectively (all dose arms n=9). In the 28 day dosing cohort, there were no appreciable difference in the level of suppression on CTX, NTX and DPD compared with the 15 day cohort. There were also no apparent effects on BSAP, TRAP5b or OC and with possible reduction in P1NP in 28 days dosing.
Conclusions: Repeated dosing with ONO-5334 at daily doses of 100 mg or higher resulted in considerable suppression in bone resorption markers with no appreciable effects on bone formation markers. This may suggest unique mode of action of the cathepsin K inhibitors compared to current osteoporosis medications. Whether this difference in the mechanism of action would affect BMD or anti-osteoporotic fracture efficacy is of interest.

Disclosure of Interest: S. Nagase Employee of: Ono Pharma UK Ltd., M. Ohyama Employee of: Ono Pharmaceutical Co., Ltd, M. Small Employee of: Ono Pharma UK Ltd., T. Kuwayama Employee of: Ono Pharma UK Ltd., S. Deacon Employee of: Ono Pharma UK Ltd.

P800 - SAFETY, TOLERABILITY AND PHARMACOKINETICS OF THE NOVEL CATHEPSIN K INHIBITOR, ONO-5334, IN POSTMENOPAUSAL WOMEN: AN ASCENDING SINGLE AND MULTIPLE DOSE PHASE I STUDY

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[1]Ono Pharma UK Ltd., London, United Kingdom, [2]Ono Pharmaceutical Co., Ltd, Tsukuba, [3]Ono Pharmaceutical Co., Ltd, Osaka, Japan

Aims: To investigate the safety, tolerability and pharmacokinetics (PK) of ONO-5334 in postmenopausal women.

Methods: This was a double-blind, randomised, placebo-controlled, single site study consisting of 3 parts. Parts 1, 2 and 3 were conducted as single, 15 and 28 days multiple doses, with 52, 96 and 24 postmenopausal women aged 45-75y, respectively. Postmenopausal status was confirmed by FSH>30IU/L and Estradiol<92pmol/L. ONO-5334 doses ranged from 3-600 mg. Standard safety assessments including adverse events (AE) evaluation and safety laboratory, continuous ECG and vital sign assessments were performed throughout the study. Plasma and urine concentrations of ONO-5334 and its metabolite were measured for PK assessment. In Part 1, the effect of the food intake on the PK profile was investigated with 100mg of ONO-5334.

Results: In the 3-600mg dose range, the plasma concentration of ONO-5334 reached Cmax (5.69 to 941 ng/mL) 0.50 to 1.0 hour after dosing and thereafter decreased biphasically. In the initial phase, ONO-5334 was rapidly eliminated and the plasma concentration decreased to less than one-tenth of Cmax 4 hours after dosing. The $t_{1/2}$ was 9.1 to 22 hours and the AUC0-∞ was 7.70 to 2400 ng*h/mL. Linear increases in Cmax and AUC0-∞ were observed in the 3-300mg and 3-600mg dose range, respectively. After postprandial administration, the Cmax and AUC0-∞ were 0.78 (0.31 to 1.94 range) times and 0.95 (0.67 to 1.35) times to those after fasted administration (geometric mean of the ratio, 95% CI). After repeated dosing steady state was achieved rapidly after 2 days with no evidence of accumulation with continued dosing. There were no serious AEs and no AEs that lead to withdrawal during any of the three parts of the study. Headache was the most frequently reported AE and occurred in all dose groups including placebo. AEs were transient and predominantly mild in nature with no clear evidence of dose relationship in the overall frequency of AEs or in the incidence of any particular type of report. There were no other clinically significant findings.

Conclusions: ONO-5334 was safe and well tolerated following administration of up to 600mg daily for up to 28 days. The linear increases in Cmax and AUC0-∞ were observed in the 3-300mg dose range. Steady state was achieved rapidly after 2 days with no evidence of accumulation with continued dosing.

Disclosure of Interest: S. Nagase Employee of: Ono Pharma UK Ltd., Y. Hashimoto Employee of: Ono Pharmaceutical Co., Ltd, M. Ohyama Employee of: Ono Pharmaceutical Co., Ltd, T. Kuwayama Employee of: Ono Pharma UK Ltd., S. Deacon Employee of: Ono Pharma UK Ltd.

P801 - SAFETY AND TOLERABILITY OF BAZEDOXIFENE IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: RESULTS OF A 5-YEAR, RANDOMIZED, PLACEBO-CONTROLLED PHASE 3 TRIAL

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Aims: Bazedoxifene (BZA) is a novel selective estrogen receptor modulator under development for the prevention and treatment of postmenopausal osteoporosis. A pivotal phase 3 study of postmenopausal women with osteoporosis showed that BZA was safe and well tolerated over 3 years of therapy, with no evidence of endometrial or breast stimulation. Here we describe the safety and tolerability of BZA over 5 years of therapy; efficacy findings are presented separately.

Methods: In the core study, postmenopausal women with osteoporosis (N=7,492; mean age, 66.4 years) were randomized and received daily treatment with BZA 20 or 40 mg, raloxifene (RLX) 60 mg, or placebo for 3 years. A total of 4,216 subjects were enrolled in the extension study (Years 4 and 5); the RLX 60-mg group was discontinued in the fourth year, and subjects receiving BZA 40 mg were transitioned to BZA 20 mg (BZA 40/20 mg) after 4 years. Safety data over 5 years are reported for subjects who received BZA 20 mg, BZA 40/20 mg, or placebo.

Results: Overall, BZA was associated with a favorable safety and tolerability profile over 5 years of therapy. In the BZA groups, the incidence of adverse events (AEs), serious AEs, and discontinuations due to AEs was similar to that seen in the placebo group. The incidence of cardiac or cerebrovascular events, including myocardial infarction and stroke, in the BZA groups was not different from that seen in the placebo group. Similar to the 3-year results, subjects treated with BZA had a higher incidence of deep venous thrombosis, hot flushes, and leg cramps compared with placebo-treated subjects (overall P <0.05). BZA was associated with a neutral effect on the breast. There were fewer cases of endometrial carcinoma in the BZA groups compared with the placebo group (overall P=0.05).

Subjects, n (%)	BZA 20 mg (n = 1,886)	BZA 40/20 mg (n = 1,872)	Placebo (n = 1,885)
Any AE	1,821 (96.6)	1,807 (96.5)	1,826 (96.9)
Any serious AE	467 (24.8)	439 (23.5)	439 (23.3)
Discontinuations due to AEs	317 (16.8)	325 (17.4)	293 (15.5)
Myocardial infarction	9 (0.5)	10 (0.5)	11 (0.6)
Ischemic stroke*	12 (0.6)	14 (0.7)	13 (0.7)
Hemorrhagic stroke*	1 (0.1)	1 (0.1)	4 (0.2)
Stroke, unspecified*	3 (0.2)	2 (0.1)	2 (0.1)
Transient ischemic attack*	6 (0.3)	12 (0.6)	4 (0.2)
Deep vein thrombosis*,†	9 (0.5)	11 (0.6)	3 (0.2)
Pulmonary embolism*	4 (0.2)	3 (0.2)	4 (0.2)
Hot flushes†	245 (13.0)	251 (13.4)	124 (6.6)
Leg cramps†	256 (13.6)	249 (13.3)	192 (10.2)
Endometrial hyperplasia	1 (0.1)	1 (0.1)	1 (0.1)
Endometrial carcinoma†	0	3 (0.2)	6 (0.3)
Breast carcinoma	10 (0.5)	9 (0.5)	10 (0.5)
Vaginal hemorrhage	19 (1.0)	22 (1.2)	28 (1.5)

*Based on adjudicated data.
†Overall $P \leq 0.05$; Chi-square test.

Conclusions: BZA showed a favorable safety and tolerability profile in postmenopausal women with osteoporosis over 5 years of therapy.

Disclosure of Interest: D. Kendler Grant / Research Support from: Amgen, Lilly, Novartis, Merck, P&G, Wyeth, Pfizer, BioSante, GSK, Zelos, Consultant / Speaker's bureau / Advisory activities with: Amgen, Lilly, Novartis, Merck, P&G, Wyeth, Pfizer, BioSante, GSK, Zelos, A. Chines Employee of: Pfizer Inc, P. Lips: None Declared, J. Kaufman: None Declared, A. Levine Employee of: Pfizer Inc, N. Mairon Employee of: Wyeth Pharmaceutical, C. Codreanu: None Declared, D. Felsenberg Consultant / Speaker's bureau / Advisory activities with: Lilly, Chugai, Roche, Amgen, Servier, Novartis, Nycomed, Wyeth, J. Brown Grant / Research Support from: Abbott, Amgen, Arthrolab, Bristol Myers Squibb, Eli Lilly, GlaxoSmithKline, Merck Frosst, Novartis, Nycomed, P&G, Roche, sanofi-aventis, Servier, and Wyeth, Consultant / Speaker's bureau / Advisory activities with: Abbott, Amgen, Arthrolab, Bristol Myers Squibb, Eli Lilly, GlaxoSmithKline, Merck Frosst, Novartis, Nycomed, P&G, Roche, sanofi-aventis, Servier, and Wyeth, T. De Villiers Consultant / Speaker's bureau / Advisory activities with: MSD, Novartis, Servier, and Wyeth

P802 - DOES ANGIOTENSINOGEN II TYPE 1 RECEPTOR BLOCKER USE AFFECT BONE MINERAL DENSITY IN ELDERLY? A CROSS-SECTIONAL STUDY

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Aims: Angiotensinogen II type 1 receptor blockers (ARB) are widely used antihypertensive drugs that are able to reduce cardiovascular morbidity and mortality mainly through their inhibitory effect on renin-angiotensin system (RAS). Beyond the inhibition of RAS, the identification of accompanying mechanisms has motivated studies evaluating the relationship between the blockage of this system and the modification of bone mineral density (BMD)[1]. Up to now, there is no report on the relationship between ARB use and BMD in elderly. The purpose of this study was to evaluate the association between ARB use and BMD in elderly.

Methods: We included 78 older subjects (52.6% women; mean age 76.22±6.08) who are under ARB treatment (mean 2.8 years, 18-48 months) in the study. One hundred sixty eight subjects (58.3% women; mean age 77.73±5.99) without use of any drug affecting RAS system were selected to the control group. Exclusion criteria included secondary causes of metabolic bone diseases, bilateral hip arthroplasties, inability to ambulate independently, and current treatment with bisphosphonates, calcitonin, calcium or D vitamin or any other drug known to affect to bone metabolism. The BMD was measured at the lumbar spine (L1-L4) and hip by dual energy x-ray absorptiometry (DXA).
Results: When compared two groups, there was a significant difference on the total femur and femur neck BMD, T-score of total femur and femur neck, respectively (p=0.015; p<0.001; p=0.020; p<0.001). ARB use was associated with higher total femur and femur neck BMD compared to age, body mass index, alcohol intake, smoking, and physical activity level matched controls, respectively (0.908±0.119, 0.847±0.133; 0.774±0.086, 0.693±0.116). Also, femur total and neck T-score was found higher in ARB users than controls, respectively (-0.88±0.82, -1.28±0.93; -1.09±0.82, -1.75±0.89). No significant difference was found among two groups for total lumbar BMD and T-score.
Conclusions: This is the first study that shows a positive relationship between ARB use and BMD in elderly. Antihypertensive therapy with ARB seems not only to regulate arterial blood pressure but also may modify femur BMD in elderly. Future randomized controlled studies are needed to examine this association.
References: 1. Lynn H et al, Bone 2006;38:584.

Disclosure of Interest: None Declared

P803 - ANALYSIS OF RISK FACTORS IN OLDER MEN WITH OSTEOPOROSIS

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Aims: Osteoporosis (OP) in men is an important reason for morbidity in advanced age, although less common than in women. While the risk of hip fracture in older men is half of the women, vertebral fracture risk is almost same. The morbidity and mortality risk for older men is higher than women after fracture. However, there is little information regarding risk factors in this population. The aim of this study is to examine the risk factors in older men with OP.
Methods: Medical records of 558 older men (mean age: 77.36±6.1) admitted to our clinic were assessed retrospectively. Exclusion criteria included conditions known to cause OP (hypogonadism, chronic steroid use, etc), bilateral hip arthroplasties, inability to ambulate independently, and current treatment with bisphosphonates, calcitonin, calcium or D vitamin. The bone mineral density (BMD) was measured at the lumbar spine (L1-L4) and hip by DXA. The diagnosis of OP was established according to the criteria of WHO.
Results: One hundred sixty three of assessed 558 subjects have BMD in medical records. Among this group, OP, osteopenic, and BMD in normal range were observed in 50 (30.7%), 72 (44.2%),

and 41 (25.2%) subjects, respectively. Fracture was determined in 6 (12%) osteoporotic and 5 (6.9%) osteopenic men. OP was common in men with low body mass index and weight loss ($p<0.05$). Also, the incidence of OP increased in the men living sedentary ($p<0.05$). Age, height, waist circumference, sedimentation rate, total and ionized calcium, albumin, magnesium, and phosphor levels in blood were not related to OP (for all, $p>0.05$). There was no significantly relationship between hyperthyroid and OP ($p=0.067$).

Conclusions: The factors that increase the risk for OP in older men were found low body weight, weight loss, and physical inactivity. All the fractures occurred in men with T-scores >-1.0 standard deviations below the mean. Interestingly OP was determined mostly in older men with complaints of forgetfulness. This condition might be explained that our clinic is a reference clinic for dementia. The results indicate that the primary prevention with exercise and good nourishment could be important factor for preserving of bone health in men older than 65 like in young or adults.

Disclosure of Interest: None Declared

P804 - MULTIPLE FRACTURES ON A PELVIC GIRDLE INCLUDING SACRAL INSUFFICIENCY FRACTURE

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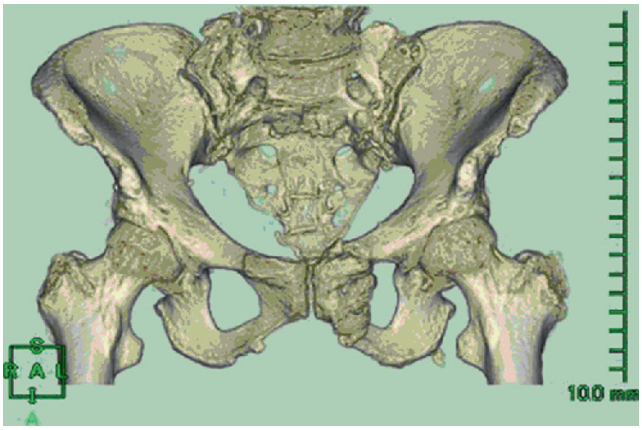
Aims: We present four cases of sacral insufficiency fractures in the old with osteoporosis.

Methods: We have diagnosed 4 cases in a year and reviewed the clinical records, radiographs, CT and MRI. We also assessed the degree of osteoporosis and the duration of the symptoms.

Results: All cases were postmenopausal women visited our hospital at least 40 days after the onset. All of them, after falling down slightly, suffered from something discomfort around their low back, had been checked their lumbar spine and pelvis by plane radiographs, and told there was no apparent fracture nor abnormality at the previous hospitals. When they visited our hospital, their pain had become worse especially when they try to sit or change their position of body trunks. Curiously, all of them said that their pain became better when they stood up or lay down on the bed. The mean age,± YAM at their calcaneus, BMI were 78 years old, 52% and 21 each in our 4 cases. Only one case had the past history of spinal compression fracture who also had the history of maturity-onset diabetes mellitus and cerebral infarction. Other two cases had the past history of hysterectomy. They had no other past history. None of them had the history of steroid use. In making the diagnosis of sacral insufficiency fractures, plain radiographs were not useful. With CT or MRI, we could easily confirm fracture line and also check the absence of malignant appearance. The duration before making the diagnosis depended on the timing of CT or MRI. The longest case was 4 months after the onset. All of them also suffered from both ischium and pubis fractures about 30 days after their first low back symptoms appeared. Three cases had complete resolution of pain within 4 months. All patients returned to their own ADL (activities of daily living).



Conclusions: Awareness of sacral insufficiency fractures is important to early diagnosis. We had better to consider the possibility of sacral insufficiency fracture if patients complain of severe pain when they sit and become better by standing up or lying down. Diagnosis tends to delay by plain radiographs, but CT or MRI is useful. Simple early treatment such as bed rest followed by rehabilitation provide good relief of symptoms and functional outcome.

Disclosure of Interest: None Declared

P805 - LIFE'S QUALITY ASSESSMENT AT PATIENTS WITH OSTEOARTHRITIS AND OSTEOPOROSIS

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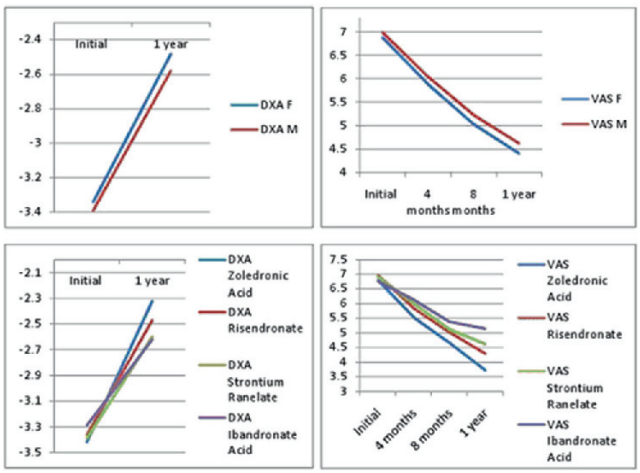
Aims: To assess life quality at patients with light/medium osteoarthritis and medium/severe osteoporosis undergoing rehabilitation programs and differentiate anti-osteoporotic treatment.

Methods: In 1 year period, 315 patients with light/medium osteoarthritis and medium/severe osteoporosis type I and II undergoing standard and similar rehabilitation programs and a differentiate anti-osteoporotic treatment (Zoledronic Acid-15 patients, Risedronate-200 patients, Strontium Ranelate-40 patients and Ibandronate Acid-60 patients) were assessed regarding pain- the most important item which alters life quality (VAS value initially, after 4 months, 8 months and 1 year) and bone quality (T-score provided by DXA initially and after 1 year). Pearson's test was used to evaluate a possible correlation between the T-score and VAS values. Also a comparison between averages of these parameters at women and men, as well for each anti-osteoporosis drug was performed.

Results: 223 (70,7%) women had osteoporosis type I and II, while 92 men were with osteoporosis type II. A strong correlation between each VAS and T-scores was detected (-0,76 at the beginning and -0,76 at 1 year; closer to -1 than to 0), meaning that if the

T-score is low VAS is high. Comparing the averages of women's batch with men's batch a better improvement regarding VAS (36% at women and 33% at men) and T-score (25% at women and 23% at men) has been encountered, also for Zoledronic Acid, followed by Risedronate, Strontium Ranelate and Ibandronate Acid.



Conclusions: Under standard and similar rehabilitation programs and anti-osteoporotic treatment, pain in performing activities of daily living has diminished and bone quality increased, with variation between women and men and by the anti-osteoporosis drug used. This outcome suggests that the pain at these patients is caused not only by osteoarthritis but also by osteoporosis and a combined therapy improves life quality.

Disclosure of Interest: None Declared

P806 - DESIGN AND CHARACTERIZATION OF A NEW INJECTABLE BISPHOSPHONATE-LOADED CALCIUM PHOSPHATE CEMENT FOR THE PREVENTION OF OSTEOPOROTIC FRACTURES

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Aims:

An original approach to design a calcium phosphate cement (CPC) containing anti-resorption agents for the prevention of osteoporotic fractures.

Methods: In a first step, a calcium phosphate precursor (e.g. calcium deficient apatite/CDA or DCPD or TCP) is loaded with a bisphosphonate (BP) in solution. Then, the solid obtained can be incorporated in the formulation of an apatitic cement mainly based on the following composition: TCP, DCPD, MCPM, CDA and polysaccharide. The liquid phase consisted in a Na_2HPO_4 solution.

Results: Based on ^{31}P solid state NMR studies, we have shown that in the case of DCPD or TCP, a BP crystalline derivative forms onto the solid. On the contrary, in the case of CDA, a chemisorption of the BP was observed allowing a slow release of the drug mainly controlled by the phosphate concentration in the medium. The BP loaded CDA can be incorporated in a hydrogel and can be used as an injectable biomaterial. Then a second generation of biomaterials have been investigated. We have studied different approaches to incorporating the BP in a cement formulation taking into account that phosphonates are considered as retarding agents and the fact that our cement must possess appropriate properties for its clinical use, including injectability, setting time, strength. In this context, the best approach consisted to use the CDA-BP system in the cement formulation. High frequency impedance and ^{31}P solid state NMR were used for monitoring the cement setting. BP adsorption/desorption experiments have been realized on cements blocks, under continuous flow condition, to model the release profile of the BP in a medium close to the *in-vivo* situation.

Conclusions: We have designed, characterized and patented, a new injectable CPC possessing the required properties to be used in pre-clinical or clinical studies.

Disclosure of Interest: None Declared

P807 - BISPHOSPHONATES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS AND MILD OR MODERATE RENAL IMPAIRMENT

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Aims: The aim of this study is to investigate whether bisphosphonates are effective in patients with osteoporosis and chronic kidney disease.

Methods: The study was carried out, between 1 January 2005 and 31 December 2009 on a population of 100 postmenopausal women with confirmed osteopenia or osteoporosis and mildly impaired (Glomerular filtration rate GFR 50-80 ml/min), or moderately impaired (GFR 30-49 ml/min) renal function. Patients with renal osteodystrophy were excluded, by biochemical profiling or by bone biopsy.

50 patients (the 1stsubgroup) were received for five years alendronate 70mg once weekly, while 50 patients (the 2ndsubgroup) were received for five years risedronate 35mg once weekly. All patients were received calcium (1000mg/per day) and vitamin D (400-800IU/ per day) if calcium serum was not increased or they didn't suffer from nephrolithiasis.

Results: After five years follow up, in the 1stsubgroup (of alendronate 70mg weekly), we noted an improvement of BMD (4,8-6,2%) on the vertebral column, and an increase of BMD (2,7-3,3%) at the hip joint. In the 2ndsubgroup (of risedronate 35mg weekly), the increase of BMD was ranged between 4,3-5,9% on the spine and between 2,8-3,1% at the hip joint.In the 1stsubgroup, there was a reduction of relative risk of both vertebral (59%) and hip (53%) fractures while in the 2ndsubgroup the decrease was 57% and 51% respectively.

Conclusions: Bisphosphonates are generally safe in patients with kidney disease, and skeletal protection, readily demonstrable in

bisphosphonate-treated populations without kidney disease, is also achievable in patients with chronic kidney disease (CKD) and other forms of nephropathy.

Disclosure of Interest: None Declared

P808 - EFFICACY OF ONCE-WEEKLY RISEDRONATE IN MEN WITH OSTEOPOROSIS

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Aims: The purpose of this study is to document that once-weekly risedronate is an effective and safe treatment for male osteoporosis.
Methods: The study was carried out, between 1 January 2005 and 31 December 2009 on a population of 100 men with confirmed osteopenia or osteoporosis; aged 32-86 years (mean age 63 years). Men with other secondary causes of osteoporosis were excluded. 50 patients (1stsubgroup) were received once-weekly 35 mg risedronate, 1000mg calcium and 400-800IU vitamin D supplements while the 2ndsubgroup (50 patients) was received only calcium and vitamin D supplements. The main outcome measures were the percent changes in lumbar-spine, hip, and total-body bone mineral density.
Results: The men who received risedronate had a mean increase in bone mineral density of 6,9% at the lumbar spine, 2,4% at the femoral neck, and 1,9% for the total body. In contrast, in the 2nd-group, there was an increase in lumbar-spine bone mineral density of 1,8% and no significant changes in femoral-neck or total-body bone mineral density. The increase in bone mineral density in the risedronate group was greater than that in the placebo group. The incidence of vertebral fractures was lower in the risedronate group than in the placebo group (0,8± vs. 7,1±). Men in the placebo group had a 2.4-mm decrease in height, as compared with a decrease of 0.6 mm in the risedronate group.
Conclusions: In male osteoporosis, once-weekly risedronate significantly increases spine, hip, and total-body bone mineral density and helps prevent vertebral fractures and decreases in height.

Disclosure of Interest: None Declared

P809 - POSTMENOPAUSIC OSTEOPOROSIS TREATMENT WITH A YEARLY DOSE OF INTRAVENOUS ZOLEDRONIC ACID: A VENEZUELAN OBSERVATIONAL STUDY

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Aims: An observational clinical study was designed so as to assess the efficacy and safety of a yearly intravenous administration of a 5mg doses of zoledronic acid in postmenopausal women suffering from osteoporosis to analyze the bone mineral density (BMD) changes and its complications.
Methods: A prospective clinical study was performed in 27 women between July 2008 and July 2009 to determine whether an annual doses intravenous of 5mg of zoledronic acid in 20 mns approximately and a supplement of 1.500mg calcium and 800 UI Vitamin D was added and how they may increase the BMD and whether it may decrease the risk of bone fracture. A DXA densitometry was performed in each subject, and the spine and hip were evaluated a year later with an Hologic QDR, Inc. equipment. The mean age of the women was 69 years (53-91 years) and their average weight was 59.4 kg.(37.5-81.5 kg) with a mean height of 151.6 cm (140-162) and a body mass index (BMI) of 22.9 kg/cm^2(9.6 kg/cm^2-42.5 kg/cm^2). The group was administered the indicated doses.
Results: At a year follow-up, the BMD spine increase was positive with a mean of +3.5% (range -0.3% y +7.9%). In the hip, the increase was +2.06% (range de +0.2).
Conclusions: The findings of this study suggest that an annual 5mg intravenous doses of zoledronic acid in postmenopausal women is safe and effective. It results in positive changes in the BMI in hip and spine, specifically in more than 70 years old with overweight women.

Disclosure of Interest: None Declared

P810 - NON-TRAUMATIC FRACTURE OF THE FEMUR IN A HEALTHY WOMAN WHO HAD BEEN TAKING ALENDRONATE FOR A LONG TIME: A CASE REPORT

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Aims: Osteoporosis is an important health problem that worsens with age. In Mérida (Venezuela) 36% of the women over 50 years of age suffer from osteoporosis and 7% of these present a hip fracture. Alendronate bisphosphonate is the drug that has most frequently been used in that community over the last 12 years because it increases mineral bone density and decreases the risk of fracture caused by that metabolic disorder. But it is still not known when the drug should be suspended. Previous studies have shown that the drug may alter the bone remodeling mechanism and produce undesirable side-effects. We present here the case of a woman who had been taking alendronate for ten years and had suffered from a transversal shaft fracture of the femur.
Methods: In May 2009 an 85-year-old woman complained of one-week-long pain in the right thigh. While trying to get up from her chair, she felt an intense pain in the right thigh. She could not control it and fell down. She was taken to a nearby medical center where she was diagnosed with a shaft transversal fracture of the femur. She was operated on, and an intramedular locking nail was inserted. The immediate post-operative put forth a satisfactory reduction, but a month later, the patient complained that the fracture site was painful. A radiological examination revealed mobility in the fracture site. Six months later, the pain persisted at the fracture site. Another physician was consulted.

Results: A new radiography evaluation revealed that it was a transversal fracture, with hypertrophic corticals and without lithic injuries in the area. The patients reported that she h been taking alendronate since 1998, once a day to start with and then once a week. The patient was not taking proton pump inhibitors or glucocorticoids. Five months later, the radiological examination revealed a consolidation delay with the onset of an irritation callus. Double photon bone densitometry (DXA) of both femurs was indicated with an Hologic equipment (QDR4). A global decrease of -5.7% between the healthy side and the fractured one was evidenced, immediately above the fracture site (R1) of 4.9%, at the level of the fracture site (R2) of -0.9% and below the fracture site of -4.0%. This finding suggested that there was an osteoblastic activity at the fracture site.
Conclusions: Reports of femur diaphysaric or subtrochanteric fractures associated with prolonged treatment with alendronate are frequent, with prodromic pain in the area of the fracture, with radiological features of being transversal with engrossed corticals and with consolidation delay. However, the use of double photon densitometry to assess that pathology has not been reported, especially when that densitometry reveals a consolidation delay at the fracture site rather than a detention . When biopsies have been taken from human beings, the reported finding was that of a remodeling process detention, but in animals even with high doses, no mechanical alteration has been found. Alendronate is widely used, but there are very few cases of the problem reported here. We could be dealing with a very special sub-group of patients with specific features. It is thus necessary to conduct further research because the effect of mechanical load support in the femur cortex could be lost.

Disclosure of Interest: None Declared

P811 - POST-HIP FRACTURE USE OF PRESCRIBED CALCIUM PLUS VITAMIN D SUPPLEMENTS IN ELDERLY MALES, AND THE CONCOMITANT USE OF ANTI-OSTEOPOROTIC DRUGS IN ELDERLY FEMALES ARE ASSOCIATED WITH LOWER MORTALITY: A NATIONWIDE STUDY IN FINLAND

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Aims: To examine the association of prescribed calcium plus vitamin D supplements and anti-osteoporotic drugs with the mortality among hip fracture patients.
Methods: Data consisted of a retrospective cohort of home discharged hip fracture patients aged 50 and older (N=23 615, mean age 76.8; women 71%) from the national PERFECT-hip fracture research database. Patients from the period 2000-2007 were enrolled. Primary exposure was the medical treatment for osteoporosis, i.e. purchases of calcium plus vitamin D supplements and anti-osteoporotic drugs, and secondary outcome was the all-cause mortality. Mortality was followed for eight years (2001-2008). The patient was determined as a user of medication if he or she had purchased medication during the first three months after discharge home. Cumulative mortality was calculated by using Kaplan-Meier-estimator. Statistical significance of differences between cumulative mortalities was tested using the log-rank test. Relationship between mortality and medication purchases was modelled using the Cox's proportional hazards regression with time-dependent covariates for medication use.
Results: Among men the use of calcium plus vitamin D supplements alone was associated with lower mortality (0.71; 95% CI 0.53-0.94). Among women, correspondingly, the use of anti-osteoporotic drugs was associated with lower mortality (0.79; 95% CI 0.67-0.92), and the survival was even better if they used calcium plus vitamin D supplements concomitantly (0.59; 95% CI 0.48-0.73). The post-fracture use of calcium plus vitamin D supplements and the commonest anti-osteoporotic-drugs, bisphosphonates was low during the follow-up period, being 13% and 8± in males and 22% and 27% in females in 2007, respectively.
Conclusions: Medical treatment for osteoporosis was associated with lower mortality in elderly females. In males calcium plus vitamin D supplements alone indicated lower mortality. Unadjusted mortality was lower among hip fracture patients discharged home who purchased calcium plus vitamin D supplements and/or anti-osteoporotic drugs than among those who did not purchase these medications ($p<0.001$). The difference in cumulative mortality remained for the whole eight year follow-up period. However, not more than every fourth female and every tenth male hip fracture patient who were discharged home were treated for osteoporosis in Finland.

Disclosure of Interest: None Declared

P812 - SPINAL ORTHOSIS IN POSTMENOPAUSAL WOMEN

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Aims: To investigate the influence of modern functional orthosis (rigid and flexible) on the strength of trunk muscles, back pain and the compliance in the use of them.
Methods: We planned a 2 year perspective study including 50 community dwelling postmenopausal women above 50 years, with established osteoporosis and/or an angle of kyphosis more than 55 degrees. Women were separated in group A (n=20, using rigid orthosis Spinomed / Spine–x), group B (n= 20, using elastic multifunctional orthosis Osteomed, Spinomed active) and group C (n=10, women who denied the use of orthosis). Women of groups A and B were asked to wear the orthosis for at least 2 hours/day for 12 months. All women receive pharmacotherapy. We measured anthropometric values (age, height, weight, body mass index) and calculated isometric maximum strength of trunk muscles (Force(F)/Weight(W)$_{abdominals}$, F/ W$_{extensors}$) with ISO-RACK device (Digimax, MechaTronic, Germany) and we

assessed back pain with visual analogue scale (VAS). In addition women completed a compliance questionnaire.
Results: Women of group A were significant older and felt more pain (72.3±8 vs.61±10.5 and 65±16.5 vs.45±16.5, p=0.015 and p=0.014, respectively, at the beginning of the study but had similar strength (ns) compared with group C. The compliance of wearing orthosis for 6 months was 66%. Spinomed decreased significantly pain (41±17.3 vs. 65±16.5, p=0.001) and increased trunk muscle strength ($F/W_{abdominals}$ 197.8±82.7 vs. 131.2±53.7, p=0.005 and $F/W_{extensors}$ 246.3±59.5 vs.197.6±48, p=0.003).
Conclusions: These results suggest that orthoses could be an effective intervention for back pain and muscle strengthening in osteoporotic women.

Disclosure of Interest: None Declared

P813 - THE EFFECT OF STANDING – THERAPEUTIC WALKING AND SPASTICITY IN PARAPLEGIA RELATED BONE LOSS

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Aims: The purpose of this study was to investigate the effect of standing-therapeutic walking and spasticity in paraplegia related bone loss.
Methods: Peripheral quantitative computed tomography system (p QCT XCT-3000, Stratec Medizintechnik, Germany) in distal epiphyses and midshafts of the tibia was used to examine 31 paraplegic men in chronic stage separated in group A (n=16, Thoracic (T)4-T7 neurological level of injury) and group B (n=15, T8-T12 neurological level of injury) in comparison with 30 healthy men. The distal end of the tibia was used as an anatomical marker. We calculated bone mineral density (BMD) trabecular, BMD total at 4% and BMD cortical, cortical thickness and 38%, respectively, of the tibia length proximal to this point and studied the influence of spasticity and standing – therapeutic walking on bone structures. The degree of spasticity was assessed with Ashworth scale.
Results: In group A (mean age: 33±16 yrs, duration of paralysis (DoP): 6±6 yrs) and in group B (mean age: 39±14 yrs, DoP: 5.6±6 yrs) most bone parameters were statistically significant decreased compared with controls. The degree of spasticity did not showed any preserving effect in the tibia. Paraplegics who used standing frames or long brace orthoses had statistically significant higher bone mass (BMD trab, BMD tot) and geometric parameters (cortical thickness) independently of the functional level.
Conclusions: Standing or ambulation could possibly have a positive effect in cortical and trabecular bone in paraplegia. The degree of spasticity did not defend bone loss.

Disclosure of Interest: None Declared

P814 - HOW A REHABILITATION PROGRAM CONTRIBUTES TO THERAPEUTIC RECOVERY AND PREVENTION OF COMPLICATION IN OSTEOPOROSIS

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Aims: Osteoporosis is defined as a skeletal disorder characterized by reduced bone strength predisposing a person to an increased risk of fracture. Modern Rehabilitation position is that prevention and treatment of osteoporosis should not focus only on bone, ignoring muscle function and balance, elements directly related to illness, which protect from falls and fractures. The evaluation of osteoporotic patients begins with the history which includes information on risk factors for osteoporosis. Furthermore, we need to consider the physical, functional, psychological and social situation of the patient and before starting the therapeutic approach to assess the nutritional status and drug treatment of osteoporosis and the accompanying disease
Methods: During the program customized training is provided to carry out daily activities safely in individuals belonging to populations increased risk for osteoporosis. The training includes the following simple loading exercises to maintain fitness and bone mass in elderly people and generally people with low bone density. Rehabilitation after vertebral fracture includes education on proper posture and body mechanics to reduce the kyphosis and safety in carrying out daily activities strengthening the back muscles. The aim is to reduce pain, improve mobility and quality of life of the patient. The use of modern spine orthosis has been shown to help reduce pain and improve posture. The conservative pain relief in vertebral fracture can be helped by specific medication and implementation of appropriate physical agents and hydrotherapy.
Results: Prevention of hip fractures includes the identification and treatment of potential causes of falls, balance exercise programs, coordination and strengthening of the hip muscles. After a hip fracture is usually required a long recovery program which should start immediately after surgery.
Conclusions: The success of a rehabilitation program after hip fracture is the reversal of functional decline and return the patient to the highest level of independence while improving the overall quality of life

Disclosure of Interest: None Declared

P815 - GREEK GUIDELINES OF HELLENIC INSTITUTION OF OSTEOPOROSIS WITH RESPECT TO THE EXERCISE OF OSTEOPOROSIS AND FALLS

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Aims: To present Greek guidelines with respect to the exercise of osteoporosis and falls.
Methods: Although exercise is used on a widespread basis, in postmenopausal osteoporosis has not yet significant evidence-

based data. These guidelines emerged from an extensive review of the literature of the subject. Where specialized studies lacking we preferred to refer to the opinion of experts.
Results: The effect of exercise on bone mineral density is side specific. For this reason, the exercises should be selected to focus in clinical points of interest. (A) Aerobic exercise is effective in reducing the loss of bone density in the spine and wrist. (A) The exercise should be intensive (i.e. capable of producing significant ground reaction forces, repetitive and in short time). (C) The muscle strengthening exercises are effective in reducing bone loss while the increase in muscle strength is associated with regional increase in bone density and is maintained for a short to moderate time duration. (A)
Conclusions: Although the exercise has proven benefits, the ideal type of exercise, duration and intensity to prevent falls is an area not yet fully clear. (B) Exercises that improve balance, including Tai Chi, are effective in population groups at highest risk of falling. (A)

Disclosure of Interest: None Declared

P816 - ENDOMETRIAL AND BREAST SAFETY OF BAZEDOXIFENE IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: FINDINGS FROM A 5-YEAR, RANDOMIZED, PLACEBO-CONTROLLED PHASE 3 TRIAL

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Aims: Bazedoxifene (BZA) is a novel indole derivative-based selective estrogen receptor modulator under clinical development for the prevention and treatment of postmenopausal osteoporosis. Within this abstract, we describe the endometrial and breast safety of BZA over a 5-year therapy duration in a pivotal phase 3 study; efficacy and overall safety findings are presented elsewhere.
Methods: In the core phase 3 study (years 1 to 3), postmenopausal women with osteoporosis (n=7,492; mean age, 66.4 years) were randomized to receive daily treatment with either BZA 20 or 40 mg, raloxifene (RLX) 60 mg, or placebo for 3 years. A total of 4,216 subjects were enrolled in the extension study (years 4 and 5); the RLX 60-mg group was discontinued in the fourth year, and subjects receiving BZA 40 mg were transitioned to BZA 20 mg (BZA 40/20 mg) at the end of 4 years. The 5-year breast and endometrial safety data are reported for subjects who received BZA 20 mg or BZA 40/20 mg compared with placebo.
Results: Overall, safety and tolerability findings with BZA at 5 years were favorable and consistent with those seen in the 3-year core study. Transvaginal ultrasound (TVU) data were available for 176 subjects at baseline and at year 5 (BZA 20 mg, n=60; BZA 40/20 mg, n=58; placebo, n=58). The mean change (± SE) from baseline in endometrial thickness with BZA 20 mg (–0.04±0.13 mm) and BZA 40/20 mg (0.07±0.13 mm) was not significantly different from that seen with placebo (–0.19±0.13 mm) at 5 years. The number of subjects with endometrial hyperplasia or endometrial thickness >5 mm was small and similar among the 3 treatment groups. The number of subjects undergoing hysterectomy through 5 years was numerically lower in the BZA groups compared with the placebo group: BZA 20 mg (n=12), BZA 40/20 mg (n=17), placebo (n=22). Fewer cases of endometrial carcinoma were reported with BZA 20 mg (n=0) and BZA 40/20 mg (n=3) as compared to placebo (n=6; P=0.05). The incidence of other pertinent adverse events, such as uterine bleeding, ovarian cysts, and benign breast disease, was comparable between the groups. The number of subjects with breast cancer was small and similar with BZA 20 mg (n=10), BZA 40/20 mg (n=9), and placebo (n=10).
Conclusions: BZA was associated with an excellent endometrial safety profile and showed a neutral effect on the breast in postmenopausal women with osteoporosis over 5 years of therapy.

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P817 - FEMOROPLASTY USING AN INJECTABLE AND RESORBABLE CALCIUM PHOSPHATE BISPHOSPHONATE LOADED BONE SUBSTITUTE TO PREVENT CONTRA-LATERAL HIP FRACTURE IN THE ELDERLY: A CADAVERIC BIOMECHANICAL STUDY

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Aims: The incidence of contra-lateral, second hip fractures after a first hip fracture is as high as 20%. We hypothesized that femoroplasty using an injectable and resorbable calcium phosphate bisphosphonate loaded bone substitute to prevent contra-lateral hip fracture may represent a promising preventive therapy. We aimed to evaluate the biomechanical consequences of the femoroplasty using this new bone substitute.
Methods: Twelve paired human cadaveric femora from donors with a mean age of 86.3 years (7 women and 5 men) were included in this study. One femur from each donor was randomly assigned for femoroplasty and biomechanically tested for fracture load against their contra-lateral control. A–P and lateral radiographs and DXA scans were acquired before injection. Femoroplasty was performed under fluoroscopic guidance with an injectable and resorbable bisphosphonate loaded bone substitute. All femurs were fractured by simulating a lateral fall on the greater trochanter by an independent observer. The Wilcoxon's signed rank test was used to test for differences in fracture load between the reinforced femurs and the controls.

Results: Mean T-score of the tested femurs was -3,4 (SD±1,53). All the observed fractures were Kyle II trochanteric fractures. Mean fracture load was 2786 Newton in the femoroplasty group (group F) versus 2116 Newton in the control group (group C) ($p<0.001$). Fracture loads were always higher in the group F: mean 41.6% (mini: 1.2%/maxi:102.1%) ($p=0.00024$). Effect of femoroplasty was significantly superior for women (+57%) and also correlated to initial BMD ($p<0.0001$). A positive correlation between BMD and fracture load was observed both in control femurs ($R^2= 0.74$) and reinforced femurs ($R^2= 0.81$).
Conclusions: According to our results, femoroplasty with an injectable and resorbable calcium phosphate bisphosphonate loaded bone substitute can provide significant short term biomechanical reinforcement of the proximal femur to prevent osteoporotic contra-lateral fracture.
References: P. Heini et al, Clin Biomechanics 2004;19:506
Acknowledgement: Authors would like to thank Sylvain Persohn (Arts & Metiers ParisTech, CNRS, LBM, Paris, France), Dr Antoine Feydy (Department of Radiology B, Hospital Cochin, France) for their contribution to this work.

Disclosure of Interest: None Declared

P818 - PTH 1-84 EFFICACY: RESULTS AFTER 18 MONTH OF THERAPY

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Aims: Bone mineral density change measured by DXA and bone turnover marker (BTM) evaluation are established tools for monitoring the effects of anti-osteoporotic therapy. BTM reduction or increase within 3-6 months of treatment (1). The aim of our experience is to analyse BTM and BMD variations in patients treated with PTH 1-84, a potent anabolic agent for the treatment of primary osteoporosis in postmenopausal women
Methods: We have measured the trend of characteristic parameters of bone metabolism (serum calcium, osteocalcin, β-Ctx) in 33 women with severe postmenopausal osteoporosis (mean age 69,7±8,7 years) treated with the anabolic drug PTH 1-84 at the baseline and after 6, 12 and 18 months of therapy. Indeed, we have measured spine T-score at baseline and at the end of therapy.
Results: In the 33 patients treated for 18 months, while serum calcium values remained on normal range (9,44±0,5 mg/dl at the baseline, 9,60±0,6 mg/dl after 6 months, 9,60±0,5 after 12 months and 9,41±0,4 at the end of treatment), after 18 months of treatment the T-score raised compared with the baseline at the spine (-3,57±0,8 at the baseline, -3,0±0,7 at the end of the treatment). Osteocalcin values raised 4,14 times after 6 months compared with the baseline, undergoing a further slight increase after 12 months of therapy and, although they fell down after 18 months, they still maintained at a level equal to 2,88 times above the baseline, testifying the strong anabolic effect of PTH. In the same way, the levels of β-Ctx showed a trend similar to osteocalcin: after 6 months of treatment with PTH, they raised 2,55 times compared with the baseline, they still increased after 12 months (2,79 times compared with the baseline) and after 18 months, while resulting fell down compared with 12 months, they showed an increase of 1,81 times compared with the baseline.
Conclusions: Our experience demonstrates that PTH 1-84 treatment efficacy is supported by spine BMD changes measured with DXA associated with strong BTM osteoanabolic activity with consistent increase in β-Ctx and osteocalcin levels (2).
References: (1) Reginster et al, Bone 2008;42:832; (2) Adami, Curr Med Res Opin 2008;24:11

Disclosure of Interest: None Declared

P819 - RANDOMIZED CONTROLLED TRIAL OF EXERCISE FALL PREVENTION PROGRAM IN ELDERLY WOMEN WITH OSTEOPOROSIS

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Aims: Falls are common in elderly people and those with osteoporosis are at higher risk for fractures due to falling, because of decreased bone strength. Possible consequences include serious injuries, functional decline and limitation of physical activity. The purpose of this randomized controlled study was to investigate the effects of a 6-month fall prevention program on balance and falling frequency in women with osteoporosis.
Methods: Fifty consecutive osteoporotic women were selected from the Physical Medicine and Rehabilitation Clinic in the Emergency Hospital of Craiova and randomized into 2 groups: the 'Intervention Group', submitted for balance and fall prevention training; and the 'Control Group', without exercises, just with antiosteoporotic medication and advice on fall prevention. Beginning from August 2009, the Intervention group attended a 6-month program of fall-prevention exercise consisting in walking exercises, the practice of fall techniques, adjustment of gait abnormalities, weight bearing exercises, 2 times/week supplemented by a home-based exercise program that focused on leg strength and balance, 3 times/week. Balance (using the Tinetti Scale) and falling incidence were evaluated before and at the end of the trial.
Results: After the 6-month fall prevention program the proportion of women with falls was 16.3% in the intervention group and 41.4% in the control group. The Tinetti Scale scores difference was significant higher in the Intervention group compared to Control (3.56±2.74 vs. −1.9±2.88, $p<0.001$).
Conclusions: An exercise fall prevention program plus a home-based program significantly decreases the incidence of falls, improving functional and static balance in the elderly women with osteoporosis.

Disclosure of Interest: None Declared

P820 - SEASONAL VARIATION OF 25-OH VITAMIN D

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Aims: Very few foods contain vitamin D3 (cholecalciferol) and only small amount of vitamin D is derived from the intestinal absorption of the food. Thus dermal synthesis is the major source of the vitamin, as a result of ultraviolet (UV) irradiation of 7-dehydrocholesterol. Vitamin D2 (ergocalciferol) is derived from plant sterols and used as a therapeutic agent or for the fortification of foods. Both vitamin D3 and vitamin D2 are inactive in many biological systems and must undergo a series of metabolic transformations before exerting effects at target tissues. The hydroxylation in the 25 position results in formation of 25-hydroxyvitamin D (25-OHD) – vitamin D (calcidiol). In plasma it is the major circulating metabolite of vitamin D and is commonly considered to provide an index of vitamin D nutritional status. The large seasonal fluctuations in 25-OHD levels in northern Europe suggest that solar irradiation provides the major source of vitamin D and its formation depends on time, length and intensity of UV exposure.
Methods: In retrospective study, we analyzed levels of 25-OHD in 1203 patients undergoing examination in our institution during a two year period (from May 2007 to May 2009), regardless their therapy.
Results: The analysis confirmed the seasonal variability of vitamin D levels, with their maximum in summer season period (months June to August) and its markedly decrease during winter season period (months December to March), when vitamin D levels decrease under generally accepted level (30 ng/mL). The close to six-fold difference between the highest and minimal average vitamin D concentrations ((99.5 ng/mL in August 2007, respectively 15.8 ng/mL in November 2008) were recorded.
Conclusions: The above mentioned results confirmed insufficient vitamin D nutritional status during winter season period. A question arise, to change the recommendation regarding exogenous doses of vitamin D in dependence to season period.

Disclosure of Interest: None Declared

P821 - TEST-RETEST RELIABILITY OF THREE NEURO-FUNCTIONAL TESTS IN COMMUNITY-DWELLING OLDER PEOPLE WITH LOW BONE MASS AND OSTEOARTHRITIS

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Aims: Low bone mass (LBM) and osteoarthritis (OA) are disabling diseases very prevalent in community-dwelling older people (CDOP). Assessing neuromuscular function of this population is essential to plan their rehabilitation. The aims of this study was to determine test-retest reliability and clinical utility of six meter walk (SMW), functional reach (FR) and sit-to-stand with five repetitions (STS-5) tests in community-dwelling older people with LBM and OA.
Methods: 59 CDOP elderly with LBM (65.6±8.1 years) were submitted to SMW, STS-5 and functional reach test (FRT) tests. After 15 days, 10 of these individuals (66.2±7.2 years) were retested. Intraclass Correlation Coefficient (ICC) was used to evaluate test-retest reliability of the neuro-functional tests (NFT). The relationships among NFT were also examined with Pearson correlations ($p< 0,05$).
Results: The ICC values indicated excellent reliability for the SMW test (0.97, 95%CI=0.90-0.99), the FR and STS-5 tests displayed fair to good reliability (ICC of 0.66 (95% CI=-0.24, 0.91) and 0.70 (95% CI=0.*10*-0.92), respectively. There was significant correlation among SMW and STS-5 tests (r=0.51, p=0,00). STS-5 significantly inversely correlated with age (r= - 0,43, p=0,001). RT was significantly but weakly associated with bone mineral density of femoral neck (r=0.37, p=0.04).
Conclusions: The application of these three tests together represents an easy and fast alternative of neuromuscular function evaluation of community-dwelling older people with low bone mass and osteoarthritis

Disclosure of Interest: None Declared

P822 - A DECREASE IN SERUM LEVEL OF MATRIX METALLOPROTEASES IS PREDICTIVE OF A DRUG'S DMOAD EFFECT ASSESSED BY QUANTITATIVE MRI IN KNEE OSTEOARTHRITIS PATIENTS

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Aims: To explore in a Phase III clinical trial in knee osteoarthritis (OA) patients, the impact of disease-modifying OA drug (DMOAD) treatment on biomarker levels.
Methods: 161 knee OA patients (according-to-protocol population) were selected from a two-year disease modifying OA drug (DMOAD) trial studying the effect of licofelone (200 mg bid) versus naproxen (500 mg bid). MRI was done at baseline and two years. Patients underwent clinical evaluation using the WOMAC questionnaire. Seven OA biomarkers were measured at baseline and two years: MMP-1, MMP-3, IL-6, CRP, COMP, and CTX-I in serum, and CTX-II in urine.
Results: Over time an increase in all biomarker levels was found with the exception of IL-6, CRP, and CTX-II, which decreased. The increase in MMP-1 and MMP-3 was significantly less ($p<0.05$; $p<0.0001$) in the licofelone than the naproxen group. The MMP-1 level at baseline was a significant predictor (inverse correlation) of cartilage volume change for the medial compartment (univariate, $p=0.043$; multivariate regression analysis, $p=0.038$) and COMP, a positive predictor for the lateral compartment (univariate $p<0.0001$; multivariate $p<0.002$). IL-6 and CRP also presented a significant relation to the volume change for the medial compartment but only in the univariate model ($p=0.038$ and $p=0.007$, respectively). A significant association was observed in the univariate model between the change in the level of MMP-1 ($p=0.034$), MMP-3 ($p=0.019$), and cartilage loss (lateral compartment) over

two years. Baseline levels of CTX-I correlated (p=0.02) with increase in bone marrow lesion size in the medial compartment. The CRP levels at baseline correlated positively with worsening of symptoms: WOMAC total index (p=0.0009), pain (p=0.002) and function (p=0.001).
Conclusions: This study demonstrated that higher baseline values of IL-6, CRP, and COMP were predictive of a greater risk of OA cartilage loss. However, over time a reduction in the MMP-1 and MMP-3 levels correlated best with a reduction in the loss of cartilage and the effect of drug treatment. The baseline CRP was found to be a good predictor of the symptomatic response to treatment.

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P823 - ORAL TREATMENT WITH A BRACHYSTEMMA CALYCINUM D. DON PLANT EXTRACT REDUCES DISEASE SYMPTOMS AND THE DEVELOPMENT OF CARTILAGE LESIONS IN EXPERIMENTAL DOG OSTEOARTHRITIS: INHIBITION OF PROTEASE ACTIVATED RECEPTOR-2 (PAR-2)

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Aims: The aims of this study were to evaluate the effect of oral treatment with a whole plant extract of Brachystemma calycinum D. don (BCD) on the development of osteoarthritic (OA) lesions and symptoms in the experimental dog anterior cruciate ligament (ACL) transection model and to document its mechanism of action.
Methods: OA was induced by sectioning the ACL of the right knee in crossbred dogs. There were two experimental groups (n=6-7 dogs/group): placebo and BCD extract (200 mg/kg/day) given orally for 8 weeks. Macroscopic and histopathological evaluation of cartilage lesions and immunohistochemical analysis of cartilage to assess levels of iNOS, MMP-13, and protease activated receptor (PAR)-2 were done. A gait analysis of dogs was performed.
Results: Treatment with BCD reduced the severity (depth) (p=0.04) and histopathological score (p<0.02) of OA cartilage lesions. BCD treatment also significantly reduced the OA chondrocyte level of key inflammatory and catabolic factors (iNOS, p=0.009 and MMP-13, p=0.003) as well as the level of PAR-2 (p=0.03). Dogs treated with BCD showed significant improvement in peak vertical force measured at 8 weeks (p<0.05).
Conclusions: Treatment with BCD extract can exert a positive effect on the prevention of cartilage lesions induced by joint instability and improve joint function. This effect was associated with the inhibition of major catabolic and inflammatory mediators. This study is the first to demonstrate that a therapeutic intervention that can inhibit PAR-2 is associated with a disease-modifying OA effect.
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P824 - COMPARISON OF SELF-ESTIMATIONS ON FRACTURE RISK WITH FRAX® RESULTS: SURVEY OF PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS IN HUNGARY

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Aims: FRAX® model was developed to calculate 10-year probability of major osteoporotic and hip fracture, offering a new base for physicians' treatment decisions. Less is known about patients' ideas about their fracture risk. However inaccurate self-estimates might have implications on patients' health behaviour, compliance, seeking medical care and evaluation of treatment effectiveness. Our aim was to study the fracture risk of postmenopausal OP patients by FRAX® in Hungary and to compare with self-assessments.
Methods: Postmenopausal OP women were included in a cross sectional survey in 10 rheumatology centres in Hungary, year 2009. Demographics, health status on visual analogue scale (VAS), osteodensitometry, OP fracture risk factors were surveyed. Patients were asked to estimate their 10-year risk of major OP and hip fracture with numerical percent and also on a 100 mm VAS (0=no risk, 100=surely will happen). FRAX® scores were calculated using the UK algorithm (advised for Hungary) and matched with patients' estimations.
Results: 1077 patients were involved, main characteristics were (mean and SD): age 68.3(8.1) years, health status VAS 62.7(17.1)mm, lumbar Tsc-2.67(1.11), femoral Tsc-2.47(0.93). Occurrence of FRAX® risk factors (patients,±): previous OP fracture 527(51.7), paternal hip fracture 213(19.9), smoking 123(11.4), corticosteroid exposure 107(9.9), early menopause 341(31.7), RA 143(13.3), secondary OP 175(16.2). FRAX® of major OP fracture was mean (SD) 22.4(14.1)% whilst patients' self-estimation was significantly higher, 28.7(24.8)% and 32.9(27.5)mm on VAS ($p<0.01$). For hip fracture risk we found robust overestimation: FRAX® resulted mean (SD) 9.5(11.4)%, patients marked mean (SD) 23.4(23.5)% and 27.5(26.5)mm.
Conclusions: Postmenopausal osteoporotic patients overestimate their 10 year fracture risk compared to FRAX® results, especially regarding hip fracture. Appropriate transmission of risk data and discussions about patient's perceptions should play important role in osteoporosis care.
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Disclosure of Interest: None Declared

P825 - SURGICAL TREATMENT OF SHORT-SEGMENT POSTERIOR SPINAL FUSION COMBINED WITH VERTEBROPLASTY FOR OSTEOPOROTIC VERTEBRAL COLLAPSE WITH NEUROLOGICAL DEFICIT

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Aims: To investigate the clinical and radiological outcome of short-segment posterior spinal fusion (PSF) combined with vertebroplasty (VP) for osteoporotic vertebral collapse (OVC) with neurological deficit, and to investigate the prognostic factor which affects patient's activities of daily life (ADL) after surgery.
Methods: Sixteen patients (mean age 79.6±4.3 years) with OVC with neurological deficit underwent short-segment PSF combined with VP using calcium phosphate cement. Clinical results regarding neurological deficit and patient's ADL were assessed by the modified Frankel performance grade and the Japanese Kaigo scale (J1-C2: eight-grade system), respectively. At the final visit, all patients were divided into two groups:(1) "good" which showed a good ADL grade (J1-A2) and (2) "no good" which did not show a good ADL grade (B1-C2). We retrospectively assessed clinical background data, complete blood cell counts and serum chemistry and plain radiographs.
Results: All patients showed a neurological improvement and 56% of them had no neurological deficits. Remarkable improvements regarding ADL between before surgery and at the final visit were obtained, and 31% of all patients were completely independent. Radiographs revealed that local kyphotic angle was 30.1°before surgery, 7.8°just after surgery and 29.4°at the final visit. Bony union rate was 82% and the duration time to bony union was 6.7months. The pedicle screw loosening in 8 patients (50%), instrumented vertebral fractures in 6 patients 8 vertebrae (38%) and adjacent vertebral fractures in 4 patients 6 vertebrae(25%). Compared with the "good" group (9 patients: male:4, female:5) and the "no good" group (7patients: male:6, female:1), only serum Cr and GFR showed a statistically significant difference ($P<0.05$). In the "no good" group, serum Cr was significantly higher and GFR was significantly lower, but there were no significant differences in surgical complications and fractures related to PSF.
Conclusions: PSF combined with VP promises good clinical results for osteoporotic vertebral collapse with neurological deficit, but it was difficult to maintain local kyphotic angle in patients with severely osteoporosis. Our study shows that renal function is a prognostic factor of patient's ADL after surgery. Severe osteoporosis and sarcopenia induced by CKD-MBD tends to disturb an improvement of patient's ADL after surgery and induce the instrumentation failure and fractures related to PSF.

Disclosure of Interest: None Declared

P826 - DOES ONCE-YEARLY ZOLEDRONATE ABATE BONE PAIN IN POSTMENOPAUSAL OSTEOPOROSIS

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Aims: To assess the bone pain relief in postmenopausal osteoporosis, within one year after a single intravenous infusion of 5 mg Zoledronic acid.
Methods: Seventy one women with postmenopausal osteoporosis (mean BMD=0,745±0,098, mean T-score=- 3,31) were selected through The Bulgarian Society of Osteoporosis and Osteoarthritis. All patients, 65 years of mean age, were assigned to receive a single infusion of zoledronic acid (5 mg) at baseline and at 12 month.. Primary endpoint was influence on the osteoporosis pain within one year of treatment. Secondary endpoints were new fractures and safety outcomes. BMD of the lumbar spine (LS) on DXA and x-ray of the LS and thoracic spine (ThS) was measured before and after the treatment at 12th month. The osteoporosis pain was assessed by visual analogue scale (VAS - mm) at baseline, 3rd and 12th month. All patients received calcium (1200 mg/d) and Vit. D_3 (1000 I.U./d) supplementation. There was no history of corticosteroid use, rheumatic, endocrine and renal diseases. Statistical analysis was performed by T-Test and Wilcoxon test, using SPSS 11.5 for Windows.
Results: Once-yearly IV infusions of Zoledronate brought within one year to significantly increase in the mean BMD from baseline at the lumbar spine (0,041±0,026 g/cm^2; 5,6±; p<0,0001) Concordantly, osteoporosis pain decreased significantly from baseline - 76,5 (± 4,84) vs. 49,5 (± 5,73) at 3rd month; p=0,001 and 76,5 (± 4,84) vs. 23,3 (± 4,04) at 12th month; p<0,0001. At baseline forty one patients (56±) have totally 97 fractures; 72 (74%) vertebral, 21 (22%) – of radius and 4 (4±) – of femoral neck. New fractures were not seen at the end of 1st year of treatment. The adverse reactions were mild and transient
Conclusions: Once-yearly IV infusion of zoledronic acid brought to significantly decrease of osteoporosis bone pain, with the significant increase of mean bone mineral density from baseline. There were no new fractures at the end of 1st year. Adverse reactions are mild and transient.
References: 1. Lyles KW et al. for the HORIZON Recurrent Fracture Trial. N Engl J Med 2007;357:1799; 2. Reid IR et al. N Engl J Med 2002;346:653; 3. Black DM et al. N Engl J Med 2007;356:1809.

Disclosure of Interest: None Declared

P827 - BENEFICIAL EFFECT OF STRONTIUM RANELATE ON BACK PAIN AND BONE MINERAL DENSITY IN PATIENTS WITH POSTMENOPAUSAL OSTEOPOROSIS

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Aims: To assess the effect of Strontium Ranelate (SR) on the back pain and bone mineral density (BMD) in patients with varying degrees of postmenopausal osteoporosis(PMO), with and without vertebral fractures(VF) in one year treatment.
Methods: The study group consisted of 71 women with a mean age of 63.9±9.0 (range 34 – 82). The clinical characteristics of the enrolled patients (pts) included PMO and back pain. VF were found in 23 of 71 pts (32.4%). 35 pts had osteoporosis (OP) with T-score ≥ – 3.0 (Group 1), and OP with T-score <– 3.0 (Group 2) was found in 36 pts. Lumbar spine BMD was measured by DXA, and thoracic and lumbar X-rays were evaluated at baseline and after one year. Back pain was evaluated at baseline, on the 3rd and the 12th month by a 4-point scale ranging from "no pain" (score 0) to "severe pain" (score 3). The pts were treated with SR 2g daily dose, Calcium – 600 mg/d, and Vitamin D – 400 IU/d for one year.
Results: At the end of the study period we were able to achieve an increase in BMD (-3.094±0.543 vs.–2.720±0.819; p<0.0001). Within-group analysis demonstrated statistically significant increases in BMD for the group without VF (-2.976±0.507 vs.–2.652±0.586; p<0.0001), for Group 1 (-2.658±0.211 vs.–2.348±0.393; p<0.0001), and Group 2 (-3.548±0.380 vs.–3.080±0.958; p=0.017). However, no statistically significant differences were observed in the group with VF (-3.395±0.516 vs.–2.863±1.177; p=0.083). Overall, the reduction in back pain from baseline to the 3rd and the 12th month follow-up was statistically significant (p<0.0001) for all groups. At baseline 13 of the pts (18.3%) had severe (score 3) pain, 40 pts (56.3%)- moderate pain (score 2), and 18 pts (25.4%) were experiencing mild (score 1) pain. The long-term follow-up proved reduction of back pain in 69 of 71 pts (97.2%). Moreover, 41 pts (57.7%) had no pain (score 0), and 23 (32.4%) complained of mild pain (score1).
Conclusions: We conclude that SR combined with Calcium and Vitamin D long-term treatment can be considered an effective option for achieving an increase in BMD and for reducing back pain independently of the severity of PMO and the presence of previous VF.

Disclosure of Interest: None Declared

P828 - THE EFFECTS OF REHABILITATION THERAPY ON MYOFASCIAL PAIN SYNDROME

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Aims: of our study was to assess the effects of the physical rehabilitation therapy on myofascial pain syndrome(MPS).
Methods: Our group of study consisted in 54 patients with the diagnosis of MPS. They were divided in two subgroups: first group (n=28 patients) was treated with physical exercises (stretching) and massage and the second group (n=26) was the placebo group with no treatment. Patients in the first group received three weeks of physical rehabilitation therapy and patients from the control group received no therapy. The patients were assessed with Short Form 12 Health Survey and Pain Disability Index (PDI) at the beginning and after three weeks, and after 6 months.
Results: PDI and SF 12 scores (both Physical and Mental Health) improved significantly in the first group (with rehabilitation treatment) at three weeks and 6 months compared with pretreatment values, and also compared with the control group, which had no improvement either in PDI or in SF 12 scores.
Conclusions:: Physical rehabilitation therapy seems to have a beneficial effect on myofascial pain syndrome. Future studies should be done to sustain the effects over time.

Disclosure of Interest: None Declared

P829 - RADIOFREQUENCY (RF) KYPHOPLASTY IN THE TREATMENT OF OSTEOLYTIC VERTEBRAL FRACTURES

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Aims: Radiofrequency Kyphoplasty (RFK) provides a new minimally invasive procedure to treat vertebral compression fractures (VCF). The purpose of this study was to investigate the functional outcomes, safety and radiographic outcomes after the treatment of painful osteolytic vertebral fractures treated with a novel minimally invasive procedure, RFK.
Methods: 88 patients (50 females and 38 males) with 158 osteolytic vertebral fractures were treated with RFK using the StabiliT Vertebral Augmentation System (Dfine Inc, San Jose, CA). The StabiliT System provides a navigational osteotome to create a site and size specific cavity prior to delivering an ultrahigh viscosity cement with an extended working time (done by applying radiofrequency energy to the cement immediately prior to entering the patient). Six months follow up in 63 patients (38 females and 25 males) with 116 treated vertebrae are reported. Pre- and postoperative, 3 and 6 months clinical parameters (Visual Analogue Scale, Oswestry Disability Index score), and radiological parameters (vertebral height and kyphotic angle) were measured.
Results: The median pain scores (VAS) ($p<0.001$) and the Oswestry Disability Score ($p<0.001$) improved significantly from pre- to post-treatment and maintained at 3 and 6 months follow up. Postoperative, 3 and 6 months follow-up RFK restored and stabilized the vertebral height and avoided further kyphotic deformity.

No symptomatic cement leaks or serious adverse events were seen in the RFK group during 3-months of follow up. In 7 out of 158 vertebrae (4.4%) a cement leakage into the disc or lateral wall could be determined by radiograph postoperatively.
Conclusions: Radiofrequency Kyphoplasty is a very safe and effective minimally invasive procedure for the treatment of osteolytic vertebral fractures. Radiofrequency Kyphoplasty shows excellent clinical and radiological results in the 3 and 6 months follow up. Site specific cavity creation and delivery of ultra-high viscosity cement in RF Kyphoplasty with extended working time resulted in the added benefits of height restoration and lower cement leakages intra-operatively.

Disclosure of Interest: None Declared

P830 - PRELIMINARY 3 MONTH RESULTS FROM A POSTERIOR DYNAMIC FLEXION-LIMITING DEVICE IN PATIENTS WITH DISCOGENIC PAIN AND SPINAL STENOSIS

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Aims: Patients with discogenic pain, spondylolisthesis and / or spinal stenosis are typically treated with decompression and spinal fusion. A posterior stabilization system has been developed to stabilize the segment without the need for fusion. The flexion-limiting device (LimiFlex) reduces the flexion of the segment and therefore stabilizes the segment. The purpose of the study was to evaluate the clinical and imaging outcomes in patients with discogenic pain in flexion and spinal stenosis due to degenerative disc disease in the lumbar spine treated with interlaminar decompression with segmental stabilization using the LimiFlex device.
Methods: 25 patients (11 males and 14 females) with discogenic pain in flexion and symptomatic spinal stenosis with claudicatio spinalis were treated with interlaminar decompression and LimiFlex: 4 patients L3/4, 18 patients L4/5 (4 patients with spondylolisthesis Meyerding grade I), 3 patients L5/S1. Follow up data were available for 22 patients at the 3 month time point. Symptomatic levels were identified by correlating the clinical presentation with conventional radiographs (A/P, lateral, flexion, extension), myelogram and post myelo CT and / or MRI. During the 3 months follow-up, reduction in pain was determined. The effects on pain symptoms were measured on a self-reported Visual Analog Scale (VAS), and the Oswestry Disability Index (ODI) was documented to assess disability. Pain free walking distance was evaluated. Functional radiographic scans were performed pre- and postoperatively and after 3 months. The segmental alignment was evaluated for any signs of instability.
Results: The median pain scores in flexion (VAS) improved significantly from pre- to post-intervention as did the ODI ($p<0.001$) and the pain free walking distance ($p<0.001$). No increase of segmental instability could be detected through radiographic assessments.

Conclusions: Interlaminar decompression with LimiFlex stabilization in patients presenting with discogenic pain in flexion and spinal stenosis led to a significant clinical improvement and improvement in walking distance. Segmental instability after decompression was avoided. Long-term results are needed to evaluate if this procedure is superior to interbody fusion in early stage degenerative disc disease.

Disclosure of Interest: None Declared

P831 - MODEST INCREASES IN TRABECULAR BUT NOT CORTICAL BMD BY QCT IN POSTMENOPAUSAL WOMEN WITH RONACALERET, A CALCIUM-SENSING RECEPTOR ANTAGONIST

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Aims: This study evaluated the effects of ronacaleret (RON) on compartmental BMD in postmenopausal women.
Methods: In a phase II, dose-ranging, placebo-controlled study, 569 postmenopausal women with osteopenia or osteoporosis were enrolled to open-label teriparatide (TER, 20mcg daily) or randomized with double-blinding to placebo (PBO), one of 4 daily doses of RON (100, 200, 300, 400mg) or alendronate (ALN, 70mg weekly).
Results: An interim analysis performed at 6 months resulted in early phase out of the trial due to lack of efficacy and subjects returned for final visit between months 10-12. There were modest increases in lumbar spine (LS) aBMD by DXA in the RON groups (200 to 400mg) vs. increases in the ALN and TER groups. RON decreased total hip (TH) aBMD vs. modest increases in the ALN and TER groups. RON increased mean vertebral integral vBMD over baseline in a dose-dependent manner; the RON 400mg dose and ALN had comparable increases. Vertebral trabecular vBMD had greater dose-dependent increases with RON over baseline vs. ALN. TER increased both parameters. In contrast, mid-vertebral cortical vBMD had small increases over baseline in the RON groups vs. significant increases with ALN and TER. At the hip, RON slightly and non-significantly reduced mean changes from baseline in femur integral vBMD while the ALN and TER groups had significant increases (Table). Thus, RON had a preferential effect on trabecular bone in a manner similar to that seen with TER, although of reduced magnitude. The improvements in trabecular bone with RON were at the expense of small non-significant negative effects on cortical vBMD. QCT provided detailed information on the trabecular and cortical compartments while aBMD measurements by DXA failed to distinguish these different response patterns.

Table: vBMD Percent Change from Baseline at Months 10-12

	PBO n=42	RON 100 n=50	RON 200 n=43	RON 300 n=43	RON 400 n=41	ALN n=49	TER n=36
Vertebral integral	-1.0	1.1*	3.0**	3.9**	4.8**	5.0	14.8
Vertebral trabecular	-2.5	1.8	6.2	9.0	13.3	4.9	24.4
Mid-vertebral cortical	-0.3	0.6	2.4	2.6	1.2	5.0	9.3
Femur integral	0.0	-0.1	-0.8	-0.5	-0.2	2.7	3.9
Femur trabecular	-0.4	-0.4	-2.2	1.2	2.8	3.1	13.3
Femur cortical	1.1	-0.3	-1.5	-1.1	-1.8	2.4	0.2

Note: 304 [275] subjects contributed to spine [femur]± change measures. RON contrasts vs. PBO were tested after ANCOVA for vertebral and femur Integral vBMD only; *-p<0.05; **p<0.001

Conclusions: Ronacaleret, due to a prolonged pharmacodynamic effect, induced a mild primary hyperparathyroidism, resulting in relative preservation of trabecular bone.

Disclosure of Interest: L. Fitzpatrick Employee of: GlaxoSmithKline, C. Dabrowski Employee of: GlaxoSmithKline, G. Cicconetti Employee of: GlaxoSmithKline, T. Fuerst Consultant / Speaker's bureau / Advisory activities with: GlaxoSmithKline, Employee of: Synarc, Inc., Stock ownership or royalties of: Synarc, Inc., K. Engelke Consultant / Speaker's bureau / Advisory activities with: GlaxoSmithKline, Employee of: Synarc, Inc., H. Genant Consultant / Speaker's bureau / Advisory activities with: GlaxoSmithKline, Synarc, Inc., Roche, Merck, Amgen, Lilly, Servier, BMS, Genentech, Stock ownership or royalties of: Synarc, Inc.

P832 - ALENDRONATE THERAPY CAN RESULT IN REDUCTION OF ECONOMIC BURDEN OF HIP FRACTURE

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Aims: Most of the economic impact of osteoporosis (OP) has been reported to be related to hip fracture including direct and indirect costs of surgery, hospitalization and subsequent medical and non-medical follow up. Aim of this study was to assess the direct economic burden of hip fracture and hospitalization costs and economic benefits of pharmacologic prevention of hip fractures in the city of Tyumen, Russia (population about 600,000 inhabitants).
Methods: Number of hip fractures related to OP in Tyumen, direct costs of hospitalization, hip replacement and bisphosphonates therapy were registered. Considering that bisphosphonates, in particular alendronate[1], were reported to reduce hip fracture rate, potential reduction of direct hip fracture costs was calculated, assuming preventive pharmacotherapy is conducted.
Results: 120 OP related hip fractures were registered in Tyumen in 2008. Total direct costs of hip replacement and hospitalization

reached 132,000 RUR (~USD 4,400) per one case and 15,840,000 RUR (~USD 528,000) total for the city. Given the minimal alendronate and vitamin D (combination tablet) treatment course of 3 years, total cost of pharmacotherapy for these 120 patients would be 14,016,000 RUR (~USD 467,000). Evidence of 59% hip rate reduction reported after 3 years of alendronate administration[1], would result in 12% direct costs reduction.
Conclusions: Our data demonstrate that preventive pharmacotherapy can result in significant reduction of economic burden of OP. These data do not include other fractures rate and related costs reduction.
References: 1. Black DM et al, for the FIT Research Group, J Clin Endocrinol Metab 2000;85:4118.

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P833 - EXPECT LOW BONE MASS: A REVIEW OF BMD TEST RESULTS IN STUDIES OF LOW-TRAUMA FRACTURE PATIENTS

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Aims: Clinical practice guidelines suggest osteoporosis treatment for low-trauma fracture patients who have low BMD and high 10 year risk of future fracture. The purpose of this study was to determine the proportion of patients who present with low BMD values at the time of low-trauma fracture, versus the proportion who present with normal BMD. These data are derived from a review of BMD test results in published articles on post-fracture osteoporosis care.
Methods: This analysis was performed on 20 published reports that describe interventions that address osteoporosis in low-trauma fracture patients. We searched for indicators of potential bias regarding BMD test results, such as selection of fracture type(s), exclusion criteria, and sample size. We compared results across studies and across sources of potential bias, and studies with three or more sources of potential bias were excluded from our analysis of the typical proportion of patients with low BMD. We contacted the authors of six studies, the three with the highest and the three with the lowest proportions of patients with low BMD, to confirm their data. The primary outcome of this analysis is the proportion of low-trauma fracture patients who have low BMD (T-score ≤-1.0; osteopenia and osteoporosis), many of whom have indications for pharmacological treatment for osteoporosis.
Results: BMD data were available for 4,546 patients, 4,378 of whom sustained a low-trauma fracture. The proportion of patients with low BMD ranged from 66% to 100%; the mean was 82.1% and the median was 82.5%. Accounting for studies in which the objectives and case selection may have led to an atypically higher or lower low BMD rate, we conclude that 80-90% of low-trauma fracture patients presenting to fracture clinics and emergency rooms have low BMD.
Conclusions: Orthopaedic surgeons can expect that 80-90% of low-trauma fracture patients have low bone density and therefore all should be considered for osteoporosis interventions. This information should provide a further basis for orthopaedic surgeons to investigate low-trauma fracture patients for osteoporosis and consider treatment where indicated.

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P834 - EFFECTS OF CALCIUM SELENIUN PROTEIN ON BONE MASS IN MIDDLE AGED WOMEN WITH LOW BONE MASS

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Aims: Objective: Identify the utility of the calcium selenium protein as an adjunct in preserving bone mass in middle aged women with osteopenia.
Methods: Double-blinded randomized study that consisted in the administration of calcium carbonate 1 000 mg/day, Ergocalciferol 200 000 UI every 6 weeks and (Ca/Se protein (study group) or placebo (control group) for a period of one year to 60 healthy women between the ages 40-59 years, who sought medical attention in the ClimOs in Havana City, between April 2008 and October 2009. After receiving their consent each woman were clinically assessed each 3 months in order to search symptoms that could be attributed to possible side effects of Ca/Se protein . Every 6 months check different carbohydrates and lipids metabolites . Every 12 months the blood levels of TSH and bone mineral density was determined by DXA (LEXXO, France). To evaluate the therapeutically response we use the difference between the initial and final values of BMD on vertebral and forearm were used. Also determine the total risk of diminish bone mass during treatment with Ca/Se protein.
Results: Completed the years of treatment 56 patients, 29 with Ca/Se protein. and 26 in the control group, Both groups were clinically similar . During treatment there was no change in body weight, blood pressure levels nor in any of the blood metabolites evaluated. In the **lumbar region** the difference between the value of BMD at the beginning and at the end of the study was 0,07±0,5 ($p < 0.001$) in the study group and 0,05±0,07 of control group, (p 0,032). Total risk for diminish bone mass was 2% for women receiving treatment with calcium/Se protein ($p = 0,005$).In the **forearm** the difference between initial and final BMD were 0.04±0.13

(p=0.854) in women with Ca/Se protein and 0.08±0.12 (p= 0.01) in the placebo group. The total risk for diminish bone mass was of 21% in the study group. (p <0,005)
Conclusions: We could recommend Ca/Se protein as part of actions to preserve bone mass in middle aged women

Disclosure of Interest: N. Despaigne Grant / Research Support from: Research support, M. Curiel: None Declared, T. Marelis: None Declared

P835 - ISSUES FOR OSTEOPOROSIS AFFECTED: RECOMMENDATIONS FOR ASIAN RESOURCE-POOR-NATIONS TO IMPROVE ACCESS-TO-CARE

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Aims: Training resources/Rx-guidelines are not easily available to nurses. Due to resource constraints newer therapies. Newer interventions, diagnosis facilities needs to be available to general hospitals. This issue of access to diagnosis & cares of serious-concern since osteoporosis management are out of reach for majority Asian-population where malnutrition common.
Methods: Observations: IOF in collaborations with local NGO's doing research/education of Osteoporosis need to form common guidelines for treatment modalities for Osteoporosis-affected population. specially issues for access to expensive drugs needs to be addressed in consultation with WHO health policy committee.
Results: Scientists/funders from industrialized nations need to support initiatives of young-researchers of Asian-nations in improving facilities. There is urgent need to educate doctors about diagnosis/treatment of osteoporosis. We will share this issues with osteoporosis specialists from developed nations at 10th IOF 2010 conference.
Conclusions: We carry back IOF WCO-ECCEO10 congress experience back in our-country to improve efforts for resource raising/care guidelines. In Asia tobacco-smoking alarmingly high.. smoking further aggravates osteoporosis. At IOF meeting, We collaborate with researchers from USA/Europe to substantially-improve care-efforts for osteoporosis in Resource-poor-nations.

Disclosure of Interest: None Declared

P836 - OSTEOPOROSIS ISSUES & COMPLEMENTARY INDIAN MEDICINE: THREE YEARS EXPERIENCES OF A INDIAN NGO

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Aims: No specific centre in India for Osteoporosis patients treatment/rehabilitation. our Indian Health NGO used locally available Complementary Indian Medicines [CAM] for providing home based care in rural/tribal areas. 1]To provide CAM in collaboration with Traditional-faith-hearers. 2] Evaluate cost-efficacy of CAM & response of pain of fractures to CAM alongside analgesics.
Methods: from April 2004 to Nov2009, 122 patients [n=122] aged 34-67 years enrolled. 68% females, 32% males. 43% returned to villages after therapy in city hospitals on allopathy. 12% physical deformities. self report questionnaire distributed to patients. treated patients with TFH in providing CAM. Mud therapy 21%, Bach-flower remedy 40%, Accupressure/Accupuncture 57%, Hydrotherapy 24%, Hypnotherapy 75%, ayurvedic therapy 82%, 26% on Unani Medicines, 61% on Homeopathic medicines, 72% on Herbal-Oil-TFH massage therapy, 58% Aromatherapy
Results: We treated patients in 8 sessions CAM. feedback Performa given to subjects & responses evaluated periodically to modify treatment methodology. Our NGO module in functioning stages shown graphically to IOF-2010 conference participants. Average pain recorded weekly on a scale of 1 to 10. mean score pain fell from 8.2 (SD 1.4) to 3.8 (SD 2.7) points, which is highly significant (p<0.001). Symptom relief(n=90), Gr-1 wanting to find alternatives to drugs(n=95). Cost of CAM 52% cheaper compared to Allopathic medicines & is locally & has high acceptance
Conclusions: 122 of patients used & preferred CAMs. Cost wise cheaper & patient compliance better. 12± dropped out of sheer frustration/fatigue. Patients need Psychosocial-Rx, Palliative-care-centers. Realizing divergent versions of CAM, multicentre study on this burning issue must be carried out. At Florence, We shall form group with researchers from USA/Europe to substantially improve CAM. We NGO-representatives from developing nations need exposure to research technicalities/methodologies used by European/American experts. This possible by my participation at WCO-ECCEO10 congress

Disclosure of Interest: None Declared

P837 - CHANGES OF VOLUMETRIC BONE DENISTIES AND 3D-BONE STRUCTURES UNDER THERAPY WITH RALOXIFENE MEASURED WITH HRPQCT

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Aims: Data of the MORE-Study demonstrated that areal bone densities measured with DXA showed only a small increase which could not explain the reduction of vertebral fracture risk of at about 50%. Therefore, "bone quality" should be improved by raloxifene, which, however, cannot be evaluated by DXA-measurements but with HRpQCT (XtremeCT®, SCANCO Medical AG). In a retrospective analysis we showed last year (Poster 0197, ECTS 2009) an increase of trabecular as well as cortical bone densities and an improvement of microarchitectural parameters. Beside in 2008 we started a prospective study to demonstrate the effects on volumetric bone densities and microarchitectural parameters in postmenopausal osteoporotic and osteopenic women, taking raloxifene.
Methods: Altogether we included more than 40 postmenopausal osteoporotic and osteopenic women taking raloxifene in this trial till now. After a baseline measurement with HRpQCT two control measurements after one and two years are planned or already done. Furthermore in about one half of the patients measure-

ments of bone markers, calcium, vitamin D and parathyroid hormone in the blood before starting therapy and after 3 to 6 month therapy are planned or have taken place already. Until now data of 15 patients for HRpQCT measurements and laboratory results of more than 15 patients are available. The number should increase significantly until next ECTS meeting in June 2010. Additionally all patients receive individual dosage of calcium and vitamin D, dependent by the measured vitamin D levels.
Results: After the first control measurement we find a significant increase in volumetric trabecular and cortical bone densities as well as in micro architectural parameters as BV/TV and trabecular number in nearly all of the 15 postmenopausal women examined till now. Bone markers (Crosslaps, BAP) showed relative decreases in all patients measured until now after 3 to 6 month therapy as we expected. Vitamin D levels in most cases were below 30 ng/ml before but above 30 ng/ml after the first control measurement due to the supplementation.
Conclusions: As shown in our retrospective study Raloxifene increases trabecular and cortical bone densities as well as "bone quality" represented by a number of micro architectural parameters also in this prospective trial which is still ongoing. Detailed results of the first 15 to 20 patients finishing at least one year of therapy we will present at the ECCEO meeting 2010 in Florence.

Disclosure of Interest: None Declared

P838 - SINGLE ORAL DOSE OF (1200 MG) SACHET OF CHONDROITIN 4&6 SULFATE (CS) RELIEVES PAIN AND IMPROVES FUNCTION. RESULTS OF A DOUBLE BLIND STUDY, VERSUS PLACEBO AND AN ACTIVE TREATMENT IN KNEE OA PATIENTS

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Aims: Evaluation of the efficacy and tolerability of a single oral dose of a 1200 mg sachet of chondroitin 4&6 sulfate (CS 1200) versus placebo (superiority study) and versus 3 daily capsules of chondroitin 4&6 sulfate 400 mg (CS 400), during 91 days, in patients with knee OA (non inferiority study).
Methods: Comparative, double-blind, randomized, multicenter study, in parallel groups, including 353 patients of both genders, at least 45 years old, with knee OA for at least 6 months. Minimum inclusion criteria was a Lequesne Index (LI) > 7 and pain > 40 mm on a visual analogical scale (VAS). IL and VAS was assessed after 30, 60 and 91 days. Global efficacy evaluation and general product tolerability was also measured.
Results: Patient treated with CS 1200 were significantly improved at D60 and D91 in terms of LI ($p<0.01$ and <0.001 respectively) and their pain was significantly improved at D91 ($p<0.01$) compared to baseline and placebo (ITT analyses). No significant difference was demonstrated between the oral daily single dose of CS 1200 formulation, and the 3 daily capsules of CS 400 (PP analyses). The global efficacy evaluation showed a statistically significant superiority of both CS 1200 and CS 400 groups compared to placebo after 60 and 91 days, when evaluated by patients ($p=0.03$) or by investigator ($p=0.005$). No significant difference, in terms of security and tolerability, was observed between the 3 groups.
Conclusions: This study suggests that daily administration of an oral sachet of 1200 mg of chondroitin 4&6 sulfate allows a significant clinical improvement compared to a placebo, and a similar improvement when compared to a regimen of 3 daily capsules of 400 mg of the same active ingredient.

Disclosure of Interest: B. Zegels Consultant / Speaker's bureau / Advisory activities with: IBSA-Genévrier, R. Theiler Consultant / Speaker's bureau / Advisory activities with: IBSA-Genévrier, P. Crozes Consultant / Speaker's bureau / Advisory activities with: IBSA-Genévrier, D. Uebalhart Consultant / Speaker's bureau / Advisory activities with: IBSA-Genévrier, J. Reginster Consultant / Speaker's bureau / Advisory activities with: IBSA-Genévrier

P839 - CHARACTERIZATION OF AND RISK FACTORS FOR ACUTE PHASE REACTIONS FOLLOWING ZOLEDRONIC ACID

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Aims: The occurrence of flu-like symptoms in patients receiving high-dose oral or intravenous amino-bisphosphonates (referred to as the acute phase reaction [APR]) has been recognized for more than 20 years, but has received little systematic analysis. It has been suggested that previous exposure to oral bisphosphonates, glucocorticoids, nonsteroidal anti-inflammatory drugs (NSAIDs) and statins might reduce the severity/frequency of the APR. In this analysis, we examine the symptoms observed after zoledronic acid (ZOL) infusion and the potential risk factors for any of these symptoms in the HORIZON-PFT study.
Methods: This international, randomized, controlled trial compared the APRs following annual injections of ZOL 5mg to placebo over 3 years in 7765 postmenopausal women with osteoporosis. Adverse events (AEs) were collected using the MEDRA dictionary, in which AEs were categorized using ~2000 individual terms. To identify the components of the APR, all AEs occurring within 3 days of the first ZOL infusion were compared between the groups.
Results: We found >30 AE terms that were significantly more common in the ZOL group, and these could be clustered into 5 groups, as shown in the Table. The musculoskeletal group included pain and joint swelling; gastrointestinal included abdominal pain, vomiting and diarrhea; other included nonspecific systemic symptoms such as fatigue and malaise as well as a significant increase in the frequency of nasopharyngitis and peripheral edema in the ZOL group. Overall, 42.5% of subjects treated with ZOL showed evidence of an APR after the first infusion, compared with 11.7% of the placebo group. All APR components had their peak onset within 1 day of infusion, and very few APRs began

after Day 3. Median duration of APR was 3 days (interquartile range: 2–5 days), each component having a similar time-course, except for eye symptoms, which had a median duration of 5 days. Severity was rated as mild or moderate in 90%, and the APR led to drug discontinuation in 0.8%. Most putative risk factors had only a small impact on APR incidence. Stepwise regression showed that APR was more common in non-Japanese Asians, younger subjects and those using NSAIDs, whereas was less common in smokers, diabetics, those with previous bisphosphonate use and the Latin Americans (OR 0.26, vs. Europe).

Symptom Cluster	ZOL (%)	Placebo (%)
Fever	20.3%	2.5%
Musculoskeletal	19.9%	4.7%
Gastrointestinal	7.8%	2.1%
Eye Inflammation	0.6%	0.1%
Other	22.1%	5.8%
Acute Phase Reaction (i.e. any of the above)	42.5%	11.7%
Each symptom cluster was more common in the ZOL group, *P*<0.0001		

Conclusions: The components of the APR are more diverse than those recognized earlier; however, is seldom a major issue following ZOL infusion.

Disclosure of Interest: I. Reid Grant / Research Support from: Novartis Pharmaceuticals, G. Gamble Consultant / Speaker's bureau / Advisory activities with: Novartis Pharmaceuticals, P. Mesenbrink Employee of: Novartis Pharmaceuticals, D. Black Grant / Research Support from: Novartis, Roche

P840 - COMPARING ONCE YEARLY ZOLEDRONIC ACID WITH ONCE WEEKLY GENERIC ALENDRONATE IN THE TREATMENT OF ESTABLISHED MALE OSTEOPOROSIS

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Aims: To compare adverse events, drug persistence and therapeutic outcomes in men with established osteoporosis treated with either oral generic alendronic acid or intravenous zoledronic acid.
Methods: In this retrospective patient chart review analysis we included 92 men with established osteoporosis. They were recruited consecutively from our out-patient department files according to their treatment to join one of two groups: A: Zoledronic acid 5mg infusion once a year, B: Generic Alendronate 70mg once a week. In addition all patients received 1200 mg calcium and 800 IU Vitamin D per day. Further inclusion criteria were BMD T-score values of lower than –2.5 SD at both lumbar spine (LS) and total hip (TH) and at least one prevalent vertebral fracture. Primary endpoints were drug related adverse events (AE), persistence with BP- and Ca/Vit.D-Therapy and changes in lumbar spine and total hip BMD after 12 months.
Results: We found different patterns of AE in the two groups with significantly more GI-complaints in group B. After 12 months only 54% of alendronate patients were still taking the medication, while the persistence with zoledronic acid was 100%. Parallel there was a significantly higher persistence with Ca/D-supplements in group A as compared to B. The average increases of LS-BMD after 12 months amounted to 7.6% in group A and 2.6% in group B ($p<0.01$). The respective mean changes at the total hip site were 4.7 and 1.3% ($p<0.03$). There was no difference in the incidence rates of new vertebral or non-vertebral fractures between groups, but both taken together 5 new fractures in group A vs. 12 in group B was significant ($p=0.041$). Furthermore we observed a 58% decrease in back pain score with zoledronic acid vs. only 22% with generic alendronate ($p<0.01$).
Conclusions: In this 12 months study on 92 men with established osteoporosis the increases in LS and TH BMD were significantly lower for patients treated with generic once weekly BP than with those treated with once yearly intravenous zoledronic acid. In addition the overall fracture rate was lower and the amelioration of back pain was better with zoledronic acid. This lower therapeutic efficacy of generic alendronate may in part be related to a lower potency but also due to a significantly lower compliance with the once weekly oral intake of the generic BP, which again in part may be due to a higher incidence of mainly gastrointestinal adverse events.

Disclosure of Interest: J. Ringe Other: Lectures, A. Dorst Other: no conflict, P. Farahmand Other: no conflict

P841 - THE EFFECT OF DENOSUMAB ON VERTEBRAL FRACTURE RISK BY TYPE AND SUBGROUP: RESULTS FROM THE FREEDOM TRIAL

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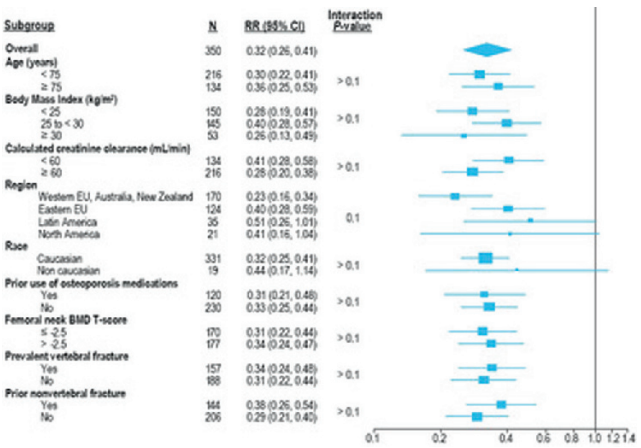
Aims: In the FREEDOM trial, denosumab (DMAb) significantly reduced the risk of new vertebral fractures by 68% (95%CI: 59%–74%, $p<0.001$) and clinical vertebral fractures by 69% (95%CI: 53%–80%, $p<0.001$) over 3 years[1]. In prospectively planned analyses, we assessed the effect of DMAb on new vertebral fractures in subgroups of patients with different baseline characteristics. We also report the effects of DMAb on new and worsening vertebral fractures as well as severe and moderate new vertebral fractures.
Methods: 7868 women aged 60–90 years with a spine or total hip BMD T-score <−2.5 and not <−4.0 were randomly assigned to denosumab 60 mg sc every 6 months (Q6M) or placebo. All women also received daily calcium and vitamin D. New vertebral fractures, including those of moderate to severe intensity, were confirmed radiologically. A worsening vertebral fracture was identified when there was ≥1 grade increase from the previous grade in any vertebra from T4 to L4. In 9 prospectively planned subgroup analyses, we examined the effect of DMAb on new vertebral fractures. Statistical significance was based on tests for quantitative treatment-by-subgroup interactions.

Results: 350 subjects overall had a new vertebral fracture. The reduction in relative risk of new vertebral fractures did not differ significantly by any of the subgroups shown in the figure (p≥0.1 for all potential interactions). DMAb reduced the relative risk of new and worsening vertebral fractures by 67% compared with placebo (95%CI: 58%–74%, p<0.001), and this effect was sustained over time (relative risk reduction was 58%, 70% and 67% at years 1, 2 and 3, respectively). In addition, DMAb reduced the risk of severe new vertebral fractures by 69% (95%CI: 52%–81%, p<0.001, prespecified analysis), and severe and moderate new vertebral fractures by 67% (95%CI: 56%–75%, p<0.001, post-hoc analysis) over 3 years. Figure. Effect of DMAb Treatment on New Vertebral Fractures by Subgroup (N=no of subjects from DMAb and placebo groups with new vertebral fractures)



Conclusions: In postmenopausal women with osteoporosis, DMAb 60 mg Q6M reduced the risk of new vertebral fractures to a similar degree in all subgroups tested. DMAb also consistently reduced the risk of new and worsening vertebral fractures as well as severe and moderate new vertebral fractures.

References: 1. Cummings S et al, NEJM 2009;361:756.

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Disclosure of Interest: R. Rizzoli Consultant / Speaker's bureau / Advisory activities with: has participated on a paid advisory board for Amgen, Novartis, Roche-GSK, Merck, Servier, Nycomed and Danone, and has served as a speaker for Amgen, Novartis, Roche-GSK, Servier and Danone, S. Boonen Consultant / Speaker's bureau / Advisory activities with: has received consulting fees, participated on a paid advisory board, and received grant support from Amgen, H. Bone Consultant / Speaker's bureau / Advisory activities with: has been an investigator for Amgen, Eli Lilly, Merck, Nordic Biosciences and Takeda and a consultant for Amgen, Merck, Nordic Bioscience, Osteologix, Pfizer and Takeda. he has also received speaker honoraria from Merck and Novartis, S. Minisola Consultant / Speaker's bureau / Advisory activities with: has served as a speaker for Roche-GSK, Novartis, Nycomed, Sanofi-Aventis, Sigma-Tau, MSD, Amgen, and Chiesi Farmaceutica and has participated on paid advisory boards for MSD and instituto Framcologico Biologic Stroder, A. Wang Employee of: Amgen and may own stock or stock options in Amgen, C. Benhamou Consultant / Speaker's bureau / Advisory activities with: has served as an investigator for Servier, Novartis, Amgen, Wyeth, MSD and Roche, as a speaker for Servier, Novartis, Amgen and Roche, and has received consulting fees or participated on paid advisory boards for Novartis, Amgen, GSK and Roche, and has received grant or research support from Servier, J. Halse Grant / Research Support from: has served as an investigator for Amgen, Astra-zeneca, Eli Lilly, GSK, Merck, Novartis, Novo, Pfizer, Roche, Takeda and Wyeth, H. Hoeck Grant / Research Support from: employed by CCBR, a private company engaged in contract research with various biotech and pharmaceutical companies, including Amgen, S. Siddhanti Employee of: Amgen and may own stock or stock options in Amgen, M. McClung Grant / Research Support from: has received research grants from Amgen, Eli Lilly, Merck, Procter & Gamble, and Takeda, Consultant / Speaker's bureau / Advisory activities with: Amgen, Eli Lilly, Merck, Novartis, Procter & Gamble, and Sanofi-Aventis, N. Franchimont Employee of: Amgen and may own stock or stock options in Amgen

P842 - USE OF ALENDRONATE FOR PREVENTION OF ENDOPROSTHESES INSTABILITY IN OSTEOPOROSIS

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Aims: To study alendronate effects on BMD dynamics in Gruen zones during the period of adaptive remodeling following arthroplasty in osteoporosis.

Methods: The study included 32 patients with osteoporosis (degenerative hip disease or hip fracture) who underwent uncemented THA (Zweymuller). The patients were randomized into 2 groups: 15 patients (treatment group) received 70 mg of alendronate weekly and 1200 mg of calcium daily for 12 months. 17 patients (control group) received 1200 mg of calcium daily for 12 months. Bone mineral density was measured in 7 periprosthetic zones (Gruen) by dual - energy X-ray absorptiometry in two weeks and 6, 12, 15 months after surgery. All patients over 50 years received 0.5 mg of alfacalcidol (alfa D3-teva).

Results: In 6 months BMD in Gruen zones in both groups was significantly decreased relative to 1st measurement (p<0.05). Highest bone loss was in R6 and R7: in treatment group -10.8%±3.1/% and -12%±2.9% (p<0.05) and in control group - 5.5%±3.8% and -7.0±3.4% (p<0.05). Differences in groups were not significant. Reliable differences between groups were noted after 12 months. In treatment group BMD increased in all zones as compared to 1st measurement and reliable bone loss was observed in R4. In control group bone loss was preserved in all zones and in R5 and R7 it was reliable. After 15 months in treatment group BMD increased in all zones as compared to 1st measurement and in R1, R5, R6 that increase was reliable (p <0.05). In control group in all zones bone loss in R6 was reliable (p<0.05). Zones R1 and R5 showed significant differences between the groups (p<0.05). During the period from 6 to 15 months BMD in treatment group increased monthly by 1.28% and in control group only by 0.16%. BMD deficit in Gruen zones after 15 months was preserved in control patients more often than in treatment group, but reliable differences (p<0.05, Fisher exact test) were in zones R1, R5 и R6, i.e. 58.8%, 52.9% and 52.9% vs. 21.4%, 13.3% and 20%, respectively.

Conclusions: Alendronate don't inhibit the bone loss within the first 6 months after uncemented arthroplasty, but increases BMD in Gruen zones in 6-15 months; in R1, R5, R6 – reliably ($p<0.05$). Action of the drug was preserved 3 months after treatment was stopped. These results confirm that during the period of adaptive remodeling following arthroplasty in osteoporosis, alendronate optimizes the intensity of bone formation without evident decreasing of bone resorption.

Disclosure of Interest: None Declared

P843 - PHASE 3 FRACTURE TRIAL OF ODANACATIB FOR OSTEOPOROSIS – STUDY DESIGN

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Aims: The number of patients who could benefit from osteoporosis therapy is growing steadily. However, poor tolerability limits the use of existing anti-osteoporotic therapies in some patients, and development of new therapies for osteoporosis is needed. Most current anti-resorptive drugs are either bisphosphonates or act via the estrogen receptor. Odanacatib selectively and reversibly inhibits cathepsin K, a collagenase secreted by osteoclasts. In a 2-year, phase 2, dose-finding study and its 1-year extension of postmenopausal women with low BMD, oral odanacatib 50 mg once-weekly increased BMD progressively over 36 months compared to placebo, and was similar to placebo in terms of safety and tolerability. The incidence of cutaneous adverse experiences was similar among treatment groups.
Methods: In a randomized, double-blind, phase 3 trial, postmenopausal osteoporotic women receive odanacatib 50 mg or placebo once weekly with or without food for approximately 36 months. Participants also receive vitamin D_3 5600 IU weekly. Patients are ≥ 65 years old, with or without a prior vertebral fracture (BMD T-score at either total hip or femoral neck ≤ 1.5 and ≤ 2.5, respectively). Participants without prior vertebral fracture were enrolled so that at least 2/3 were ≥ 70 years old. This trial has three primary endpoints: morphometric vertebral fracture, hip fracture, and non-vertebral fracture (with controls for elevation of the false-positive error rate due to having multiple primary endpoints). Fractures will be adjudicated centrally via clinical history, radiology reports, and/or x-rays. Secondary endpoints include clinical vertebral fractures, BMD, height loss, bone turnover markers, and safety and tolerability. Collection of trans-iliac bone biopsies from some participants, archived serum and urine samples, and responses to a health utilization questionnaire will provide additional information about osteoporosis and the effects of odanacatib from this large trial. This event-driven trial will be completed after pre-specified numbers of fractures have occurred.
Results: Enrolment at approximately 380 centers world-wide was completed in November 2009 with approximately 16,200 patients randomized.
Conclusions: The results of this trial will determine whether once-weekly odanacatib 50 mg, orally administered without regard to food intake, is safe and effective in reducing the risk of osteoporotic fractures in postmenopausal women with osteoporosis.

Disclosure of Interest: J. Eisman Grant / Research Support from: Merck Research Laboratories, Consultant / Speaker's bureau / Advisory activities with: Merck Research Laboratories, H. Bone Grant / Research Support from: Merck Research Laboratories, D. Dempster Grant / Research Support from: Merck Research Laboratories, S. Greenspan Grant / Research Support from: Merck Research Laboratories, M. McClung Grant / Research Support from: Merck Research Laboratories, T. Nakamura Grant / Research Support from: Merck Research Laboratories, S. Papapoulos Grant / Research Support from: Merck Research Laboratories, J. Shih Grant / Research Support from: Merck Research Laboratories, A. Lombardi Employee of: Merck Research Laboratories, A. Santora Employee of: Merck Research Laboratories, N. Verbruggen Employee of: Merck Research Laboratories, E. Rosenberg Employee of: Merck Research Laboratories, A. Leung Employee of: Merck Research Laboratories

P844 - VERTEBROPLASTY: RISK AND DETERMINANTS OF SECONDARY VERTEBRAL FRACTURE IN PATIENTS WITH OSTEOPOROSIS

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Aims: Percutaneous vertebroplasty is a minimally invasive procedure consisting of the injection of cement into a compressed vertebral body for pain relief.

Incidence of secondary vertebral fracture and predisposing clinical factors have not been fully documented in patients in whom vertebral fractures are due to osteoporosis.
Methods: Here we report the results of a retrospective observational study on the incidence of new incident vertebral fractures in patients treated at local Neuroradiology Service with vertebroplasty for vertebral osteoporotic fractures. Thirty three patients (25 females and 8 males; mean age, 73 years, range 51-91 years) were evaluated 1 to 4 years since vertebroplasty.
Results: For 67% of the patients the treated vertebra was the only one with a deformity. The mean densitometric T-score was -2.4 (±1.1) at the spine and -2.1 (±0.8) at the total hip. In 52% of the patients a new vertebral fracture occurred during follow-up, almost invariably (70%) adjacent to the previous vertebroplasty. Patients with the new incident fracture were significantly ($p<0,05$) older (mean aged 76 years old vs. 70 years old) and their total hip T-score was significantly ($p< 0,01$) lower (-2.5 vs. -1.7) in comparison with patients without additional vertebral fractures. In

27% of the patients no specific treatment was prescribed for osteoporosis after vertebroplasty: a new vertebral fracture occurred in 78% of these patients as compared with 42% of those who took an antireabsorptive drug (mostly oral risedronate, alendronate and ibandronate).
Conclusions: Half of the patients treated with vertebroplasty for an osteoporotic fracture get across a new vertebral fracture within few years. Age and low bone mineral density are the main clinical risk factors. Oral bisphosphonates treatment lowers the risk, but this remains unacceptably high. Vertebroplasty should be associated with a thorough investigation and treatment for osteoporosis.

Disclosure of Interest: None Declared

P845 - THE EFFECT OF GC-GENOTYPE ON BONE MINERAL DENSITY AND CALCIUM METABOLISM IN FINNISH CHILDREN AND ADOLESCENTS

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Aims: Gc-proteins are polymorphic carriers of vitamin D and its metabolites. Gc-proteins also influence bone metabolism: they are converted into macrophage-activating factor that increases osteoclast activity and stimulates bone resorption. There are three common phenotypes of Gc-proteins, which differ by their amino acid composition. Gc-phenotypes have been associated with fracture risk and with plasma concentration of vitamin D. The impact of Gc-genotype on vitamin D status and bone mineralization in children has not been studied. We investigated whether Gc-genotype impacts bone mineral density (BMD) and vitamin D status in children and adolescents.
Methods: The study included 161 healthy children and adolescents (68 girls, 93 boys) aged 7-19 years, who were assessed for bone health and its determinants. Lumbar spine, femoral head and whole body BMD was measured with DXA (Hologic Discovery A). Dietary vitamin D intake was evaluated with a food frequency questionnaire. The concentrations of serum PTH, 25-OHD and several other markers of bone metabolism were determined. DNA was isolated from peripheral blood samples with Gentra Puregene Blood Kit (Qiagen). Genotyping was performed with qPCR (MX3000P, Stratagene). BMD values and biochemical markers were compared with Gc-genotypes. Statistical analyses were performed with SPSS.
Results: We detected three different Gc-genotypes among the 161 subjects: 1/1 (70%), 1/2 (25%) and 2/2 (5%). There was an association between Gc-genotype and BMD Z-scores in boys (genotypes 1/1 n=49, 1/2 and 2/2 n=15) with mean whole body BMD Z-scores of +0.37 vs. -0.25 (p=0.021) and lumbar spine BMD Z-scores of 0.83 vs. 0.75 (p= 0.026). Similar trend was observed among girls (1/1 n= 58, 1/2 n=27, 2/2 n=6) with mean lumbar spine BMD Z-scores, -0,09 vs. -0,01 vs. -0,18 (p= 0.022) and whole body BMC Z-scores of 0,01 vs. 0,08 vs. 0,05 (p=0.049). The Gc-genotype was associated with serum PTH levels in girls with mean values of 48 vs. 46 vs. 30 ng/L (p= 0.013). Serum 25-OHD levels did not differ in Gc-genotype groups.
Conclusions: The observed association between BMD and Gc-genotype suggest that Gc-genotype may be one factor that impacts bone mass accrual, but not a major determinant of bone health in children and adolescents. The variation of serum PTH levels between different Gc-genotypes may indicate differences in vitamin D and calcium metabolism between genotype groups.

Disclosure of Interest: None Declared

P846 - ONCE-WEEKLY TREATMENT WITH TERIPARATIDE FOR 18 MONTHS INCREASES BONE STRENGTH VIA THE AMELIORATE TRABECULAR ARCHITECTURE, COLLAGEN ENZYMATIC AND NON-ENZYMATIC CROSS-LINK FORMATION IN OVARIECTOMIZED CYNOMOLGUS MONKEYS

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Aims: Two clinical trials demonstrated that once-weekly administration of human parathyroid hormone (hPTH1-34, teriparatide), or hPTH(1-84), increased lumbar bone mineral density in patients with osteoporosis. The aim of this study was to clarify the effects of once-weekly administration of teriparatide for 18 months on bone mass, structure, mineral content, collagen enzymatic and non-enzymatic cross-links and bone strength in ovariectomized (OVX) monkeys and to correlate these bone parameters to mechanical strength.
Methods: Adult female cynomolgus monkeys were divided into four groups (n=18-20 each) as follows: Sham group, OVX group, and OVX monkeys given once-weekly subcutaneous injections of teriparatide either at 1.2 μg/kg or 6.0 μg/kg (Low-PTH or High-PTH groups) for 18 months. Bone mass, trabecular architecture, mineral and collagen content, content of collagen enzymatic immature and mature cross-links and the non-enzymatic crosslinking pentosidine and trabecular bone strength of the third lumbar vertebral cancellous bone were analyzed.
Results: Teriparatide treatment increased bone volume (BV/TV), trabecular thickness (Tb.Th), content of collagen and enzymatic immature divalent and mature pyridinium cross-links compared with the OVX group. It is worthy to note in this study the significant reduction in AGEs cross-linking pentosidine content in the teriparatide treated groups Trabecular bone pattern factor (TBPf) and the structure model index (SMI) were improved by teriparatide treatment. Stepwise logistic regression analysis revealed that ultimate load and breaking energy were affected by BV/TV, Tb.Th, and the content of calcium, collagen, and enzymatic cross-links independently. Stiffness was affected by TBPf and the content of calcium and enzymatic cross-links.
Conclusions: Once-weekly administration of teriparatide increased bone strength in vertebral cancellous bone by increasing BV/TV, Tb.Th, the content of mineral and enzymatic cross-links, and improving trabecular architecture.
References: Saito M, Marumo K, Osteoporos Int 2010;21:195

Disclosure of Interest: None Declared

P847 - DECISION TO TAKE OSTEOPOROSIS MEDICATION – A QUALITATIVE STUDY

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Aims: To examine fracture patients' experiences with the decision to take osteoporosis (OP) medication.
Methods: A phenomenological qualitative study was conducted in English-speaking outpatients screened in an urban fracture clinic OP program aged 65+ who had sustained a fragility fracture within 5 years, were identified as 'high risk' for future fracture, and were prescribed OP medication. Interviews were 1-2 hours in duration and included questions about medication recommendations received by health care providers and what patients were doing about those recommendations. Two researchers coded all transcripts to promote comprehensive data examination. Analysis was guided by Giorgi's methodology with 'meaning units' identified and then related to each other and to the overall objective.
Results: 21 patients (6 males, 15 females) aged 65-88 years participated. Fracture type varied: 7 wrist, 7 hip, 4 humerus, 3 other. 12 patients had osteopenia and 9 had OP based on World Health Organization criteria. 14 patients were taking a bisphosphonate and 7 patients were on no OP medication. For 12 participants, the decision to take OP medication was an easy one, occurring at the time of prescription and involving minimal contemplation. Patients in this group made the decision because they liked/trusted their health care provider; they did not perform any risk-benefit analysis or seek information from other sources about the medication. However, 3/10 participants taking OP medication in this group suggested they might subsequently decide to *not* take it. For 9 patients, the decision was more difficult, requiring time and consideration of many factors. These patients were unconvinced by their health care provider, engaging in risk-benefit analyses that involved other sources of information and was dominated by concerns about potential and actual side effects; 4/5 patients not taking medication in this group indicated they might decide to take medication at a later date.
Conclusions: Approximately 57% vs. 43% of patients found the decision to take OP medication an easy vs. difficult one. Many participants indicated that this decision was not static. Health care providers should understand their role in patients' decisions and be prepared to discuss the side effects of medication.
Acknowledgement: Funding provided by the Canadian Institutes of Health Research and Ontario Ministry of Health and Long Term Care. Views expressed are those of the researchers.

Disclosure of Interest: J. Sale: None Declared, M. Gignac: None Declared, G. Hawker: None Declared, L. Frankel: None Declared, D. Beaton: None Declared, E. Bogoch Grant / Research Support from: Alliance for Better Bone Health, Consultant / Speaker's bureau / Advisory activities with: Alliance for Better Bone Health, Board member of: International Osteoporosis Foundation; Osteoporosis Canada; Fragility Fracture Network, V. Elliot-Gibson: None Declared

P848 - IBEROAMERICAN CONSENSUS ON OSTEOPOROSIS SIBOMM 2009

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Aims: To present the Iberoamerican Consensus on Osteoporosis 2009 as a guideline for the management of osteoporosis in the Iberoamerican region.
Methods: The Iberoamerican Society of Osteology and Mineral Metabolism (SIBOMM) based this Consensus on the contributions made in similar agreements achieved by the SIBOMM Member Societies and the Guidelines on Osteoporosis issued by the said societies. It followed the principles and advances in the world literature and the contributions made by the experts who are members of the Consensus Panel. The contributions were presented and discussed during the 8th SIBOMM Congress/3rd BRADOO, held in Foz do Iguaçu, Brazil, on October 1-3, 2009. The consensus is available on the webpage at www.sibomm.net, www.iofbonehealth.org (*Health Professionals*; *National and Regional Guidelines*; *Latin America)*, www.ammom.com.mx
Results: The major problem of osteoporosis is the risk of bone fractures. The main objective of its treatment is the prevention of fractures. Assessment of the risk for osteoporosis should be based on a correct and complete medical history and the necessary diagnostic tests, the most important of which is bone densitometry. The main risk factors for osteoporosis are age, previous fractures, family history, low calcium intake, low levels of vitamin D, smoking, low body weight, menopause, and low bone mass. Aging, low bone mass, and history of fragility fractures are the most common risk factors for osteoporotic fractures. There are many therapeutic and preventive measures such as a balanced diet with an adequate intake of calcium and vitamin D, physical activity, avoidance of tobacco and excessive drinking, fall prevention, and use of approved drugs. There are several such drugs: bisphosphonates, strontium ranelate, selective estrogen receptor modulators, parathormone, estrogens, calcitonin, calcium, and vitamin D, among others.
Conclusions: Management strategies for patients with osteoporosis consist of: a) Identifying those who are at risk of developing osteoporosis and of suffering fragility fractures. b) Establishing the necessary measures to achieve a reduction in modifiable risk factors, to administer drug treatment, and to carry out the cor-

responding follow-up with the adequate use of diagnostic resources.

Disclosure of Interest: None Declared

P849 - LOW ENERGY SUBTROCHANTERIC FRACTURES IN PATIENTS RECEIVING BISPHOSPHONATE THERAPY

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Aims: Recent studies have questioned the safety of bisphosphonates in the treatment of osteoporosis, citing a potential increase in the risk of low-energy subtrochanteric femur fractures. The purpose of this study was to determine the relationship between low energy subtrochanteric fractures and bisphosphonate therapy.
Methods: A retrospective review of all low-energy subtrochanteric fractures treated in Hamilton between January 2003 and July 2008 was performed. Medical records were used to abstract data on demographics, bisphosphonate use, medical and fracture history, and fracture risk factors. Radiographic measurements were obtained to assess subtrochanteric bone thickness. Additionally, the radiographs of both the fractured femur and the contralateral femur were examined looking for evidence of characteristic fracture morphology.
Results: 74 patients were included, 19 of which were taking bisphosphonates at the time of fracture. The ratio of the subtrochanteric cortical thickness to the diameter of the bone at this level was found to be much greater in the BP+ (0.267 (0.042) mm vs. 0.215 (0.048)mm, P<0.0001) as compared with the BP- group. No evidence of a unique fracture morphology was identified, although cortical "beaking" was seen in one isolated case prior to fracture.
Conclusions: It appears that there may be an increased prevalence of bisphosphonate use in patients who have experienced a low energy subtrochanteric fracture. Increased cortical thickness was demonstrated, but the mechanical properties of this thickened bone remains unknown. Although it appears to be rare, cortical beaking on radiographs may prove to be a warning sign of an impending subtrochanteric fracture.

Disclosure of Interest: E. Scriven: None Declared, J. Adachi Consultant / Speaker's bureau / Advisory activities with: Amgen, Astra Zeneca, Eli Lilly, GSK, Merck, Novartis, Nycomed, Pfizer, Procter & Gamble, Roche, Sanofi Aventis, Servier, Wyeth, Bristol-Myers Squibb, L. McKnight: None Declared, G. Ioannidis: None Declared, J. DeBeer: None Declared, A. Adili: None Declared

P850 - RELATIONSHIP BETWEEN BASELINE REMODELLING INTENSITY AND CHANGES IN HR-PQCT PARAMETERS AT THE RADIUS IN POSTMENOPAUSAL WOMEN TREATED WITH DENOSUMAB OR ALENDRONATE

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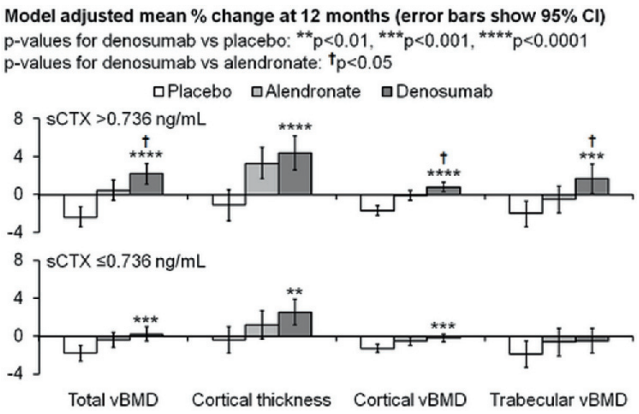
Aims: Denosumab (DMAb) suppresses bone remodelling more than alendronate (ALN)[1]. Given that remodelling intensity is a major determinant of structural decay, we tested the hypothesis that DMAb will produce greater changes in morphology than ALN, and that the magnitude of the change and the differences between these treatments will be influenced by baseline remodelling intensity.
Methods: Postmenopausal women aged 50–70 years with low BMD at the spine or total hip were randomized to placebo, DMAb (60 mg sc twice yearly) or ALN (70 mg oral weekly). All received daily calcium (≥500 mg) and vitamin D (≥400 IU). Total, trabecular and cortical volumetric BMD (vBMD) and cortical thickness at the radius were assessed by HR-pQCT (XtremeCT®, Scanco Medical) at baseline, 6 months and 12 months. Serum CTX (sCTX), a resorption marker, was measured at baseline and throughout the study. The relationship between treatment and baseline sCTX on HR-pQCT parameters was assessed by ANCOVA.
Results: Within one week, sCTX decreased by 87% in the DMAb group (n=81) and 52% in the ALN group (n=80). Near maximal reduction in sCTX was seen at 1 month with DMAb (89% decrease) and ALN (75% decrease). Total, trabecular and cortical vBMD and cortical thickness decreased in the placebo group (Figure). In subjects with baseline sCTX above the median (0.736 ng/mL), increases in total, cortical and trabecular vBMD were significantly greater with DMAb than with ALN (Figure). Changes in subjects with baseline sCTX ≤0.736 ng/mL were smaller than in those with baseline sCTX above the median, and differed less between treatments (Figure).



Conclusions: DMAb increases vBMD and cortical thickness at the radius, particularly in subjects with higher baseline remodelling in whom increases tend to be greater than those seen with ALN. Greater remodelling suppression results in increases in structural parameters that may contribute to a reduction in fracture risk, particularly in individuals with high bone remodelling. Sponsored by Amgen Inc.

References: 1. Kendler et al, J Bone Miner Res 2010;25:72.

Disclosure of Interest: E. Seeman Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc., A. Cheung Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc and Merck., E. Shane Consultant / Speaker's bureau / Advisory activities with: served as a consultant or speaker for Amgen Inc. She has served as an investigator for Amgen Inc. and received research support from Merck, Eli Lilly and Novartis., T. Thomas Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc., S. Boyd: None Declared, S. Boutroy: None Declared, D. Hanley Consultant / Speaker's bureau / Advisory activities with: served on advisory boards, as a speaker, and investigator for Amgen and Merck Frost Canada, C. Bogado: None Declared, D. Sellmeyer Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc., S. Majumdar Grant / Research Support from: received grant or research support from Merck, GSK, and Nocimed., A. Kearns Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc., M. Fan Employee of: employees of Amgen Inc. and may own stock or stock options in Amgen Inc., J. Zanchetta Grant / Research Support from: served as an investigator, received research support, and / or served as a consultant or speaker for Amgen Inc., C. Libanati Employee of: employees of Amgen Inc. and may own stock or stock options in Amgen Inc.

P851 - ZOLEDRONIC ACID REDUCES THE INCREASED RISK CONFERRED BY FURTHER FRACTURES

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Aims: In HORIZON-Pivotal Fracture Trial (PFT), once-yearly infusion of zoledronic acid (ZOL) 5 mg reduced the risk of morphometric vertebral (by 70%), hip (by 41%), and all clinical fractures (by 33%) during 3 years[1]. As with all treatments, fracture risk is reduced but not abolished. Nevertheless, treatment slows progression of fragility or partly reverses it. As fractures beget fractures, we tested the hypothesis that ZOL will reduce the increased risk conferred by fractures occurring in the subset of individuals who sustained fractures despite therapy.

Methods: In a pre-planned analysis, we examined the effect of ZOL in preventing recurrence of all clinical fractures and a second morphometric vertebral fracture in 7765 postmenopausal women with osteoporosis randomized to an annual i.v. infusion of ZOL 5 mg (n=3889) or placebo (n=3876) during 3 years. Clinical fractures were reported by all patients to the investigator every 3 months. Lateral spine x-rays were done at baseline and yearly in stratum 1 (patients not receiving other antifracture therapy) and at baseline and end of study in stratum 2 (patients receiving other antifracture therapy). Recurrence of clinical fractures was evaluated by using multivariate proportional hazards regression model in all intent-to-treat patients stratifying by the use of other antifracture therapies. Multiple morphometric vertebral fractures were evaluated using logistic regression adjusting for treatment and number of baseline fractures (stratum 1 and 2 separately).

Results: In ZOL-treated patients, 36 (11.7%) of the 308 (7.95%) sustaining a clinical fracture had ≥2 subsequent fractures. While in placebo-treated patients, 94 (20.6%) of the 456 (11.81%) sustaining a clinical fracture experienced ≥2 subsequent fractures. This corresponded to 38% risk reduction (95% CI: 28, 46) of multiple fractures (p<0.0001) with ZOL. The risk reduction of ≥2 morphometric vertebral fractures with ZOL was 89% (95% CI: 77, 95) in stratum 1 (Figure 1) and 61% (95% CI: -23, 88) in stratum 2 (NS).

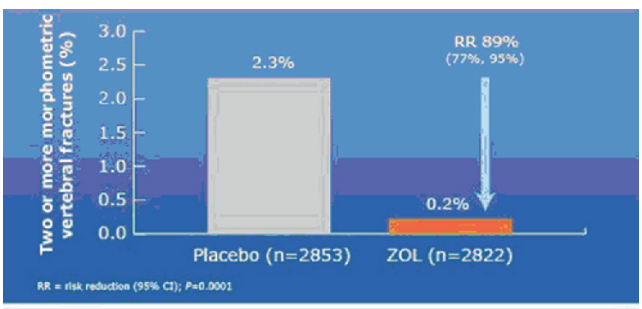

Figure 1. *Reduction in the risk of experiencing two or more morphometric vertebral fractures in postmenopausal women treated with ZOL over 3 years (Stratum 1)*

Conclusions: Once-yearly, ZOL 5 mg reduces the worsening fragility accompanying a fragility fracture.

References: 1.Black DM et al, N Engl J Med 2007;356:1809.

Disclosure of Interest: E. Seeman Consultant / Speaker's bureau / Advisory activities with: Eli Lilly, Sanofi Aventis, Procter & Gamble, MSD, Novartis, Servier, GSK, Amgen, D. Black Grant / Research Support from: Novartis, C. Bucci-Rechtweg Employee of: Novartis Pharmaceutical Corporation, R. Eastell Grant / Research Support from: Novartis, S. Boonen Grant / Research Support from: Novartis, P. Mesenbrink Employee of: Novartis Pharmaceutical Corporation

P852 - SERUM CTX AND TRACP ARE USEFUL MARKERS FOR MONITORING IBANDRONATE TREATMENT

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Aims: To estimate the ibandronate (IB) antiresorptive effect during one year treatment, by determining serum levels of bone resorption markers C-terminal telopeptide of type I collagen (CTX) and tartrate-resistant acid phosphatase (TRACP) and their post treatment decrease.
Methods: The bone resorption markers CTX and TRACP were assessed at baseline and 3 months after treatment in the 1st group, at 6 months in the 2ndgr. and at 12 months in the 3rd gr. All postmenopausal osteoporotic women (N=90) in three groups received calcium and vitamin D daily, and received 150mg ibandronate monthly. CTX was determined by the immunoanalytical in vitro method for quantitative hormone determination ECLIA, ECL-technology by Roche Elecsys 1010/2010 analyzer. Serum TRACP activity was determined by the kinetic method using Biomerieux reagents with Mira Cobas plus analyzer and the values were expressed in U/L.
Results: Baseline serum TRACP values in the 1st gr from 4.99±0.95 U/L lowered to 3.7±0.46 U/L after three months IB treatment, in the 2nd gr their values of 5.15±1.15 U/L lowered to 4.015±0.796 U/L after six months IB treatment, and in the 3rdgr. they lowered from 4.81±1.21 U/L to 3.65±0.79 U/L after twelve months IB treatment. The decrease in all groups was highly significant ($p<0.0001$). Percentage of TRACP lowering in three groups was not different and it was 24.52±10.16% in the 1stgr, 22.67±11.07% in the 2ndgr and 22.45±13.39% in the 3rdgr. Baseline CTX values 0.58±0.22 ng/ml in the 1stgr lowered to 0.169±0.12 ng/ml, in the 2ndgr their values 0.55±0.22 ng/ml lowered to 0.096±0.045 ng/ml, and in the 3rdgr they lowered also significantly from 0.44±0.19 ng/ml to 0.11±0.05 ng/ml ($p<0.0001$). Baseline CTX and TRACP values were not different between the groups. The percentage of CTX lowering in three groups was not different and it was 72.09±14.36% in the 1stgr, 79.19±10.65% in the 2ndgr and 71.58±14.76% in the 3rdgr., which were significantly higher compared to TRACP.
Conclusions: Baseline CTX and TRACP values were increased and the percentage of their reduction 3, 6 and 12 months after ibandronate treatment did not differ indicating significant continuous reduced osteoresorption during one year ibandronate treatment, although they were on different level for CTX and TRACP. Their decrease was highly significant and was not influenced by the basal values because they were not different among the groups. These results indicate that CTX and TRACP reductions are useful markers for monitoring ibandronate treatment.

Disclosure of Interest: None Declared

P853 - MIDDLE-TERM RESULTS OF THE CONSERVATIVE TREATMENT OF THE AVASCULAR NECROSIS OF THE FEMORAL HEAD

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Aims: estimation of middle-term results of the combined conservative treatment of avascular necrosis of the femoral head.
Methods: 50 patients (85 hips, 36 hips 0-II, 49 hips III-IV on Steinberg,) with ONFH, 38 male and 12 female, middle age 32 y.o. (20-45 y.o.), received ibandronate 3 mg/3ml of 1 times in 3 months within 1,5 years, alfacalcidol 0,5-1 mkg per day and 1,5 g Ca within 3 years. The control of X-ray and MRI of the hip was carried out, joint function was estimated on HHS.
Results: Prior to the beginning of the therapy the average estimation on HHS patients with stages 0-II on Steinberg was 50 pts., with stages III-IV 44 pts. In 12 months of the therapy the average estimation on HHS patients with stages 0-II was 87 pts, with stages III-IV of 66 pts. In a kind of low efficiency of the conservative treatment three patients with bilateral process were executed THR in one of the hips (Steinberg IV) in terms 13, 15 and 18 months from the therapy beginning. After 3 years 43 patients (70 hips) appeared for the control, with 7 patients communication has been lost in terms 1.5 - 2 years, we did not consider function of 3 endoprotesis. The average estimation on HHS patients with stages 0-II was 83 pts, with stages III-IV 67 pts. Data MRI and X-ray are corresponded to various stages of arthrosis.
Conclusions: In our research we have shown high efficiency of application of the combined conservative therapy, with use of the ibandronate and alfacalcidol in a treatment of early stages of ONFH. In some cases the therapy is effective in stages with deformation of the femoral head.

Disclosure of Interest: None Declared

P854 - RELATION BETWEEN BONE MARKER (P1NP) RESPONSE AND BONE DENSITY CHANGES IN PATIENTS ON TERIPARATIDE TREATMENT

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Aims: Teriparatide (1-34 PTH), in UK is restricted by the NICE for women who, fail to respond to prolonged bisphosphonate (BP) treatment[1]. Therefore it is uncommon in clinical practice to commence teriparatide, on BP naïve patients. BP use is associated with delay the biochemical response to teriparatide[2]. Early (1-month) changes in P1NP correlates with improvement in bone structure[3]. We wanted to see, if there is a relation between P1NP

change at 3 months with the BMD change at 18 months in such patients.
Methods: BMD was measured by DXA at 0 and 18 months (previous licence duration in the UK). Serum P1NP was measured at baseline, and 3 months. Spine BMD data was included only as hip BMD data was not always present. Women on long term glucocorticoids were excluded.
Results: 28 women were included; average age was 74 years (range 50-85) and the minimum duration of prior BP treatment was 1 year (range 1- 5). Average percentage increase in P1NP was 320% (Average baseline P1NP was 28µg/L (range 9-60) and 96 µg/L (range 37-347) at 3 months). Average increase in spine BMD was 0.068 g/cm^2 or 9.09%. (Mean baseline spine BMD 0.787 g/cm^2 (range 0.547-1.061) and mean BMD at 18 months was 0.855 g/cm^2 (range 0.583-1.150). 4 patients did not have a >3% rise in BMD, the least significant change. There was no significant correlation between increase in BMD and increase in P1NP at 3 months (Spearman Rank-order Correlation Coefficient 0.093, p=0.317)
Conclusions: The bone turnover marker P1NP does show positive response in bisphosphonate treated patients on teriparatide at 3 months but this in not directly indicative of the expected BMD changes at the end of treatment period. Though the study has only small numbers, it does show that the bone turn over marker may be useful in assessing the compliance and initial response to teriparatide injections, BMD measurement at the end of treatment period will be more indicative of over all treatment effect.
References: 1. NICE Technology Appraisal 161; 2. Bone HG et al, N Engl J Med 2004;350:1189; 3. Keel C et al, J Bone Miner Metab 2010;28:68.

Disclosure of Interest: None Declared

P855 - TOLERABILITY OF ONCE YEARLY INTRAVENOUS INFUSION OF ZOLENDRONIC ACID IN THE TREATMENT OF POSTMENOPAUSAL OSTEPOROSIS

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Aims: Bisphosphonates (BPs) are currently considered as first line treatment for postmenopausal osteoporosis. Oral BPs are associated with gastroesophageal side effects and insufficient patient's adherence to the therapy. Intravenous BPs may cause acute-phase reaction with flu-like symptoms in the first 2-3 days following administration. The aim of this study was to assess the adverse events of once yearly intravenous Zoledronate and the possible relation to previous treatment in postmenopausal women with osteoporosis.
Methods: An intravenous infusion of 5 mg Zolendronic acid was administered to 78 females with postmenopausal osteoporosis (mean age 60,7 years, from 44 to 80 years), 9 of them had a second infusion after one year. We analyzed the clinical features and risk factors of the patients, DXA densitometry of lumbar spine and femoral neck, previous treatment and laboratory exams of blood count, creatinine, AST, ALT, TSH, Ca, P, Na, K, Cl. 22 women turned out to have early menopause before 45 years of age, 15 of them because of hysterectomy. There were 15 cases with vertebral fractures (9 with one affected vertebra and 6 with more than one). 20 of the participants had a previous non-vertebral fracture. Concomitant endocrine disorder was registered in 16 cases (diabetes in 6 cases, hyperthyroidism in 10 cases and hypothyroidism in 2cases).
Results: Side effects were observed in 25 of 87 administrations (28,7%) – most common chills in 17,2%, fever in 14,9%, pain in the joints and muscles in 13,8%, one case with pain in eyeballs and one case of nausea and vomiting. 36,5% of the patients with side effects had not been taking calcium despite recommendation of 600 mg calcium and 800 UI vitamin D and 40,1% had been using calcitonin or bisphosphonate which lead to low serum calcium levels. The undesired symptoms went away for one day in 85% and for two days in 15% with non steroid anti inflammatory drugs (NSAID). Only one patient (from nine) had side effects after the second administration. During the follow up of one year we did not observe any case with osteonecrosis of jaw or arrhythmia.
Conclusions: Treatment with most of the anti-osteoporosis medicines has low patient's compliance and this problem is overcome by once yearly administration of Zolendronic acid. The transient side effects are exceptional in the second administration and they can be avoided even in the first one by adequate calcium intake and NSAID in the days around the infusion.

Disclosure of Interest: None Declared

P856 - SUBTROCHANTERIC/FEMORAL SHAFT FRACTURES IN PATIENTS ON BISPHOSPHONATES

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Aims: To study the X-ray appearance and clinical presentation of atypical subtrochanteric/femoral shaft fractures in patients on bisphosphonates (BPs).
Methods: We reviewed x-rays and charts on all femoral shaft/subtrochanteric fractures in the Kaiser Southern California system 2007-2009 identified by ICD9 and CPT coding.
Results: We identified 56 cases of which 55 were nontraumatic. Only one patient had no BP exposure. We identified 175,940 Kaiser SCAL members who had been on a BP at some time between 2002 and 2009 as documented by our Pharmacy Information Management System. The mean age of the fracture cases was 71.1 years. There were 54 women and 2 men. The mean duration of BP therapy in the fracture cases was 5.5 years. All but 1 patient was on alendronate prior to the atypical femur fracture. Of the 55 patients who were on a BP, 88% (n=49) were taking a BP within 1 year of the fracture and 12% (n=6) had stopped the BP more than one year prior to the atypical femur fracture. Prodromal pain in the thigh was reported in 73% (n= 41) of these patients. The fracture occurred in the subtrochanteric region in 37.5% (n= 21) and in the shaft region in 62.5% (n=45). Changes were seen in the contralateral femur in 51% (n= 29) patients. These changes ranged from cortical thickening, to incomplete stress fractures,

to contralateral complete fractures. 19.6% of the fractures were bilateral. 21.4% had stress fracture or marked thickening on the contralateral side. The characteristic x-ray appearance was a fracture which began on the lateral cortex as a transverse fracture which became oblique at the anatomic axis. In all cases lateral cortical thickening was seen with or without cortical beaking. Four of the patients had an incomplete fracture that did not require surgical fixation, two patients were treated with a dynamic plate fixation, and the remaining 50 patients were treated with intramedullary rods. Surgical interventions with intramedullary rods were the preferred method of fixation as plating was associated with longer healing times.
Conclusions: Atypical femoral shaft/subtrochanteric fractures have a characteristic x-ray and clinical appearance. These fractures are often bilateral with time.

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P857 - MEDICARPIN, AN ESTROGEN MIMIC IN OSTEOBLAST, IS A NOVEL BONE FORMING AGENT

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Aims: To evaluate the mode of action and bone forming activity of medicarpin (M.W. 270), a pterocarpan class of naturally occurring small molecule.
Methods: Neonatal rat calvarial osteoblasts were used for all *in vitro* experiments. Kinase-, reporter- and RNAi experiments were performed following standard protocols. Female *Sprague Dawley* (weaning) rats (12/group) were administered medicarpin at 1.0- and 10.0 mg/kg body weight doses by gavage for 30 days along with vehicle control. Bone mineral density (BMD) and femoral biomechanical strength (force and stiffness) were evaluated. Periosteal bone formation was determined by double fluorochrome labeling of bones. Oral pharmacokinetic studies of medicarpin were performed in adult female *Sprague Dawley* rats. Student's t-test and ANOVA were used to test significance of effects.
Results: Medicarpin at as low as 10^{-10}M concentration stimulated osteoblast differentiation and mineralization. Stimulation of osteoblast differentiation by medicarpin was mediated by BMP-2 as noggin blocked this effect. Medicarpin required functional estrogen receptor (ER) as ICI-182780, an ER antagonist, inhibited medicarpin-stimulated differentiation and BMP-2 secretion from osteoblasts. Reporter assay and mammalian two hybrid assay in heterelogous system revealed that medicarpin transactivates both ERa and -b. In osteoblasts, medicarpin increased synthesis of both ERa and -b. However, silencing (by RNAi) of ERb but not ERa abrogates medicarpin-stimulated synthesis of BMP-2 and collagen-I in osteoblasts. In contrast to osteoblast, medicarpin inhibits differentiation of bone marrow cells to osteoclasts and the effect is ER independent. *In vivo*, compared with vehicle treatment, medicarpin treatment in developing rats resulted in dose-dependent (1.0 and 10.0 mg/kg/day) increase in BMD of both cortical and cancellous bones, femoral force and stiffness, and periosteal mineral apposition/bone formation rate in femur. Medicarpin had no uterine estrogenicity assessed by uterotrophic assay. Plasma concentration-time profile analysis of medicarpin following single oral dose (5.0 mg/kg) show that medicarpin has 22.3% oral bioavailability.
Conclusions: Medicarpin, acting via ERb promotes osteoblast differentiation. Medicarpin promotes new bone formation *in vivo* and accelerates peak bone mass achievement. Good oral bioavailability added to its osteogenic effect suggests that medicarpin has therapeutic promise as bone anabolic agent.

Disclosure of Interest: None Declared

P858 - COMPLIANCE TO ANTIOSTEOPOROTIC TREATMENTS UPON RESULTS OF PHONE INQUIRY

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Aims: The results of several studies have revealed that low compliance to antiosteoporotic treatments could increase the risk of fractures and significantly reduce quality of patients' life. The aim of study to determine frequency of antiosteoporotic drugs cancellation and to analyze the reasons for treatment refuse in postmenopausal women.
Methods: Phone questionnaire of 100 women with primary osteoporosis, with average age of 63,49±0,87 years. Mean duration of disease 3,65±0,15 years.
Results: General compliance to therapy in joint group was 49%. Patients with higher level of education were 2,1 times more compliant to treatment than patients with secondary education($p<0,05$). All patients were distributed to three groups dependently on age: I group - 50-59 years (37%), II group - 60-69 years (37%), III group - 70 years and higher (26%). In group I compliance to treatment among being long time ill patients was 1,6 times ($p<0,05$) higher in comparison with patients got ill recently. In group II no reliable difference were found out. In group III compliance to treatment among recently got ill patients was 3,2 times higher ($p<0,01$). 8% of patients have cancelled the therapy during first 3 month after the beginning of treatment, 5% - after 6 months, 5% - after 1 year. 18% of patients have not started the therapy at all. The main reasons for low compliance to treatment were: uncertainty of patients in heaviness of illness, high cost of treatment, advises of relatives and friends, wish to make temporary interruption in treatment course, uncertainty in efficiency of treatment.
Conclusions: Compliance to antiosteoporotic therapy among postmenopausal women quite low and could be determined not only by pharmacological properties of drugs, but by psychological and social factors as well.

Disclosure of Interest: None Declared

P859 - DEFINING THE GAP: DECONSTRUCTING OSTEOPOROSIS TREATMENT INITIATION RATES AFTER FRACTURE

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Aims: To describe the gaps in initiation of osteoporosis (OP) testing and care after a fragility fracture.
Methods: The analysis is based on a longitudinal cohort of persons in Ontario, Canada, aged 50+, who sustained a fragility fracture and were treated at a fracture clinic with an OP screening coordinator. Sociodemographics, fracture description, OP risk factors and knowledge of OP and its link to fracture were collected for consenting patients. Those not diagnosed with OP and not on treatment at baseline were followed up within 6 months of their fracture to determine initiation of OP testing and care. It would be expected that approximately 80% of these patients would have an indication for OP care.
Results: 3,324 patients were eligible for follow up (undiagnosed and/or not on treatment at baseline). Follow-up data were available for 56% (n=1,620). 32% of patients were on OP care at the time of their fracture and 16% of patients not on treatment initiated care within 6 months of their fracture. Of those not diagnosed and not on care at baseline, 30% of patients did not take the initiative to follow up with their family physician (FP) as recommended by the screening coordinator. Forty-four percent had a bone mineral density (BMD) test done before follow-up and BMD appointments were pending in 8%. However, 10% of patients stated that their FP said a BMD was not needed or that they were ineligible. While only 16% initiated treatment overall, treatment initiation rates are substantially higher if we consider those who saw their FP (23% uptake), had a BMD test done (32%), or knew their test results showed low bone density (83%).
Conclusions: Treatment uptake improved with each step in the care process, identifying patient (e.g. not wanting follow up), physician (e.g. not referring patients for a BMD) and system-based treatment uptake barriers (e.g. patients waiting for appointments). The current system is perhaps over-dependent on patients and their FPs to initiate several steps in care when their understanding of OP guidelines might be limited. We will evaluate alternatives to this dependence, including BMD testing at the site of screening to increase OP testing and care to optimal levels.
Acknowledgement: Funding provided by Ontario Ministry of Health and Long Term Care. Views expressed are those of the researchers. Osteoporosis Canada implements the Ontario Fracture Clinic Osteoporosis Screening program.

Disclosure of Interest: None Declared

P860 - A NOVEL PEDICLE SCREW FOR PMMA AUGMENTATION: A PRELIMINARY STUDY OF PULL-OUT TEST IN OSTEOPOROTIC SPINE

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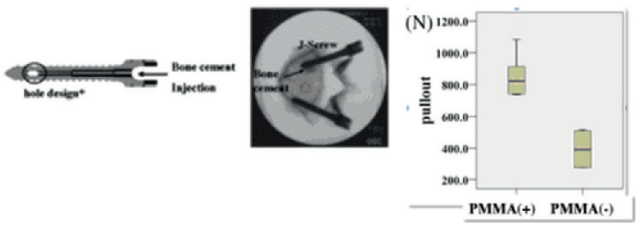
Aims: Instrumentation of the osteoporotic spine occasionally brings about complications due to pedicle screw loosening and/or pull-out. Excessive usage of PMMA carries disadvantages like: allergic reactions, pulmonary embolism, leakage into epidural space, adjacent vertebral failure due to changes in mechanical properties of the augmented vertebrae, PMMA remaining in the vertebral body after screw removal in case of infection. To reduce the number of disadvantages of PMMA augmentation in treatment of osteoporotic patients, we designed a new screw with side holes and performed a pull-out test to evaluate its applicability.
Methods: Six osteoporotic lumbar vertebrae were obtained from fresh cadavers. The newly designed screws were inserted into the pedicles and 0.5~0.7 ml of PMMA was injected into the screws. Then, 0.3~0.5 ml of PMMA was push out into the vertebral body through the side holes and afterwards, the pull-out force was measured. In addition, forces required to detach the PMMA from the screws axially or rotationally were also measured.
Results: The mean pull-out force of the designed screw was 853.4N (1.74 times compared to conventional screws). The average force needed to detach PMMA from the screw was 1569N/1.5Nm (torque) (axially/ rotationally).



Conclusions: The pull-out strength of the newly designed screws with PMMA was increased about twofold above the mean. These results are more favorable than those previously reported including our study (Soshi et al, Spine, 1991). Additionally, less PMMA with this newly designed screw was needed for augmentation and therefore: (1) complications associated with PMMA were reduced, (2) PMMA was easily detached with a lower rotational force, (3) following screw removal, PMMA remaining in the vertebral body was minimized. Therefore we concluded that the newly designed screw with side-holes for PMMA injection can be very useful for augmentation of osteoporotic vertebrae.
References: Soshi S et al, Spine 1991;16:1335.
Acknowledgement: Technical support: Showa Ika Kohgyo Co. LTD. (Japan)

Disclosure of Interest: None Declared

P861 - REGAINING URINARY CONTINENCE IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS: PRELIMINARY RESULTS OF A RCT OF PHYSIOTHERAPY

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Aims: There is a high prevalence of urinary incontinence (UI) in women with osteoporosis.[1] Also, UI can significantly limit a woman's ability to be physically active and is an independent risk factor for falls and low trauma fractures in older women. Thus the aim of this study is to assess the effectiveness of conservative management for UI compared with a control intervention, for reducing the number of UI episodes and severity of UI, in postmenopausal women aged 55-85 years old with osteoporosis and UI.
Methods: A randomized controlled trial was conducted. Participants in the treatment group received physiotherapy for UI once a week for twelve weeks, while control group participants received 3 hours of education about osteoporosis and follow up phone calls. Frequency of UI episodes was measured using the 7-day bladder diary, and severity of UI was measured using the 24 hour pad test. Significance was set at $p<0.05$ a priori.
Results: Preliminary analysis of the first 34 participants (total n required is 48) found a significant difference in change on the 24 hour pad test between groups ($p= 0.03$) and a trend toward differences between groups for the number of leakage episodes in 7 days ($p=0.05$) and change in the number of leakage episodes ($p=0.05$), all in favor of the physiotherapy group.
Conclusions: Our preliminary results suggest that a short 3 month course of physiotherapy for UI may reduce both the frequency of UI episodes and the severity of UI in postmenopausal women with osteoporosis.
References: 1. Sran MM, J Obstet Gynaecol Can 2009
Acknowledgement: BC Women's Health Research Institute, Doris Winterbottom Research Award

Disclosure of Interest: None Declared

P862 - ZOLENDRONIC ACID 5MG IV ONCE YEARLY INCREASES BONE DENSITY AND STRENGTH IN POSTMENOPAUSAL OSTEOPOROTIC WOMEN: A PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (PQCT) STUDY

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Aims: We assessed the effect of intravenous Zolendronic Acid (ZOL) 5 mgs once yearly on volumetric densities and bone strength indexes in postmenopausal osteoporotic women using tibia pQCT.
Methods: We reviewed records of 30 postmenopausal women who received 1 infusion of ZOL in our department. Inclusion criteria: 1) age>50y 2) postmenopausal status>2y, 3) DXA measurement (Spine/Hip) with T-score<-2,5 SD 4) Tibia pQCT before and 1 y after treatment. Exclusion criteria: 1) Secondary osteoporosis' conditions 2) Other bone metabolic diseases 3) Previous use of bone anabolic agents 4) Previous use of bisphosphonates > 2 y 5) malignancies. Biochemical markers of bone formation (Osteocalcin, bALP) and resorption (serum CTX, NTX) were tested before and 1y after treatment. Patients had tibia pQCT (Stratec Medizintechnik, Pforzheim, Germany),3 slices were obtained at the 4% (trabecular), 14% (subcortical) and 38% (cortical bone) of tibia length sites. We studied 15 variables per slice, mainly total bone content(TOT_CNT), total density (TOT_DEN), trabecular content (TRB_CNT), trabecular density (TRB_DEN), cortical content (CRT_CNT), cortical density (CRT_DEN), subcortical content (CRTSUB_CNT), subcortical density (CRTSUB_DEN), cortical area (CRT_A), subcortical area (CRTSUB_A), mean cortical thickness (CRT_THK), and Stress Strength Indexes (SSIs) at the 14% and 38% sites. We performed statistical analysis (t-test, ANCOVA)- data expressed as mean±standard deviation (S.D.)
Results: Patients' mean age was 65,3± 8,6y and mean tibia length 359,83± 22,1mm. After treatment, we report increases at the 14% site in TOT_CNT (324.08± 54.53 vs. 329.89±55.85, $p=0.012$), CRT_DEN (994.91± 51.89 vs. 1005.45± 56.62, $p=0.006$), SSI (1000.7± .208.05 vs. 1026.6± 215.21, $p<0.0005$). At the 38% site we report increases in TOT_CNT (272.66± 41.08 vs. 279.94± 41.13, $p<0.0005$), in SUBCRT_CNT (205.98± 22.32 vs. 210.99± 24.50, $p<0.0005$), CRTCNT (152.04± 52.03 vs. 165.87± 54.78, $p<0.0005$), TOTDEN (700.53± 102.64 vs. 711.03± 104.83, $p=0.008$), CRT_DEN (1198.77± 24.58 vs. 1213.10± 25.76, $p<0.0005$), CRT_A (126.42± 42.10 vs. 136.29± 43.74, $p< 0.0005$), CRT_THK (2.02± 0.76 vs. 2.19± 0.79, $p<0.0005$) and SSI (1259.0± 205.01 vs. 1297.0± 237.39, $p=0.001$). All biochemical markers decreased and remained within normal range after 1 y.
Conclusions: Our results indicate that i.v. ZOL 5 mgs once yearly increases significantly volumetric cortical densities, cortical thickness and bone strength in postmenopausal osteoporotic women.

Disclosure of Interest: None Declared

P863 - DISABILITY PRODUCED BY OSTEOPOROSIS COMPARED TO OCCULT MALFORMATIONS OF LUMBAR SPINE

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Aims: Adaptation of the spine to the new mechanic conditions imposed by biped position required complex structural changes. Transitional abnormalities in the lumbosacral charniere, sacralization or lumbarization have a frequency of up to 20% in general population. The percentage of these anomalies is much higher in patients with low back pain (10-11%) than in normal ones (6-7%). The aim of this study was to reveal disability in patients with low back pain due to lumbar vertebral anomalies treated at Rehabilitation Clinical Hospital from Baile Felix.

Methods: We performed a prospective randomized study on a total of 140 patients with low back pain due to vertebral anomalies and lumbar spondylosis that were treated in the Rehabilitation Hospital from Baile Felix between October 2008 - May 2009 (lot I), compared to 128 cases with a diagnosis of vertebral osteoporosis certified by DXA (lot II). In all these parameters such as pain and functional impact were followed. To highlight the impact of low back pain due to vertebral anomalies and vertebral osteoporosis on functionality and daily activities we have relied on Oswestry questionnaire. Average Oswestry score for lot I was 33.79±, which reveals a moderate disability. To assess the functional deficit created by back pain during the various activities we have analysed each domain of the Oswestry test. Evaluation of life quality of the patients from lot II, with osteoporosis diagnosed by DXA, was made with Qualeffo-41 questionnaire, (table 1). Lumbar pain of patients with vertebral anomalies affected in ascending order: personal care activities -21.42±, sleep -22.85±; professional life - 27.14±; social life – 30±; sex life -36.36%; sitting - 37.14%; good physical condition - 40%; lifting weights - 40%; walking - 40%; standing - 44.28%.

Results:

DOMAINS	VALUES	DEFICIT
Global score	49.82±5.78	49.82
Pain	40.7±0.85	40
Physical function	21.6±0.86	21.06
Social function	31.2±1.65	31.2
Health perception	58.5±0.64	58.5
Mental function	47.46±1.23	47.46

Table 1. Average scores of all 41 areas investigated by Qualeffo questionnaire (Lot II).

Conclusions: 1. The frequency of vertebral anomalies in causing low back pain was estimated around 30%. Functional impact of low back pain was moderate in all investigated areas, except for standing, which was severely affected. 2. Lumbar pain due to osteoporosis severely affects quality of life, issue detected by the Qualeffo-41 questionnaire.

Disclosure of Interest: None Declared

P864 - REDUCING THE RISK OF VERTEBRAL FRACTURES IN PATIENTS WITH OSTEOPENIA THROUGH EXERCISE

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Aims: In is estimated that the risk of a fracture will double with every decade past 50, even with the same bone density. A 55 years woman with osteopenia has a 2% chance per year of having a fracture, while a woman aged 75 with osteopenia has about 8% chance per year. At menopause, it has been shown that loss of estrogen affects postural stability by slowing down brain processing speed. After menopause, the incidence of falls among women is three times that of men. It has been determined that postural stability appears to be related to risk of fracture in women with osteoporosis. It was found that, respectively, 43.3% and 12.6% of all non-vertebral fractures occurred in women with osteopenia or normal BMD.Our hypothesis was that physical training can prevent bone loss in postmenopausal women, thus the objective of this study was to determine the effects of balance training exercises and weight-bearing exercise program on balance, strength and bone mineral density (BMD) in osteopenic women.

Methods: 84 osteopenic women aged between 39 and 76 years, mean age 63.21 years, SD 11.9 years with T-scores ranging from −1.0 to −2.5 were recruited from the patients admitted in the Rehabilitation Clinical Hospital from Baile Felix. Training included three fast 30-minute walks and two sessions of one-hour training per week. They followed an exercise program every day for two weeks, then twice a week, for 20 weeks (one-hour exercise sessions with a trained physiotherapist). Assessments at baseline and at the end of this program included balance testing, strength testing (quadriceps, hip adductors / abductors / external rotators and trunk extensors), and DXA scans (proximal femur and lumbar spine).

Results: Evaluation made at the end of the training revealed markedly significant better performances in balance (unilateral and bilateral stance sway measures, lateral reach, timed up and go and step test) ($p < 0.05$) with strong positive training effects reflecting improvements of between 10% to 65%. Similarly there were gains in strength of the hip muscles (abductors, adductors, and external rotators), quadriceps and trunk extensors with training effects between 9% and 28%. The total hip BMD increased in the trained group + 0.005 g/cm2 (±0.018), representing +0.58% .

Conclusions: The results indicate a small but positive effect of physical exercise on hip BMD in postmenopausal women with low BMD.

Disclosure of Interest: None Declared

P865 - OSTEOPOROSIS INFLUENCE ON QUALITY OF LIFE

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Aims: Quality of life in osteoporosis represents an important parameter both in clinical research and practice and in patient care activities. It reflects the manner patients perceive and react to their health state and integrate physical, functional, emotional and mental well- being status.

This study aimed to reveal the influence of osteoporosis on the quality of life of affected individuals

Methods: The study was performed in the Rehabilitation Clinical Hospital from Baile Felix between July 2008 - May 2009 and included a group of 82 patients who underwent osteodensitometry to measure bone density. Qualeffo quality of life questionnaire was used. The lot was composed exclusively of women, with a mean age of 61.6 years, ranging between 44 and 81years.

Results: Average T-score at lumbar spine level was around -2.62, ranging between -0.8 and -4.5. Average T-score for the hip was around -1. 65, ranging between 0.1 and - 4.2. Considering the

entire lot, this risk was 2.76 for a major osteoporotic fracture and 1.57 for a hip fracture. Qualeffo-questionnaire includes questions about spinal pain arisen during the last week before the interrogation, daily activities, home activities, patient's mobility, leisure and social activities, general health perception, and about the patient's mood. As expected, this score was strongly affected in generalized osteoporosis, 49.33, followed by vertebral osteoporosis, 47.81 and less in osteopenia, 36.01. Impaired quality of life in cases with osteopenia raise the issue of the need for treatment even in these patients. The entire lot had an average pain value of 64.69. Considering, physical function" domain, the average value for daily activities item was 30.94, for domestic activities the average value was 32.96, mobility had an average of 24.65. Leisure and social activities had an average 33.36 score. Among the studied areas, the assessment of general health status was the most severely affected item, the average value for the entire group being 70.73. The mean for mental function was 63.04.
Conclusions: both social and professional domains. Patients with osteoporosis have mood and communication problems with lack of energy, loneliness, fear and worry about small things, which reduce quality of life. As expected, Qualeffo 41 score was severely affected in generalized osteoporosis, followed by vertebral osteoporosis and osteopenia. Impaired quality of life in cases with osteopenia, raise the issue of therapeutic intervention even in these patients.

Disclosure of Interest: None Declared

P866 - RISK OF LOSING INDEPENDENCE IN OSTEOPOROSIS

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Aims: It is estimated that nearly 40% of Caucasian women aged over 50 years will experience at least one fracture of the spine, hip or wrist during their lives. These fractures have physical, psychological and social consequences that can profoundly affect health related quality of life.
Methods: We have performed the study on a lot of 122 patients, mean age 73.6 years, treated in the Medical Rehabilitation Clinical Hospital Baile-Felix, between July 2009 - January 2010. All cases were evaluated by DXA technique. The perceived quality of life was assessed by a standardized, internationally and nationally validated questionnaire: Qualeffo-41 for quality of life in osteoporosis.
Results: Mean Qualeffo score in the total group of patients was 49.0±18.4. Pain was present in 45% of cases, independently from age, and in 23% of them, for more than 10 hours a day. Considering the physical function domain, 42% of the women under 65 years of age indicated the perception of a significant physical change, as did 69% of those over 65. In the domain of general health perception, 58% of the women had a sense of poor well-being. Comparing their present level of well-being with that of 10 years before, 58% of the women aged less than 65 indicated a deterioration, as did 83% of those aged 65 or more. Overall, 41% of the women affected by osteoporosis had a reduced quality of life.
Conclusions: 1. Osteoporosis is generally considered a silent disease before the occurrence of fractures, but we found that pain was often present in the group of women without known fractures.

2. Osteoporosis was perceived by our patients as a disease leading to severe discomfort and/or disability, and affecting different aspects of personal life with a variety of undesirable consequences, such as chronic pain, reduced physical ability, reduced social activity, poor well-being, and depressed mood. The fear of losing autonomy and independence was extremely high.

Disclosure of Interest: None Declared

P867 - LITERATURE REVIEW OF PATIENT-CENTERED POST-FRACTURE INTERVENTIONS IN THE CONTEXT OF THEORIES OF HEALTH BEHAVIOUR CHANGE: ARE WE UTILIZING PREVIOUS RESEARCH?

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Aims: This study examined current literature to determine whether current post-fracture osteoporosis (OP) interventions utilize major theories of health behaviour change and whether those that are theory-based are more successful in producing desired behaviour changes in terms of treatment initiation and adherence.
Methods: Studies were identified by applying additional criteria to the final selection stage of a systematic review of non-surgical OP interventions in the orthopaedic environment. We identified 35 patient-targeted, primary studies that aimed at improving post-fracture OP care. These studies contained interventions aimed at changing patients' knowledge, attitude and/or behaviours. As well as describing the studies (in terms of design, population, interventions, outcomes), we focused on theoretical framework and elements of behaviour change models.
Results: Despite an abundance of literature supporting theories of behaviour change, post-fracture osteoporosis interventions do not utilize these theories. While three studies drew on what we felt to be elements of a theoretical framework, none of the studies we reviewed specified whether the interventions they implemented were based on theories of health behaviour change. Theories of behaviour change could be applied to post-fracture osteoporosis interventions to explain factors and processes that regulate behaviour and to account for patient perceptions of health and decision-making.
Conclusions: Patients' perceptions of their health play a major role in treatment initiation and adherence. Research has found that behaviour change theories are useful in explaining initiation and adherence to prescribed care in chronic diseases. However, these theories are not being applied to post-fracture osteoporosis interventions. Future research should explore the application of health behaviour change theories to this patient population.

Acknowledgement: Funding provided by Ontario Ministry of Health and Long Term Care. Views expressed are those of the researchers.

Disclosure of Interest: None Declared

P868 - MISSING LINKS IN PATIENT-MEDIATED CARE: FACTORS ASSOCIATED WITH PATIENTS MAKING THE ASSOCIATION BETWEEN A FRAGILITY FRACTURE AND OSTEOPOROSIS

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Aims: To examine baseline factors associated with patients linking their fragility fracture to osteoporosis (OP) at follow up. Previous research has shown that making the OP-fracture link is predictive of initiating first-line OP treatment; however, it is not known who is more likely to make this link.
Methods: Data on a population cohort of low trauma fracture patients over the age of 50 years were collected as part of a provincial OP screening initiative. OP screening coordinators collected data at baseline and treatment-naïve, previously undiagnosed patients were followed up within 6 months of their fracture. Unadjusted analyses were performed to identify which modifiable (e.g., patient perception) and non-modifiable (e.g., previous fracture) factors are predictive of patients making an association between their fragility fracture and OP.
Results: 978 patients were included (mean (SD) age 66.6 years (10.5); 80.1% female). At baseline, 89.5% of patients were unsure or did not believe their fracture could have been caused by OP. Only 8.6% of these patients changed this perception at follow up. Those who changed were more likely to have had a previous fracture (RR 2.34 [95%CI 1.52-3.59] p<0.0001), more likely to perceive benefits to OP drug treatment (89.7% vs. 83.1% p=0.03), and were more likely to perceive their bones as thin (RR 7.16 (4.33-11.84] p<0.0001) at baseline.
Conclusions: Many fragility fracture patients do not link their fracture with OP. Those that made that link within 6 months of their fracture were more likely to have had a previous fracture, to perceive benefits to OP drug treatment, and to perceive their bones as thin at the time of fracture. Helping patients make the OP-fracture link should include a clear message about the state of their bones, the significance of even one fragility fracture and the benefits of OP treatment Future research should support increasing awareness in this group and consider using other approaches in those not fitting this profile.
Acknowledgement: Funding provided by Ontario Ministry of Health and Long Term Care. Views expressed are those of the researchers. Osteoporosis Canada implements the Ontario Fracture Clinic Osteoporosis Screening program.

Disclosure of Interest: None Declared

P869 - COST-EFFECTIVENESS OF NSAIDS IN PATIENTS WITH EXISTING HEART DISEASE AND OSTEOARTHRITIS

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Aims: To assess the health economic impact of NSAIDs in patients with existing heart disease and osteoarthritis (OA).
Methods: An individual state transition model (3 month cycles, 1-year treatment duration, lifetime horizon, healthcare perspective) encompassing eight CV events (heart failure, stroke, transient ischemic attack, myocardial infarction, stable angina, unstable angina, stroke death and MI death) and three GI events (dyspepsia, symptomatic ulcer and POB) was constructed. The four most widely prescribed NSAIDs were included in the cost-effectiveness assessment: celecoxib, diclofenac, ibuprofen and naproxen.

The model was populated with absolute CV risks for patients who have experienced an MI; NSAID dependent GI risks from UK treatment guidelines; and UK cost and quality of life data. NSAID dependent relative risks of CV events were obtained from a recent prospective cohort study by Ray et al (2009); those were 1.03x, 1.27x, 1.18x, 0.88x for celecoxib, diclofenac, ibuprofen and naproxen respectively.
Results: Naproxen provided both quality of life and cost savings compared to the other NSAIDs. Cost savings (quality adjusted life year (QALY) gains) amounted to £250 (0.03), £123 (0.06) and £195 (0.10) compared to celecoxib, ibuprofen, and diclofenac respectively.
Conclusions: Naproxen is associated with significant costs and quality adjusted life year benefits compared to other NSAIDs in treatment of patients with existing heart disease and OA. However, given the high cardiovascular risk in this patient segment, a new NSAID with improved cardiovascular profile could provide significant benefits.
References: Ray WA et al, Circ Cardiovasc Qual Outcomes 2009;2:155.

Disclosure of Interest: A. Svedbom Grant / Research Support from: NicOx S.A., F. Borgström Grant / Research Support from: NicOx S.A.

P870 - EFFECTS OF TREADMILL RUNNING BY THE DIFFERENT SLOPES ON BONE MICROARCHITECTURE AND MINERAL DENSITY IN OVARIECTOMIZED RATS

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Aims: It is reported that treadmill running inhibits bone loss in ovariectomized (OVX) rats. The loading on bone differs by an angle of inclination. But the effect on bone microarchitecture by a slop running hasn't been reported yet. This study was investigated the effects of treadmill running by the different slopes (upward, flat, downward) on bone microarchitecture and mineral density in ovariectomized rats.

Methods: Thirty-two female Wistar rats aged 8-week-old were divided into five groups randomly. One group had sham-operated (SHAM), and other groups had OVX. One of OVX group was non-running as control (OVX) and other groups were running. Running groups divided into three groups; upward running (Up), flat running (Level), downward running (Down). Running groups started to run on treadmill at 20 m/min, for 30 min, on 5days/week, for 8 weeks at a week after the operation. Three different gradients were upward, +10%, flat, 0%, downward, -10%. After this experiment, tibias in all rats were dissected out. Metaphysical region of the proximal tibias were scanned with Micro CT (CBSTAR, MCT-100CB; Hitachi Medical Co. Ltd), and bone volume (BV), tissue volume (TV), BV/TV, trabecular thickness (Tb.Th), trabecular number (Tb.N), trabecular separation(Tb.Sp), trabecular spacing(Tb.Spac), Trabecular Bone pattern factor(TBPf), marrow space star volume(V*m space) and trabecular star volume(V*tr) were measured with bone analysis software, TRI/3D-BON (RATOC System Engineering Co. Ltd) . The differences of the bone microarchitecture parameters among SHAM, OVX, Up, Level and Down groups were examined.
Results: BV/TV and Tb.Th of Up group were significantly higher than those of OVX and other running groups. BV/TV of Level group was significantly higher than that of OVX and Down group, and Tb.Th of Level group was significantly higher than that in Down group. Compared with OVX group, BMD of all running groups was significantly high. Compared with SHAM group, BMD of OVX, Level and Down groups was significantly low.
Conclusions: Bone loss, especially in trabecular thickness, and BMD reduction were inhibited by treadmill running with upward and flat slopes. In particular, upward running was the most effective and it was considered quantity of loading on bone was increased by upward slope.

Disclosure of Interest: None Declared

P871 - IMPACT OF A PHONE FOLLOW-UP PROGRAM ON PERSISTENCE WITH TERIPARATIDE OR PTH 1-84 TREATMENT

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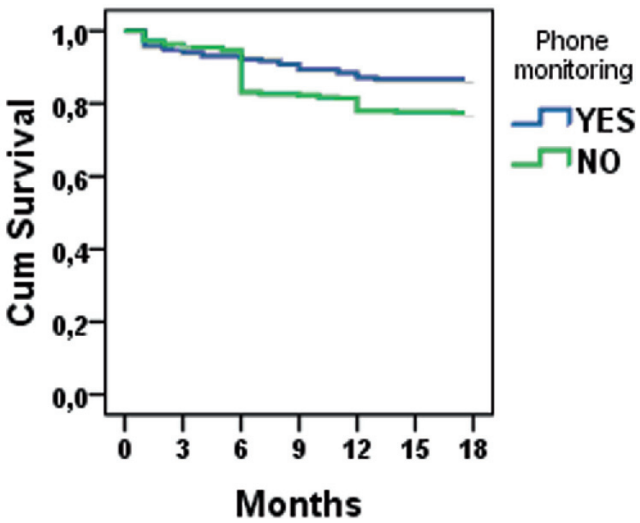
Aims: To improve the adhesion of therapy, in April 2008 we began a phone follow-up program to help patients during their severe osteoporosis (OP) therapy with daily subcutaneous injections of either teriparatide or full-length parathyroid hormone (PTH 1-84). The objective of this study was to evaluate the 18-month persistence of these therapies in patients participating in the program.
Methods: We enrolled 217 patients who started teriparatide or PTH 1-84 following this program and compared them with 351 patients who were treated with the same therapies, but who did not participate in any follow-up program from November 2004 to March 2008. At the beginning of the therapy, our centre nurses trained patients on self-injection and evaluated their ability to do so. The patients received weekly phone calls from nurses during the first month of therapy, then monthly for five months thereafter, then every three months for the following 12 months. In every call, nurses help patients to resolve any possible issues, book next visit, and, if applicable, collect adverse event information, and dates and reasons for treatment discontinuations. Here we present interim analysis of the first 20 months of the program.
Results: Persistence rate of the group following the phone program was 86%; that means 8% higher than the group that had not followed any program (77%), with a relative risk for the second group of 1,4 (IC 1.025-1.976, p 0.035). Long rank-test on persistence rates of teriparatide or PTH 1-84 in patients enrolled in the program and not enrolled in any program was performed (fig. 1), the difference is statistically significant (p 0.01). In the phone program group, the majority of patients who discontinued treatments did so in the first months: the most common causes of discontinuation were adverse events. The majority of not following patients discontinued therapy at 6 and 12 months of treatment, for not therapy-plane renewal.



Conclusions: Our data suggests that severe OP patients treated with teriparatide or PTH 1-84 and enrolled in a phone follow-up program have higher persistence rates than patients not following the program. The program is still on-ongoing.

Disclosure of Interest: None Declared

P872 - SAFETY OF TERIPARATIDE USE AT 3 AND 18 MONTHS OF THERAPY IN AN OSTEOPOROTIC PORTUGUESE POPULATION

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Aims: Full-length PTH(1-84) is a potent anabolic agent currently used in the treatment of osteoporosis. The physiological role of PTH is to increase serum calcium. Therefore, there is the fear that its use might cause hypercalcemia or hypercalciuria. There are data documenting that adequate 25(OH) vitamin D3 levels are essential for an optimal response to teriparatide since there is

an increase in endogenous serum 1,25(OH)2 vitamin D3. Its sustained use might cause decreases in the serum 25 (OH) vitamin D3 levels. With this study, we intended to evaluate teriparatide impact on phosphorus and calcium metabolism.
Methods: Total and ionized calcium, phosphorus, 25(OH) vitamin D3, PTHi, calciuria and creatinine clearance were measured at baseline, 3 and 18 months.
Results: Forty patients (37 women) were evaluated, 27 of them with glucocorticoid-induced osteoporosis and/ or secondary to chronic inflammatory diseases. There was a slight increase in serum total calcium at 18 months, not accompanied by equal rises in ionized calcium. At 3 months we noticed a rise in calciuria and a modest increase in serum phosphorus, which returned to baseline levels at 18 months. Concerning 25(OH) vitamin D3, a progressive increase in its deficiency was reported, although all the patients were under calcium and cholecalciferol supplementation. There were no significant variations in creatinine clearance.

	Baseline	3 months	18 months
Total calcium (mEq/L)	4,67±0,18	4,79±0,19	4,78±0,22
Ionized calcium (mmol/L)	1,17±0,09	1,20±0,06	1,19±0,06
Phosphorus (mg/L)	35,25±5,29	36,25±5,24	35,09±5,80
25(OH) vitamin D (ng/mL)	25,74±9,74	26,07±12,53	23,26±10,63
Calciuria (mEq/24 h)	6,43±4,48	8,09±5,94	5,92±3,95

Conclusions: After 18 months of therapy, teriparatide has proven to be a safe drug, particularly in what concerns variations in calcium (serum level and urinary excretion) and its inherent risks. Given the variations in the 25(OH) vitamin D3 status, one must keep in mind that supplementation with cholecalciferol should be individualized during teriparatide use.

Disclosure of Interest: None Declared

P873 - EARLY CHANGES IN BONE TURNOVER MARKERS CORRELATE WITH BONE MINERAL DENSITY RESPONSE TO TERIPARATIDE IN AN OSTEOPOROTIC PORTUGUESE POPULATION

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Aims: The purpose of this study was to test the ability of early changes in markers of bone turnover to predict changes in bone mineral density (BMD) in patients treated with teriparatide.
Methods: BMD values at baseline and 18 months were obtained with a LUNAR Expert 1320 [*]. β-C-telopeptide of collagen 1 cross-links (β-CTX1), osteocalcin (OC), bone alkaline phosphatase, alkaline phosphatase and 25 (OH) vitamin D3 were measured at baseline, 3 and 18 months. Baseline, 3 months values and their variation were correlated with BMD changes at 18 months of treatment. Pearson correlations were used for statistical data analysis (SPSS 14.0).
Results: Forty patients (37 women) were evaluated, 27 of them with glucocorticoid-induced osteoporosis and/ or secondary to chronic inflammatory diseases. β-CTX1 levels at 3 months correlated positively with the variation of BMD in lumbar spine at 18 months (r =0,421; p<0,05) and with BMD gain in lumbar spine at 18 months (r =0,416; p<0,05). OC levels at 3 months also correlated with BMD gain in lumbar spine at 18 months (r=0,416; p<0,05). OC variation was associated with lumbar spine BMD increase at 18 months (r=0,405; p<0,05). Bone alkaline phosphatase, alkaline phosphatase and 25 (OH) vitamin D3 values at baseline and 3 months were not significantly correlated with BMD changes.
Conclusions: These results support the improvement in lumbar spine BMD after treatment with teriparatide. The measurement of bone turnover markers is a useful tool to identify responders to this anabolic therapy.

Disclosure of Interest: None Declared

P874 - TERIPARATIDE EFFECTS ON BONE MICROARCHITECTURE IN OSTEOPOROTIC WOMEN: 18-MONTH EVALUATION BY HIGH RESOLUTION PQCT

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Aims: Teriparatide [recombinant human PTH, rhPTH(1-34)] is the first bone anabolic agent with proven antifracture efficacy. Whether its effect on bone structure especially on cortical compartments, is related to weight-bearing environment of bone sites, remains a fascinating question. Our aim was to provide additional clues in this topic as we assessed teriparatide effects on 3D bone structural parameters in vivo by HR-pQCT at both distal radius and tibia.
Methods: Ten postmenopausal women (74.3±8.8 yrs) with established osteoporosis and at least two vertebral fragility fractures, regardless of any previous osteoporosis treatment, were measured by HR-pQCT at baseline and at 1, 3, 6, 12 and 18 months of teriparatide treatment (20microg/d). Serum bone alkaline phosphatase (bALP) and C terminal collagen type I telopeptides (sCTX) as well as lumbar and femoral BMDs assessed by DXA, were obtained at the same time points.
Results: The 18-month results indicated a 5% increase in lumbar spine BMD. The sCTX levels were significantly increased (p=0.01), reaching a peak at month 12 while bALP levels increased more steadily up to 40%. HR-pQCT analysis revealed no significant alteration of bone microarchitecture at the radius level suggesting that this site was preserved during the treatment. At the tibia site, cortical mineral density decreased by 5.8% (p<0.001) and cortical thickness and area decreased even more importantly (11.7 and 11.5%, p<0.001, respectively) while the periosteal diameter slightly but significantly increased (0.4%, p=0.02). The tibia trabecular area was enlarged (0.6%, p=0.01) whereas trabecular density and structural parameters were preserved. Finite element analysis showed no clear alteration in strength for all patients. Therefore, it remains unclear whether the modest increase in periosteal diameter might compensated for the radial thinning of the cortical envelope. Other mechanisms such as strain-driven

cortical bone reorganization may occur as suggested by qualitative imaging analysis.
Conclusions: Overall, our results demonstrate for the first time differences in teriparatide effects on microarchitecture between weight-bearing and non weight-bearing bone sites in osteoporotic patients. We suggest that these differences between tibia and radius changes may reflect interactions between TPTD and bone strain with targeted response on specific areas depending on loading.

Disclosure of Interest: T. Thomas Grant / Research Support from: Amgen, Lilly, Novartis, P&G, Roche, Servier, Consultant / Speaker's bureau / Advisory activities with: Amgen, Daichi-Sankyo, Ipsen, Lilly, MSD, Novartis, P&G, Roche, Servier, C. Alexandre Grant / Research Support from: Lilly, Consultant / Speaker's bureau / Advisory activities with: Lilly, B. Van Rietbergen Consultant / Speaker's bureau / Advisory activities with: Scanco Medical, L. Vico: None Declared

P875 - ADHERENCE TO BISPHOSPHONATE THERAPY FOR POSTMENOPAUSAL OSTEOPOROSIS IN BULGARIA

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Aims: Osteoporosis is a major health problem in Bulgaria. Currently approved therapies for osteoporosis are effective at lowering fracture risk, but adherence to the therapy is suboptimal.

The objective of this study is to quantify the adherence of the patients to drug therapy for osteoporosis with oral bisphosphonates in Bulgaria.
Methods: Women from South Bulgaria aged >55 years with diagnosed postmenopausal osteoporosis were recruited to participate in this study. Up to 490 women conform to the diagnostic criteria; 70% taking weekly Alendronate 70 mg, 30% monthly Ibandronate 150 mg. For the purposes of this study: patient medication persistence refers how long a patient receives therapy for treatment lasting 24 months after initiating treatment; patient medication compliance, how correctly patient takes the available medication; patient medication adherence to assesses both persistence and compliance (calculated in this study by Medication possession ratio (MPR).
Results: Pooled persistence rates decreased from 86% (95%CI, 85%>87%) for the treatment lasting 12 months; and to 59% (95%CI, 52%>63%) for treatment 24 months. For patients who had no more 60-day gap in the therapy, the pooled adherence for the treatment lasting 12 months is 0.97 calculated by MPR. Adherence for the period 12 to 24 months is 0.98.
Conclusions: For first 12 months only 14% of the patients don't take their medication as directed. Nonpersistence among osteoporotic women remains high in 12-24 months - 41%. MPR adherence in 24 months for patients without discontinuation of the therapy more than 2 months are high.

Disclosure of Interest: None Declared

P876 - FIVE-YEAR OUTCOME OF HIP FRACTURE PATIENTS ADMITTED TO A SINGAPORE HOSPITAL: QUALITY OF LIFE AND SURVIVAL RATES POST-TREATMENT

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Aims: Osteoporotic hip fractures affect morbidity and mortality significantly(1). The negative impact osteoporotic hip fractures have on quality of life has been demonstrated but few prospective long-term follow-up studies have been conducted. This is a five-year follow-up study to our previous paper [(2)]documenting the quality of life of patients one-year post-fracture and their survival rates.
Methods: A prospective and consecutive longitudinal osteoporotic hip fracture study where patients are reviewed 5 years after the index surgery. Medical records of 70 consecutive patients admitted to Singapore General Hospital following either a cervical or intertrochanteric femoral fracture from late February 2004 to May 2004 are studied. Patients' progress was reviewed one-year and five-years after. Survival rates one-year and five-years post fracture were compared. The EuroQOL was used to quantify patients' quality of life.
Results: Follow-up rate at five years described in this report is 100 percent. Mortality rate at five years stands at 47.1 percent. Mortality plateaued after 1 year (Kaplan- Meier curve drawn but unable to upload to system). Thirty-one percent ambulate independently compared to 78 percent at pre-fracture status. Seven patients (10%) suffered from a second osteoporotic fracture, of which majority are vertebral compression fractures. Two had supracondylar femoral fractures on the ipsilateral side. The average self-scoring system (EuroQOL) yielded an average of 70.4 out of 100, compared to 66.6 at one-year follow-up.
Conclusions: Mortality of osteoporotic hip fracture patients plateau after first-year post fracture. Five years after osteoporotic hip fractures, in spite of further mortality, survivors show improvement of ambulatory status and quality of life scores over the first year. However, only a minority achieve pre-fracture ambulatory status. Such fractures are best prevented; once sustained, aggressive surgical and rehabilitative treatment to improve patient independence especially in the first year of sustaining an osteoporotic hip fracture, may reduce potential strain on their families and our national healthcare resources.
References: 1) Nather A et al, Injury 1995;26:187; 2) Lee AYJ, Chua BSY, Howe TS, Singapore Med J 2007;48:996.

Disclosure of Interest: None Declared

P877 - SECONDARY PREVENTION OF HIP FRACTURES IN ELDERLY OSTEOPOROTIC PATIENTS WITH LOCOMOTOR DISABILITIES

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Aims: To identify and correct the risk factors of a new hip fracture in elderly with locomotor disabilities.
Methods: The study group comprises 146 patients with a previous surgically treated hip fracture, secondary to a fall (mean age 73.6 years). For 6 weeks, the patients followed a post-surgery rehabilitation program adapted to the associated pathology, for mobility, balance and gait improvement. For 1 year, patients received a calcium and D vitamin supplement and followed a physical training program (hip, knee, ankle, and paravertebral muscle strengthening, in order to improve locomotion). 18% patients also received an antiresorptive drugs.
Results: The main diseases associated with locomotor disabilities were neuromotor consequences after stroke (n=34), balance impairments secondary to circulatory insufficiency (n=43), Parkinson disease (n=11), advanced osteoarthritis (n=33), inflammatory rheumatic diseases (n=15). 8.17% patients haven't finished the study, because of the complications appeared during the study period (senile dementia, cardiac complications). At one year follow-up, a reduced fall incidence was assessed.
Conclusions: Identification and correction of osteoporosis and fall risk factors by a performing an adapted physical training program, home modification, and a proper medication, seem to reduce the risk of a new hip fracture, with a good adherence to a prophylactic treatment.

Disclosure of Interest: None Declared

P878 - CLINICAL EFFECT OF SWIMMING IN PATIENTS WITH OSTEOARTHRITIS AND OSTEOPOROSIS

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Aims: To evaluate the clinical effect of swimming for patients with osteoporosis (OP) and osteoarthritis (OA) in improving bone mineral density (BMD), pain, functionality and quality of life.
Methods: The study included 22 postmenopausal women, mean age 54.7±4.5 diagnosed with osteoporosis and primary osteoarthritis. BMD was assessed using DXA and we also used visual analog scale (VAS) to assess pain and Short Form-36 (SF-36) questionnaire to assess the quality of life. The patients were divided in two symmetric groups. First group (group A) performed free swimming one hour/day, 3 days/week and the second group (group B) performed one hour daily kinetotherapy, 3 days/week for one year. The kinetotherapy rehabilitation program was structured in 3 parts: warm-up 10 minutes, work-out 40 minutes consisting in specific weight-bearing exercises and 10 minutes cool-down (breathing exercises, stretching). All patients received calcium and vitamin D supplementation. The patients were evaluated at baseline and one year later.
Results: Although BMD was not modified after one year, we noticed important differences in VAS and SF-36 in group A. In group B, mean BMD T-score increase from -2.63 at baseline at -2.42 at endpoint. In group A, VAS decreased from 69 to 12 (82, 61% improvement) and in group B VAS decreased from 64 to 24 (62, 50% improvement). For SF-36 only group A showed significant improvements compared with baseline ($p<0.05$).
Conclusions: Although weight-bearing physical activity is known to be superior to non-weight-bearing activity to increase BMD, our present outcomes shows that free swimming is associated with improvement of pain, functionality and quality of life in patients with OA and OP.

Disclosure of Interest: None Declared

P879 - EFFECTS OF 12 MONTHS TREATMENT WITH TERIPARATIDE ON VOLUMETRIC BONE MINERAL DENSITY AND STRUCTURAL PARAMETERS AT THE FEMORAL NECK ASSESSED BY QUANTITATIVE COMPUTERIZED TOMOGRAPHY IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Aims: We have recently reported that teriparatide treatment for 12 months significantly increase femoral neck bone strength, as assessed by finite element analysis of hip CT scans, despite no significant changes in areal BMD measured by DXA (1). To further explore the effects of teriparatide at the femoral neck site, hip QCT scans were acquired at baseline and after 12 months of treatment with daily injections of 20 ug teriparatide in a group of 20 postmenopausal women with osteoporosis.
Methods: QCT scans were analyzed using the QCT Pro Bone Investigational Tool software (Mindways, Austin, TX). Six mid-femoral neck cross-sectional images, perpendicular to the femoral neck axis, were extracted at 1 mm intervals. After analysis, the results from the six slices were averaged. The following parameters were obtained: volumetric BMD for the integral (Int vBMD), cortical (Ct vBMD) and trabecular (Tb vBMD) bone compartments, periosteal perimeter (Perim), cortical cross-sectional area (Ct CSA), cortical thickness (Ct Th), cortical cross-sectional moment of inertia (CSMI), density-weighted CSMI (W-CSMI) and buckling ratio.
Results: The results, as mean percent change from baseline, after 12 months of treatment with teriparatide are presented in table below.

	Mean % change	95% CI	P
Int vBMD (g/cm3)	2.12	1.08; 3.15	0.0004
Ct vBMD (g/cm3)	-1.66	-2.90; -0.42	0.0113
Tb vBMD (g/cm3)	4.21	2.02; 6.39	0.0007
Perim (cm)	0.0006	-1.54; 1.55	0.9994
Ct CSA (cm2)	3.19	1.71; 4.68	0.0002
Ct Th (mm)	4.19	2.47; 5.91	0.0001
CSMI (cm4)	4.89	1.90; 7.89	0.0029
W-CSMI (mg cm)	3.08	0.91; 5.25	0.0077
Buckling ratio	-5.41	-7.68; -3.15	0.0001

Conclusions: The positive changes in bone strength estimators (CSMI, W-CSMI and buckling ratio) and structural parameters (Ct CSA and Ct Th) are in line with our previous observation of an increase in femoral neck bone strength induced by teriparatide. Moreover, the increase in Ct Th is in agreement with our previous results on the effects of teriparatide at the distal radius and tibia and iliac crest biopsy samples in this group of patients (2).The increase in Ct Th and Ct CSA in the absence of change in periosteal perimeter might suggest endosteal apposition of new bone. This preliminary observation requires further investigation.

References: 1- Masiukiewicz U. et al 2009 J Bone Miner Res 24 (Suppl 1) Available at http://www.asbmr.org/Meetings/AnnualMeeting/AbstractDetail.aspx?aid=62fd292a-5658-480a-aad0-55319985728e
2- Bogado CE et al 2009 J Bone Miner Res 24 (Suppl 1) Available at http://www.asbmr.org/Meetings/AnnualMeeting/AbstractDetail.aspx?aid=8024c14d-c2f2-4a0d-bd3c-0584c85b91ad

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P880 - ANTIFRACTURE EFFECTS OF DENOSUMAB IN POSTMENOPAUSAL WOMEN AT HIGHER FRACTURE RISK: A SUBGROUP ANALYSIS FROM THE FREEDOM TRIAL

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Aims: In the FREEDOM trial, denosumab (DMAb) significantly reduced the risk of new vertebral, hip and nonvertebral fractures by 68% (95%CI: 59%–74%), 40% (95%CI: 3%–63%) and 20% (95%CI: 5%–33%), respectively, over 3 years.[1] We evaluated the effects of DMAb in subgroups of FREEDOM subjects at higher fracture risk.

Methods: In this 3-year, blinded phase 3 trial, 7868 postmenopausal women aged 60–90 years with a lumbar spine or total hip T-score <−2.5 and not <−4.0 were randomized to DMAb (60 mg sc every 6 months) or placebo. Subjects with ≥2 of 3 prespecified criteria (age >70 years; baseline T-score ≤−3.0 at lumbar spine, total hip, or femoral neck; prevalent vertebral fracture at baseline) were considered to have a higher risk for fracture. Additional post-hoc criteria were used to identify women at a higher risk for fracture at the hip (age ≥75 years) or vertebrae (≥2 prevalent vertebral fractures, moderate/severe prevalent vertebral fractures, or both).

Results: In the overall placebo group (n=3906), hip, new vertebral and nonvertebral fracture incidences were 1.2%, 7.2%, and 8.0%, respectively, over 3 years. Among patients in the placebo group with a higher fracture risk, according to the prespecified criteria (n=1752), the corresponding fracture incidences were higher (2.1%, 10.0% and 9.3%) In the DMAb group (n=1761) the fracture incidences were 1.1%, 3.5% and 8.3%, respectively, with DMAb significantly reducing the risk of hip (relative risk reduction [RRR] 48% (95%CI: 9%–71%), p=0.0208) and new vertebral fractures (RRR 65% (95%CI: 53%–74%), p<0.0001), but not nonvertebral fractures (RRR 12% (95%CI:-11%–30%), p=0.2901).

DMAb also significantly reduced fracture risk in the subgroups identified using post-hoc clinical criteria (Table).

Subgroup	Fracture Incidence Placebo	Fracture Incidence DMAb	Relative Risk Reduction DMAb (95% CI)	P-value
Hip fracture				
≥75 years	2.3% (n=1236)	0.9% (n=1235)	62% (22%, 82%)	0.0065
Baseline femoral neck T-score ≤–2.5	2.8% (n=1406)	1.4% (n=1384)	47% (8%, 70%)	0.0227
New vertebral subjects with ≥2 prevalent vertebral fractures, moderate or severe vertebral fracture, or both	16.6% (n=372)	7.5% (n=387)	55% (31%, 71%)	0.0002

n = number of subjects in subgroup

Conclusions: In the FREEDOM trial, the antifracture efficacy of DMAb in subgroups of women at a higher fracture risk is consistent with the risk reductions observed for the overall study population.

References: [1]Cummings et al, N Engl J Med 2009;361:756

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P881 - QUALITY OF LIFE IN PATIENTS WITH OSTEOPOROSIS – ASSESSMENT AND COMPLEX HEALTH CARE

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Aims: More than 50% of patients over 65 years, with a history of fracture, which addresses medical services for spine and limbs pain have a diagnosis of diffuse osteoporosis. The consequences of osteoporosis are significant, especially for daily activities and quality of life. The study has proposed to highlight the influence of clinical-functional status in quality of life for patients with diffuse osteoporosis and the importance of complex health care.

Methods: 76 patients with osteoporosis - bone T-scores<-2.5SD, completed questionnaires detailing lifestyle factors, co-morbidities and quality of life (SF-36) before (T1) and six month after a complex rehabilitation program (T2) associated with osteoporosis medication. Each patient was complex evaluated (clinical, functional and imaging): 100mm VAS pain, SF-36, EQ-5DSleep Assessment.

Results: The mean age was 61.2±6.6 years; the mean duration of pain was 5.31±1.53 years. The SF36 was significantly correlated with the level of pain ($p < 0.01$), especially for female patients. For all patients, the presence of pain had repercussions on sleep ($r=0.424$). After rehabilitation program was performed, the SF-36 and EQ-5D improved, with statistically significant differences between initial and final average.

Conclusions: The principal goals of health care for these patients

are to maintain independence and preserve good quality of life. The impact of clinical and functional status on quality of life for patients with osteoporosis is important, the results of study supporting the idea that the general health and functional status are strongly influenced by the duration of pain. Any patient with diffuse osteoporosis should have a complex health care.

Disclosure of Interest: None Declared

P882 - MEASURING PATIENT SATISFACTION WITH COMPLEX TREATMENT FOR KNEE OSTEOARTHRITIS

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Aims: The aim of the study was to assess the level of knee pain in patient with knee osteoarthritis and the measuring patient satisfaction with complex pain management. We also aimed to ascertain the association between socio-demographic and medical status of patients with knee OA and their quality of life.
Methods: 21 patients who fulfilled the ACR criteria for knee osteoarthritis were included in the study; the patients were observed over 3 month. Each patient was fully evaluated in two moments: T1 – initial, at inclusion in the study; T2 - after an average period of 3 months; during this period the patients followed a comprehensive healthcare program. The rehabilitation programme included: igieno-dietary and patient education, electrotherapy and thermotherapy, kinetic programme, massage. Also the most used medications was anti-inflammatory therapy. Parameters chosen as representative of the evaluation were:
Results: The mean age was 62.4±8.6 years; the mean duration of knee pain was 5.08±1.68 years and the mean duration of knee OA was 3.47±0.51 years. Almost half of the patients were overweight and majority, 17 patients, had at least one co-morbidity, the commonest being hip osteoarthritis. The physical health status showed lower score as compared to mental health component. The domain concerning physical health components showed positive correlation with age. We found a significant negative correlation between age and physical functioning (p=0.001). The better scores in SF36 (especially in the physical functioning domain) were observed in male responders (p=0.02). There was significant association between SF36 and education level (r=0.74). Patients with higher body mass index (BMI) and existence co-morbidities scored lower in both of the SF36 domains.
Conclusions: The patients with knee OA need a complex, medical and rehabilitation program to improving the level of pain and finally the quality of life

Disclosure of Interest: None Declared

P883 - POLYMERIC BIODEGRADABLE NANO-MATRIX-ASSOCIATED ORAL DELIVERY OF SMALL MOLECULE TO ENHANCE OSTEOGENIC EFFECT: A CASE OF KAEMPFEROL

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Aims: Dietary polyphenols have the potential to be developed as effective drugs for the treatment of osteoporosis. However, very poor oral bioavailability, due to extensive conjugative metabolism of these compounds in the intestine and liver, is a severe limiting factor. Kaempferol (K), having osteogenic effect similarly suffers from poor oral bioavailability. We sought to increase the oral bioavailability and tissue distribution of pure K (PK) by formulating it in the form of biodegradable nanomatrix (FK) to enhance its osteogenic effect.
Methods: Single oral dose (1.0 $mg.kg^{-1}$) of either PK or FK was given to adult female *Sprague Dawley* rats and concentration-time profile of K determined in plasma and bone marrow by HPLC. Aged *Sprague Dawley* rats with established osteopenia induced by ovariectomy 3 months prior to the start of various drug treatments were used. FK or PK (5.0 $mg.kg^{-1}.day^{-1}$ dose) was administered orally for 12 weeks. Sham operated + vehicle, OVx + vehicle and OVx + PTH (20.0 $mg.kg^{-1}$ twice a week s.c.) groups served as various controls. Bone mineral density (BMD) and bone histomorphometry (mCT and osteoid formation) were studied.
Results: Single oral dose of FK dramatically increased the plasma and bone marrow levels of K compared with PK. K levels in bone marrow of FK treated rats were sustained for up to 24 h compared to x h for PK treated rats, suggesting improved metabolic stability of K delivered via FK. OVx rats treated with FK for 12 weeks exhibited increased trabecular BMD, microarchitectural indices and osteoid formation (MAR and BFR) than OVx + vehicle group. OVx + PK group also exhibited significantly better skeletal outcomes based on those parameters than OVx + vehicle group. However, OVx + FK group showed significantly better response than OVx + PK group, suggesting that improved metabolic stability of K in FK contributed to its improved skeletal effects. Comparison of various bone parameters between OVx + FK and OVx + PTH groups revealed that overall PTH treatment was more effective than FK. Despite increased bioavailability of K delivered via FK, uterine estrogenicity was not observed in uterotrophic assay.
Conclusions: We provide proof-of concept that nanomatrix-associated oral delivery of small molecule such as K enhance its bioavailability and bioactivity in bone. This technology can potentially be applied for other anti-osteoporosis drug candidates with poor oral bioavailability.
Acknowledgement: Ministry of Health and Welfare Government of India.

Disclosure of Interest: None Declared

P884 - CAUSE OF DISCONTINUATION IN PTH (1-34) TREATMENT

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Aims: Objective of this study is to evaluate the causes of discontinuation in treatment with Teriparatide.
Methods: Patients with osteoporosis and at least two fragility vertebral fractures were enrolled in an educational and follow-up program between July 2008 and January 2010 en 15 centres of Lazio region by different specialist physician (geriatrician, endocrinology, orthopaedics, rheumatology). All patients received 15 phone calls by sanitary operator which interviewed their about ability to auto-inject the drug, adverse events and causes of discontinuation.
Results: The patients enrolled in program were 261. The mean value for observation was 11 months. After 18 month patients in treatment were 200 (76.7%). The patients who never started therapy were 10 (3.8%); patients who stopped therapy were 51 (19.5%). Among the 51 patients 10 stopped assuming therapy during first month (19.6%), 24 among 2 and 6 months (47%),12 during 7-11 months (23.5%,), 5 during 12-18 months(9.8%). We observed a higher rate of discontinuation in the first 3 months. The most common cause of discontinuation was in non-serious adverse event such as erithema diarrhoea, nausea muscle cramps (28 patients, equal to 55%). 23 patients stopped for other reasons (45%).Moreover, 9 patients stopped for personal decision (37.5%), 5 patients for physician decision (25%), 9 patients for causes nor correlated with the treatment (25%).The most common cause of not starting therapy was the lack of family support, and /or physician. The discontinuation treatment was caused by family physician, specialist physician and by patient respectively in 35(68.6) 12 (23.5%)and 5 (9.8%)cases.
Conclusions: An educational and follow up program may help to increase persistence therapeutical rate because is a valid support to know and to resolve difficulties quickly. These data suggest to use particular attention in the first 3 months in order to avoid causes of discontinuation.

Disclosure of Interest: None Declared

P885 - PREVENTION OF OSTEOPOROSIS FRACTURES AND THE EFFECTS OF HORIZONTAL THERAPY COMBINED WITH PHYSICAL THERAPY ON THE QUALITY OF LIFE IN PATIENTS WITH REDUCED BONE DENSITY

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Aims: To quantify the positive effects of Horizontal therapy (HT) in combination with physical therapy on the quality of life as well as the prevention of osteoporotic (OP) fractures in individuals with low bone density (T-score<1.7 SD and lower).

Methods: This study was conducted on 400 individuals with decreased bone density (measured with a DTX 4000 bone densitometer at the distal forearm) between November 2005 and January 2010. Individuals were assigned into two groups of 200 patients each. In the Therapy group HT (without any pharmaceutical drugs) was administered (through Hako-MED ProElecDT2000 systems) for at least 2 therapy cycles of 30 treatments each during a one-year period along with a corresponding exercise program. Individuals in the Control group received neither physical therapy nor any pharmaceutical drugs. Individuals in this group did not use therapy due to paramedical reasons. A risk factors Questionnaire for OP was completed for each individual. All subjects were continuously monitored over the next 3 to 5 years using the quality of life and the new fractures questionnaires. The results were statistically analyzed.
Results:

INCIDENCES OF OP FRACTURES	CONTROL GROUP (200 subjects)±	HT - GROUP (200 subjects)±
OP prior to treatment	18% (36 subjects)	17.5± (35 subjects)
OP after treatment	4% (8 subjects)	1.5% (3 subjects)
Height reduction >4 cm – stooping stature	3% (6 subjects)	0.5± (1 subject)
QUALITY OF LIFE QUESTIONNAIRE		
Low back pain – without change	41%	38±
Low back pain - decrease	11±	47±
Low back pain - aggravation	48±	15%
OP diet	61%	73%
Physical activity	51±	67±
OP exercises	17±	60±
Sunbath	56±	71±

At the conclusion of the observation period the low incidences of new OP fractures in the observed groups is highly statistically significant for the physical treatment with HT ($p<0.001$). The positive effects of HT on low back pain, quality of life and the change in lifestyle are also noticeable.

Conclusions: Individuals who did not have physical treatment with HT and exercises are at greater risk for new OP fractures and may experience a decreased quality of life. In addition, HT demonstrated positive effects on the reduction of low back pain. Our data implies that changes in lifestyle, regular physical activity and HT treatments are important and effective tools for the treatment of osteoporosis. Patient education and enhanced physician-patient contact are also important.

Disclosure of Interest: None Declared

P886 - IN VITRO AND IN VIVO EVALUATIONS OF AN INNOVATIVE BISPHOSPHONATE-COMBINED CALCIUM PHOSPHATE SYSTEM

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Aims: An injectable bisphosphonate-combined calcium phosphate matrix has been developed in order to reinforce locally osteoporotic bone by increasing bone mineral density and improving bone micro architecture.
Methods: *In vitro* evaluation of calcium deficient apatite (CDA) loaded with bisphosphonate (BP) was performed using primary rabbit osteoclasts (resorption activity) as well as calvaria-derived and MC3T3-E1 osteoblasts (ALP activity and cell viability). For the *in vivo* evaluation, this combined CDA was mixed with a sterile cellulosic-derived hydrogel that made it injectable. Eight ewes were ovariectomized in order to induce osteoporosis. Biomaterial were implanted for 12 weeks in proximal femur of osteoporotic ewes. 3D-μCT analysis was conducted on all implanted and control femurs. Bone volume density (BV/TV), trabecular thickness (TbTh), space between trabeculae (TbSp) and number of trabeculae (TbN) were measured.
Results: Extractive solution of BP-loaded CDA exhibited dose-dependent effect on the reduction of osteoclastic resorption[1]. Furthermore, BP-loaded CDA did not affect osteoblastic viability and ALP activity[1]. Osteoporosis induction is confirmed by a 40% decrease of BV/TV (iliac crest). After 12 weeks of implantation most of BP-loaded CDA particles have been resorbed and significant modifications of the bone density and micro architecture are observed in all the treated proximal femurs. Comparing treated versus control femurs, 3D-μCT measurements show significant increases ($p<0.05$) for BV/TV (+32,3%), TbTh (+15,8%) and TbN (+16,8%) and a significant decrease for TbSp (-12,8%). These modifications were confirmed by histological and SEM observations which revealed CaP granules resorption and new bone trabeculae formation.
Conclusions: A local combined effect of calcium phosphate particles and BP is evidenced on ewes osteoporotic proximal femurs. Those preliminary results can be considered as a first step for a local approach that aims in delaying or even preventing osteoporotic fractures. In fact, we could expect to reinforce specific bone sites like proximal femurs, vertebral bodies or wrists by implanting calcium phosphate materials that can promote bone ingrowth and release controlled quantities of BP.
References: Faucheux C et al, J Biomed Mater Res A 2008:46.

Disclosure of Interest: None Declared

P887 - EFFECTS OF PERIODIZED EXERCISE TRAINING ON BONE AND CHD RISK FACTORS

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Aims: To determine the effect of periodic exercise training on Bone Mineral Density (BMD) and 10-y Coronary-Heart-Disease (CHD) risk in early postmenopausal females.
Methods: 85 early postmenopausal females (1-3 years post) were randomly assigned to an exercise (EG: n=43), and a wellness-control group (CG: n=42). The exercise group performed a periodic exercise program with 4-5 weeks of high intensity resistance/high impact exercise dedicated to bone, intermitted by blocks of 10 weeks of endurance exercise that focus on CHD parameters. Primary endpoints were BMD at the Lumbar Spine and Proximal Femur and Framingham-based 10-y CHD-risk as proposed by Wilson.
Results: BMD at the Lumbar Spine maintained in the exercise group (EG: -0.1±2.2%) and significantly decreased (p=.000) in the CG (-2.0±2.0%). Between group differences were significant for this parameter (p=.001; Effect Site (Cohens d`): 1.00). By contrast, no significant differences (p=.26; ES: .39) were determined between both groups for Femoral Neck BMD (EG: 0.5±3.0%, n.s. vs. CG: -0.6±2.7%, n.s.). Although 10-y CHD-risk significantly increased in the CG (16.5±27.8%, p=.007) and slightly decrease in the EG (-2.7±21.9%, n.s.) differences did not reach significance (p=.057; ES: .77).
Conclusions: Our periodic exercise program dedicated to bone and CHD-risk factors, favorably affected BMD at the Lumbar spine and to a borderline significant extend, 10-y CHD-risk in women 1-3 years postmenopausal. These results confirmed our strategy to implement only short blocks of high impact/high intensity exercise and use the "bone desensitization" period to perform exercise contents with lower intensity but higher volume typically suggested to affect the cardiovascular system.
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Disclosure of Interest: None Declared

P888 - EFFECTS OF WHOLE BODY VIBRATION ON VERTICAL VERSUS ROTATIONAL DEVICES ON OSTEOPOROTIC RISK FACTORS – PRELIMINARY RESULTS OF THE ELVIS II STUDY

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Aims: Whole Body Vibration (WBV) training is a new promising approach to counteract osteoporosis in the elderly population. However, the knowledge about the critical variables of vibration protocols to most effectively reduce the risk for osteoporosis is

still scarce. In the ELVIS II (Erlangen Longitudinal Vibration Study II) trail we determined the effect of vertical versus rotational WBV devices using different vibration protocols on bone mineral density (BMD) and neuromuscular performance.
Methods: 108 postmenopausal women (65.8±3.5 y) were randomly assigned to: (1) vibration training on rotational plates producing side alternating acceleration: 12.5 Hz, 12mm, 8g, 3 sessions/week, a´ 15 min (RVT); (2) vertically vibrating plates producing simultaneously acceleration on both sides: 35 Hz, 1.7mm, 8g, s.a. (VVT) (3) wellness control group (CG): two blocks of 10 sessions low intensity gymnastics and relaxation training. BMD was measured at the hip and lumbar spine at baseline and follow-up using the DXA method. Maximum strength was measured for leg extension.
Results: After one year an increase in BMD at the lumbar spine was observed in both vibration training (VT) groups (VVT: +0.5±2.0%; RVT: +0.7±2.2%) which was significant compared to CG value (-0.4±2.0%) for RVT only (p=0.026). Between VVT and CG the difference was borderline non-significant (p=0.08). However, in VVT a significant weight loss was determined. Using weight changes as covariable in a post hoc analysis, BMD changes in VVT also reached level of significance. There was a non-significant gain in the neck region in both VT groups (VVT: +1.1±3.4%; RVT +0.3±2.7%) whereas BMD stayed stable in CG (-0.0±2.1%). Both WBV training groups significantly gained in maximum strength (VVT: +24±34%; RVT: +27±22% compared to CG (+6±20%; p=0.000).
Conclusions: WBV was effective to reduce fracture risk by increasing BMD at lumbar spine and maximum muscular strength, whereas there was no significant differences between the two devices or protocols. WBV might be an alternative to strenuous conventional exercise to reduce fracture risk. However further studies should be conducted to identify most effective programs in humans.
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Disclosure of Interest: None Declared

P889 - BETTER PREDICTION AND PREVENTION OF FRAGILITY FRACTURES OF THE HIP: A BIOMECHANICAL ANALYSIS

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Aims: The objective of this project was to apply finite element analysis to determine the influence of bone quality, cortical thickness, and a novel implantable device on femoral neck fracture risk in a simulated fall to the side.
Methods: A parametric axisymmetric finite element analysis was used to simulate the compressive buckling fracture of the superolateral cortex of the femoral neck that often occurs in a fall to the side (1-3). Twenty-eight models were run with four cortical thicknesses (0, 0.5, 1.5 and 2 mm), two cancellous bone densities, two cancellous bone distributions, and the presence or absence of the device. A simulated load of 3200 N was applied and the maximum von Mises stress in the femoral neck was determined for each model. The stress levels were compared to the yield strength of the bone tissues (5, 10, and 150 MPa for low density cancellous, high density cancellous, and cortical bone, respectively) in order to determine a fracture risk for each case.
Results: There were "failures" when there was zero cortical thickness combined with low density cancellous bone and also when there was a thin (0.5 mm) cortex and no cancellous bone in the neck region. Both of these conditions were protected from failure by the device. With 1.5 mm or greater cortex thickness, the risk of fracture was always less than 33%.

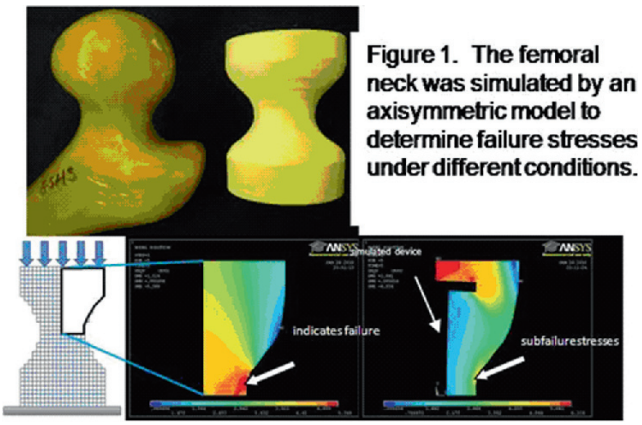

Figure 1. The femoral neck was simulated by an axisymmetric model to determine failure stresses under different conditions.

Conclusions: Cortical wall thickness and cancellous bone distribution are much better predictors of femoral neck fracture risk than cancellous bone density in computational simulation of fragility hip fractures. A simple metallic implant device can decrease the risk of such fractures, particularly in the poorest quality bone.
References: 1) Mansek et al. Orthopaedic Research Society 2008; 2) Turner CH, Lancet 2005; 3) Wakao N et al, Med Eng & Phys 2009.
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P890 - THE BURDEN OF NON-ADHERENCE WITH ORAL BISPHOSPHONATES AND THE POTENTIAL COST-EFFECTIVENESS OF ADHERENCE-ENHANCING INTERVENTIONS

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Aims: The objectives of this study were to estimate the clinical and economic burden of non-adherence with oral bisphospho-

nates and to evaluate the potential cost-effectiveness of adherence-enhancing interventions.
Methods: A validated Markov microsimulation model [1] was used to compare costs and outcomes (i.e. the number of fractures and the quality-adjusted life-year (QALY)) obtained at real-world adherence levels with those expected with full adherence. The real-world adherence scenario employed adherence data from a published Belgian observational study [2] and adherence was divided into persistence and compliance. Simulated patients matched the Belgian populations where osteoporosis medications are reimbursed. The incremental cost per QALY gained was estimated comparing the adherence scenarios and no treatment. We also examined the cost-effectiveness of adherence-enhancing interventions according to their cost and effect on adherence.
Results: The number of fractures prevented and the QALY gain obtained at real-world adherence levels represented only 38.2% and 40.7% of those expected with full adherence, respectively. Sensitivity analyses showed that non-adherence was primarily driven by the issues of persistence. The cost per QALY gained of real-world adherence compared with no treatment was estimated at €10,279, and full adherence was found to be cost-saving (i.e. lower cost for greater effectiveness) compared with real-world adherence. An intervention that would improve adherence by 25% would be associated with an incremental cost-effectiveness ratio of €/QALY 12,653 and €/QALY 29,073 if they cost an additional €50 and €100 per year, respectively. For potential interventions associated with a 50% increase in adherence rates, their cost-effectiveness were estimated at €/QALY 16,768 and €/QALY 37,142 for additional annual costs of €100 and €200.
Conclusions: This study suggests that more than half of the potential benefits from oral bisphosphonates in patients with osteoporosis are lost due to poor compliance and failure to persist. Strategies to improve adherence are therefore urgently needed and, depending on their cost, have the potential to be an attractive use of resources.
References: [1] Hiligsmann et al, Value Health 2009:12:687. [2] Rabenda et al, Osteoporosis Int 2008:19:811.

Disclosure of Interest: None Declared

P891 - ALENDRONATE USE PREVENTS NEW VERTEBRAL COMPRESSION FRACTURES IN OSTEOPOROTIC PATIENTS AFTER PERCUTANEOUS VERTEBRAL AUGMENTATION

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Aims: To assess the effects of alendronate on the prognosis of vertebral compression fractures (VCFs) in patients with osteoporosis after the percutaneous vertebral augmentation procedure.
Methods: 80 patients (65 females and 15 males) with osteoporotic vertebral fracture were successively recruited before given a percutaneous vertebral augmentation procedure. These subjects were interviewed from 3 months after the procedure with an interval of 6 months, and followed up for on average 2.5 years. The incidence of new VCFs and new adjacent VCFs were assessed in 58 patients who kept taking alendronate (alendronate group) during follow-up and in 22 patients who did not (non-alendronate group), respectively. The degree of focal back pain was assessed using a Visual Analogue Scale. The degree of mobility was assessed using a Locomotor Activity Scale and use of analgesics by Taking Analgesic Scale.
Results: 11 patients with 18 fractures were treated by kyphoplasty and 69 patients with 164 fractures by vertebroplasty. During the follow-up, 16 of these patients had 39 new fractures. 8 patients in the alendronate group sustained 15 new VCFs (of which 5 patients sustained 8 new adjacent VCFs), whereas 8 patients in the non-alendronate group had 24 new VCFs (of which 6 patients had 8 new adjacent VCFs). This indicated that the patients who kept taking alendronate after the procedure had significantly lower risk of new VCFs (RR 0.38, 95%CI 0.16 to 0.89) and new adjacent VCFs (RR 0.32, 95%CI 0.11 to 0.93). Logistic regression models, including age, gender, type of procedure, number of fractures before the procedure, number of treated vertebrae, and the use of alendronate as the prediction factors, showed that the use of alendronate was the only significant predictor for both new VCFs and new adjacent VCFs. Patients in non-alendronate group had 5.806 and 3.975 times higher risk for new VCFs and new adjacent VCFs, respectively, compared to those in alendronate group. Locomotor activity was significantly improved and score of pain and analgesics use reduced after kyphoplasty or vertebroplasty. However, the use of alendronate during follow-up had no additional beneficial effects on these parameters.
Conclusions: The use of alendronate after the percutaneous vertebral augmentation procedure reduces the risk for new VCFs and new adjacent VCFs, but had no additional beneficial effects on pain relief, mobility improvement and analgesics use reduction.(Chinese Clinical Trial Register number: ChiCTR-TCH-00000478)

Disclosure of Interest: None Declared

P892 - MIKKELI OSTEOPOROSIS INDEX (MOI) IDENTIFIES IT´S LIKE FRAX®

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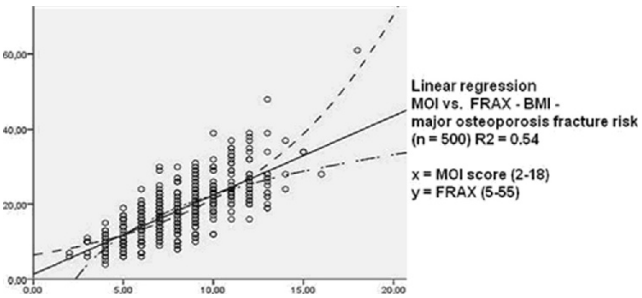
Aims: We compare a Finnish fx risk tool, Mikkeli Osteoporosis Index (MOI)(1), with FRAX®´s Intervention Thresholds (ITs). MOI is in nation-wide use in Finland since 2005 and identifies osteoporosis as well as ORAI (1).
Methods: MOI (derived from Fracture Index)(2) includes 7 risk factors: age 55-59/60-64/65-69/70-74/>74 (1/2/3/4/6 risk points), weight below 80/71/64/58 kg (1/2/3/4 p), previous adult fx, maternal hip/spine fx and smoking (2 p each), shortening by 3/5 cm (1/2p) and need of arms when rising from chair (2 p), max 20 p. For FRAX®-UK ITs we used 10-year hip fx risk: 1± (at age 50) - 7± (80y) and major osteoporosis fx risk: 7,5 (50y) - 30± (80y); Australian ITs were 2 (50y) - 10± (75 y) and 10 (50y) - 30± (75y)(3). MOI-UK ITs were: score 0-4: no treatment, 5-11: treat at T ≤ -1,5, MOI >11: treat without DXA; Australian ITs were: 0-5:no

treatment, 6-12: treat at T ≤-2 and >12: treat without DXA. We calculated with linear regression the correlation of MOI vs. BMI-based FRAX® hip and major osteoporosis fx risk, and, after BMD measurement, the diagnostic characteristics of ITs between MOI and FRAX® in a cohort of 500 PMP low energy fracture patients, age 45-79.

Results: Linear regression: MOI vs. FRAX®-BMI hip fx risk: R2= 0.46, F 261; MOI vs. FRAX®-BMI major osteoporosis fx risk: R2=0.54, F 596)(Fig). MOI identified ITs, based on FRAX®-BMD hip fx risk, well: ITs for UK: Sensitivity 91, Specificity 66, AUC 74, LR+ 2.7, LR- 0.14, and for Australia: Sens 86, Spec 84, AUC 90, LR+ 5.4, LR- 0.17. Based on FRAX®-BMD major osteoporosis fx risk, match was fair for UK: Sens 74, Spec 70, AUC 82, LR+2.5, LR- 0.37, and for Australia: Sens 55, Spec 83, AUC 76, LR+ 3.2, LR- 0.54.



Conclusions: MOI identifies, in PMP women after fx, ITs based on FRAX®-BMD-hip fx risk well, and ITs based on FRAX®-BMD-major osteoporosis fx risk well in patients with osteopenia below T-score of -1,5 or -2.

References: 1. Waris P et al, Osteoporos Int 2007;18S1:58 (P157); 2. Black DM et al, Osteoporos Int 2001;2:519; 3. Borgström F et al, Osteoporos Int 2006;17:1459

Disclosure of Interest: None Declared

P893 - POSTURAL 3D KYPHOSIS ASSESSMENT, BACK PAIN AND QCT IN OSTEOPOROTIC VERTEBRAL COMPRESSION FRACTURE CASES: PRELIMINARY STUDY

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Aims: The aim of the study was to develop and implement multifactorial approach to osteoporotic vertebral compressive fracture patients including sagittal curve postural evaluation of the spine utilizing non invasive 3D method, QCT BMD spinal assessment and treatment options implementation.

Methods: 3D postural assessment originally developed of spinal curvatures, semi quantitative radiographic evaluation and QCT BMD measurement were used in the study. The kyphosis angle based on back shape curve was measured on the 3D surface image utilizing dedicated software mimicking Debrunner kyphometer measurement. Radiographic assessment and measurements were performed on digital images using DICOM viewing analytic software (DICOM Vision, Alteris Ltd.). Radiographic assessment of VCF was based on semiquantitative visual assessment. Lumbar spine QCT Bone mineral density was measured. The polish translation of Oswestry Disability Index (ODI) version 2.1a. Summary and nonparametric statistical analysis was performed.

Results: The group of 22 elderly patients finally enrolled to the study consisted of patients whose data, images, and other examinations were analyzed. Average age of patients was 73,22 years. Average number of fractured vertebra was 3,6 in the study group. The most frequent anatomical location of fractures was lumbar first and third vertebral body. The most frequent fracture types were Biconcave Grade II (38,6%) and Wedge Grade II (36,9%). The most frequent 53-A1.2 and 53-A2.1 types of fractures. An average QCT bone density was lower than 80 mg/cm3 in whole examined group that represents severe osteoporosis. Bone density lower than 30 mg/cm3 was found in almost one third of the group that coincided with highest number of fractured vertebral bodies. Fresh VCF cases were augmented with vertebroplasty. Oswestry disability score was highest along with lowest values of QCT BMD, and significantly improved after vertebral augmentation.

Conclusions: Complexed approach shows the clinical flow of the individual patient from Metabolic Bone Diseases and Osteoporosis Unit through diagnostics and surgery. The developed 3D structural light method of postural evaluation helps to identify and monitor patients with kyphotic deformation due to OVCF. The frequency of vertebral bodies fractures coincides with low values of QCT BMD.

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P894 - TREATMENT OF OSTEOPOROTIC VERTEBRAL BODY FRACTURES BY MEANS OF PERCUTANEOUS BALLOON KYPHOPLASTY: LONG TERM RESULTS OF A PROSPECTIVE, CLINICAL TRIAL

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Aims: Balloon kyphoplasty is a minimally-invasive, percutaneous surgical technique for reduction and stabilization of osteoporotic vertebral body fractures. However, there is no prospective, clinical trial on long term results concerning the safety and efficacy of the method so far.
Methods: This prospective, clinical trial investigated both safety and efficacy of percutaneous Balloon kyphoplasty. All vertebrae were stabilized with Polymethylmethacrylate (PMMA). Pre- and postoperatively, the following data were acquired: subjective rating of pain (Visual Analog Scale, VAS), bisegmental endplate-angle (EA2), anterior and posterior height of vertebra. Inclusion criteria were osteoporotic fractures of vertebral bodies in the thoracolumbar spine, patient age ≥ 65 years, fracture age ≤ 4 months, and t-score ≤ -2.5 (DXA). Exclusion criteria were tumor lesions and additional posterior instrumentation.
Results: 352 vertebrae of 314 patients suffering from acute pain could be included with a minimum-follow up of two years. The average patient age was 74 years (65-92). Average t-score was -2.7. (-3.1 to -2.5). 262 patients suffered from pain for three weeks on average, whereas 52 patients were not able to recall the onset of pain. Fractures were only localized within the thoracolumbar spine with only A type of injuries occurring. 309 of 314 patients experienced marked pain-relief as expressed on the VAS (2.1±1.9 to 8.2±1.5; 0 "worst" to 10 "best"). Average correction of EA2 was 6.2°. The anterior vertebral height could be restored by 7.4 mm on average, posterior height by 3.0 mm. There were no neurological complications. In 32 (9.1%) vertebrae, we saw intraoperative leakage of cement (6 (1.7%) out of these with epidural leakage), however, no clinical consequences had to be noted. There were 6 (1.7%) cases of intraoperative balloon-perforation, and 11 (3.1%) cases of subsequent vertebral body fractures in the adjacent level.
Conclusions: Balloon-kyphoplasty is an efficient, and minimally-invasive therapeutic option for the treatment of painful vertebral body fractures having its focus on cases with underlying osteoporosis. Depending on the age and type of fracture, this treatment can obtain a significant rate of fracture reduction. Compared to current literature on vertebroplasty, this technique presents fewer leakage complications at equal success in reducing pain.

Disclosure of Interest: None Declared

P895 - SALVAGED EFFECT OF TERIPARATIDE ON IMPENDING FAILED FEMORAL NECK FACTURE SURGERY

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Aims: Teriparatide (1-34 PTH) is an anabolic agent for management of osteoporosis. Previous animal studies showed that daily subcutaneous administration of low-dose Teriparatide will increase fracture healing due to its bone formation effect. Similar results are also reported in human cases. We report our experience about an impending implant failure patient treated successfully with Teriparatide without surgery.
Methods: A 73y/o female undertook multiple pinning for her non-displaced femoral neck fracture. She discarded her walking aide after being discharged. Sudden groin soreness occurred to her 4 weeks after index surgery and the x-ray revealed displaced fracture with implant migration. Teriparatide was prescribed for her osteoporosis.
Results: The discomfort decreased gradually and complete resolved three months after treatment. No further implant migration and displacement occurred. Patient regained her full daily activity without any support at one year follow-up.
Conclusions: Implant migration with fracture displacement is a rare but troubled scenario after non-displacement femoral neck treated by percutaneous fixation and often requires salvaged surgery. Teriparatide may provide a supplement tool on non-operative treatment for patients who are not suitable for further surgery.

Disclosure of Interest: None Declared

P896 - CLINICAL EXPERIENCE OF 1-34PTH (TERIPARATIDE) ON SEVERE OSTEOPOROSIS PATIENTS IN TAIWAN

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Aims: Osteoporosis has become a serious public health issue in Asia countries. Hip fractures pose the most deliberated role among osteoporotic fractures. The hip fracture rate in Taiwan ranks highest among the world. In 2005, 1-34 PTH (Teriparatide) was approved and reimbursed by local authority (Bureau of National Health Insurance, Taiwan) for the treatment of severe osteoporosis. Clinical trial and subsequent analysis on the use of Teriparatide have shown effective in preventing fractures and was well tolerated in osteoporotic men and postmenopausal women
Methods: We collected 95 patients F/M=77/18 with hip or multilevel vertebral fractures to undertake 20μg Teriparatide daily subcutaneous injection. We obtained DXA at base line and at the end of 12 months and performed blood chemistry examinations.
Results: During the period, no major osteoporotic fracture occurred in the treatment group. The pain scale evaluation (VAS) showed significant improvement after the first month and maintained through the therapy. The DXA data showed significant

increment in spine and hip; however, the difference was not so much as previous reports. The increment of bone marker showed gender difference in our study. The most often side effect was dizziness after injection followed by leg cramp. The most often drop-out reason was inconvenient injection and difficulty for refilling prescriptions. Most drop-off occurred between 3-6 months.
Conclusions: Compared to previous report, Teriparatide shows similar bone protection effect in our patients; however, the BMD increase is not so much. The drop-out rate is higher than other studies, which might be due to insufficient communication and education about patients and their care-providers. The drop-out rate has improved after call-center being settled in Taiwan.

Disclosure of Interest: None Declared

P897 - ZOLEDRONIC ACID IN THE TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS

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Aims: to study efficacy and safety of Zoledronic acid in the treatment of postmenopausal osteoporosis
Methods: Clinical, DXA of lumbar spine and femoral neck at baseline and after 12 months; biochemical: creatinine, calcium, alkaline phosphatase at baseline and at 9-10 days after infusion, immunoenzyme assay of bone turnover markers (BTM) – osteocalcin (OK) as formation marker and β-C-terminal telopeptides of type 1 collagen (b-crosslaps) as resorption marker at baseline and 1, 3, 6, 9, 12 months after infusion, questionnaire for quality of life, for back pain at baseline, 6 and 12 months after infusion.
Results: We studied 70 patients with postmenopausal osteoporosis using T-score DXA. Mean value (T-score) in L1-L4 was -2,9 $\pm$ 0,13, in femoral neck right=-1,4 $\pm$ 0,14, in femoral neck left=-1,6 $\pm$ 0,15 . Mean age was 59,2 $\pm$ 6,8 years, mean menopause duration – 14 years (2 to 37). BMI= 26,2 $\pm$ 2,4 kg/m^2. 41(59%) of patients had previous fractures: peripheral – 19(46%), distal radius-12(29%), vertebrae -8(19.5%) and femoral neck- 2(5%). The patients were treated with Zoledronic acid 5 mg, which was administered as a once-yearly infusion and 1200mg of calcium carbonate + 800ME vit.D3 daily. In all the patients the assessed mean values of BTM were in postmenopausal reference ranges at baseline.
Reduction in BTM was significant after first month of therapy. Mean decrease after 1 month of therapy was 77% for β-crosslaps, 27% for OK, and after 3 months - 75% for β-crosslaps and 43.1% for OK. After 12 months of therapy the mean levels of BTM increased, but remained in premenopausal range. After 12 months of therapy bone mineral density (BMD) was increased to 5% in L_1-L_4 ($p<0,05$). The dynamics of BMD in femoral neck was insignificant (3 and 2,6%). We revealed significant reduction in back pain and improvement in quality of life ($p<0,05$) after 12 months of therapy. There were 2 new fractures during 12 months of therapy.
Conclusions: A single infusion of Zoledronic acid is able to produce an excellent biochemical response at first months with significant suppression in the markers of bone turnover and keeping this response at 12 months. Zoledronic acid increased BMD in the lumbar spine and in femoral neck in patients with postmenopausal osteoporosis. Therapy with Zoledronic acid improved quality of life and reduced back pain in postmenopausal women with osteoporosis. The study allowed to consider that 12 months therapy with ZA was safe and well tolerated.

Disclosure of Interest: None Declared

P898 - TREATMENT OF POSTMENOPAUSAL OSTEOPOROSIS WITH STRONTIUM RANELATE

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Aims: to study the efficacy and compliance of strontium ranelate in the treatment of postmenopausal osteoporosis
Methods: Clinical, DXA of lumbar spine and femoral neck at baseline and after 12, 24 and 36 months; immunoenzyme assay of bone turnover markers (BTM) – osteocalcin (OK) as formation marker and β-C-terminal telopeptides of type 1 collagen (b-crosslaps) as resorption marker at baseline and 3, 6, 12, 24 and 36 months; questionnaire for quality of life, for back pain at baseline, 6 and 12, 24, 36months of therapy
Results: We studied 52 patients with postmenopausal osteoporosis using T-score DXA. Mean value BMD (T-score) in L1-L4 was -2,8 $\pm$ 0,11, in femoral neck right=-1,4 $\pm$ 0,12, in femoral neck left=-1,6 $\pm$ 0,14 . The mean age was 62,4 $\pm$ 9,4 years, mean menopause duration – 17 years (3 to 34). BMI= 26, 8 $\pm$ 2,5 kg/m^2. 22 (42,3%) of subjects had previous fragile fractures. The patients were treated with strontium ranelate (SR) 2gr and 600-1200mg of calcium carbonate +600-800ME vit.D3 daily. At baseline the assessed mean values of bone turnover fractures were in postmenopausal reference ranges in all the patients. After 36 months of therapy bone mineral density (BMD) was increased to 11,2% in the lumbar spine L_1-L_4 ($p<0,05$), in the femoral neck to 7,9 and 6,8% ($p<0,05$) . We revealed significant reduction in back pain and improvement in quality of life ($p<0,05$) after 6 months of therapy with strontium ranelate. Changes in bone turnover markers were insignificant during 36 months of therapy. The compliance to therapy was 73%.
Conclusions: Therapy with SR significantly increased BMD in the lumbar spine and in femoral neck in patients with postmenopausal osteoporosis, improved quality of life and reduced back pain in postmenopausal women with osteoporosis. The study allowed to consider that 36 months treatment with strontium ranelate was safe and well tolerated.

Disclosure of Interest: None Declared

P899 - OPEN-LABEL STUDY TO EVALUATE THE ADHERENCE, PREFERENCE, AND SATISFACTION OF DENOSUMAB AND ALENDRONATE IN POSTMENOPAUSAL WOMEN

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[1]Oregon Osteoporosis Center, Portland, [4]Internal Medicine Associates, Fargo, [5]OB-GYN Associates of Mid Florida, Leesburg, [6]Amgen Inc., Thousand Oaks, United States, [2]University of Birmingham, Birmingham, United Kingdom, [3]University of British Columbia, Vancouver, Canada

Aims: This study assessed treatment adherence between patients who received a subcutaneous injection of denosumab (60 mg) once every 6 months (Q6M) or branded oral alendronate (70 mg) once weekly (QW).

Methods: DAPS (**D**enosumab **A**dherence **P**reference **S**atisfaction) is an ongoing 2-year, multicenter, open-label, crossover study in postmenopausal women with a BMD T-score from ≤-2.0 to ≥-4.0 at the spine, hip, or femoral neck and no prior bisphosphonate use. Patients were randomized (1:1) to denosumab Q6M or alendronate QW for the first 12 months (treatment period 1 [TP1]), then were switched to the opposite treatment for the second 12 months (TP2). The primary endpoint was treatment adherence at month 12. Patients were considered adherent to denosumab treatment if they received a denosumab injection on day 1 and month 6, each injection was 6 months (±4 weeks) apart, and completed TP1. Adherence to alendronate was defined as taking ≥80% of the weekly tablets (assessed by electronic monitoring), taking ≥2 tablets in the last month, and returning for the 12-month visit at the end of TP1. Adherence was compared between treatment groups, adjusting for investigation site and prior osteoporotic fracture, using a Cochran-Mantel-Haenszel test.

Results: Overall, 250 women enrolled. During TP1, 126 women received denosumab and 124 received alendronate; 89.7% of denosumab and 85.5% alendronate patients completed TP1. Significantly more patients who received denosumab than alendronate during TP1 were treatment adherent (87.3% vs. 76.6%; p=0.043), with a relative risk of non-adherence (denosumab vs. alendronate) being 58% (95% CI 34% to 99%).

Conclusions: After 12 months in a clinical trial, significantly more patients adhered to denosumab than alendronate treatment. Greater adherence with osteoporosis therapy may translate to increased treatment efficacy.

Disclosure of Interest: M. McClung Grant / Research Support from: Amgen, Eli Lilly, Merck, Procter&Gamble, Takeda, Consultant / Speaker's bureau / Advisory activities with: Amgen, Eli Lilly, Merck, Novartis, Procter&Gamble, Sanofi-Aventis, N. Freemantle Consultant / Speaker's bureau / Advisory activities with: Amgen, D. Kendler Grant / Research Support from: Amgen, Merck, Eli Lilly, Novartis, Procter&Gamble, GlaxoSmithKline, Pfizer, Roche, Biosante, Wyeth, Consultant / Speaker's bureau / Advisory activities with: Amgen, Merck, Eli Lilly, Novartis, Wyeth, Nycomed, Procter&Gamble, Pfizer, M. Lillestol Grant / Research Support from: Amgen, A. Moffett Grant / Research Support from: Amgen, S. Satram-Hoang Consultant / Speaker's bureau / Advisory activities with: Amgen, Y. Yang Employee of: Amgen, Stock ownership or royalties of: Amgen, P. Kaur Employee of: Amgen, Stock ownership or royalties of: Amgen, D. Macarios Employee of: Amgen, Stock ownership or royalties of: Amgen, S. Siddhanti Employee of: Amgen, Stock ownership or royalties of: Amgen

P900 - COST-EFFECTIVENESS OF A FIXED DOSE COMBINATION OF ALENDRONATE 70 MG AND CHOLECALCIFEROL 5600 IU WEEKLY VERSUS IBANDRONATE IV INJECTION IN THE TREATMENT OF ESTABLISHED OSTEOPOROSIS IN AUSTRIA

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Aims: To evaluate the cost-effectiveness of a fixed dose combination of alendronate 70 mg and cholecalciferol 5600 IU (alendronate/vitamin D3; Fosavance) versus ibandronate IV injection in the treatment of postmenopausal women with a history of osteoporosis related fractures taking into account suboptimal dietary vitamin D intake.

Methods: A semi Markov state-transition model was developed. One-year cycles included health states related to hip, vertebral, wrist and proximal humerus fractures, as well as death due to hip fractures and other causes. Effect of treatment was extracted from alendronate and ibandronate clinical trials. The impact of sub optimal dietary vitamin D intake, direct costs from the payer perspective and utilities were derived from other literature. Analyses were performed for women with a history of vertebral fractures aged 50, 60, 70 and 80 years. Probabilistic sensitivity analyses were undertaken to estimate the uncertainty of outcomes.

Results: Preliminary results showed that alendronate/vitamin D3 was cost and quality adjusted life year (QALY) saving relative to ibandronate IV injections for women 50-80 years of age. For hundred 50-year old women treated with alendronate/vitamin D3 instead of ibandronate IV injections 3.30 (95%CI -1.47; 16.92) QALYs were saved. This increased to 11.77 (-1.02; 60.48) QALYs for one hundred 80-year old women. Total direct costs saved with alendronate/vitamin D3 ranged from -127 Euros (-1,979; 354) for a 50-year old woman to -4,709 Euros (-26,180; 1,067) for an 80-year old woman. Given the uncertainty in the source data, there is an 84% probability that alendronate/vitamin D3 is cost-effective relative to ibandronate IV at a willingness-to-pay ratio (WTP) of 20,000 Euros per QALY saved. This is increased to 92% for a WTP of 50,000 Euros.

Conclusions: From the payer perspective, this economic modeling study showed that alendronate/vitamin D3 is expected to be economically dominant over ibandronate IV injections for women with a history of vertebral fractures aged 50 and over in Austria.

Disclosure of Interest: J. Jansen: None Declared, S. Ghosh: None Declared, T. Fan Employee of: Merck & Co., Inc.

P901 - MANAGEMENT OF KNEE OSTEOARTHRITIS WITH THE NATURAL ROSE-HIP

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Aims: Osteoarthritis appears to be one of the most expensive and incapacitating diseases in the world, patients experiencing severe pain. The aim of the study was to determine the effect of the natural Rose-Hip on knee osteoarthritis.
Methods: A group of 58 patients, 15 men and 43 women, aged 47-78 years with established knee osteoarthritis were studied. Radiographic examination was performed and the pain VAS (Visual Analog Scale) scale, the WOMAC (Western Ontario and McMaster Universities) pain questionnaire and the WOMAC stiffness questionnaire were used to assess pain intensity and functional level in all patients before and 6 months after the administration of the natural Rose-Hip. The dose of NSAIDs before and after the administration of the natural Rose-Hip was recorded. The natural Rose-Hip was administered to all patients at a dose of 2250 mg three times daily for a month, and thereafter 1500 mg twice daily for 5 months.
Results: In 45 of 58 patients (77.6%) a reduction in pain as assessed by the pain WOMAC questionnaire was observed. In 42 of 58 patients (72.4%) an improvement in the functional level as assessed by the WOMAC stiffness questionnaire was observed. Significant improvement in the VAS scale was also found.
Conclusions: The natural Rose-Hip may be used for the management of knee osteoarthritis, being thus a useful alternative solution, especially for patients who may be susceptible to the adverse effects of NSAIDs.

Disclosure of Interest: None Declared

P902 - EFFICACY EVALUATION OF A HIGHLY PURIFIED INTRA-ARTICULAR HYALURONIC ACID OBTAINED BY BACTERIAL FERMENTATION VS HYLAN G-F20 IN THE TREATMENT OF SYMPTOMATIC KNEE OSTEOARTHRITIS: A DOUBLE-BLIND, CONTROLLED, RANDOMIZED, PARALLEL-GROUP NON-INFERIORITY STUDY

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Aims: The objective of this study was to demonstrate the non-inferiority of a highly purified intra-articular hyaluronic acid (ia HA) in the symptomatic treatment of knee OA in comparison to hylan G-F20.
Methods: This is a prospective, multicenter, randomized, double blind (patient and observer blinded), controlled, phase III clinical trial of two parallel groups, one receiving the test drug, a highly purified ia HA of 800-1200 kDa obtained by bacterial fermentation, and the other the comparative drug hylan G-F20. The primary outcome variable was the improvement in mean WOMAC index pain subscore (measured on a 0-100 mm VAS scale) from baseline to the final visit (week 26), compared between the two treatment groups. Included patient were aged between 40 and 80 years, suffered from primary knee OA, for at least 3 months, following the ACR criteria, had a KL radiological grade 2-3, a mean WOMAC pain subscore ≥ 40mm and < 80 mm on VAS and failed to respond sufficiently (not responders) to analgesics and/or NSAIDs taken regularly or responders intolerant to the regular use of analgesic and/or NSAIDs. The duration of the treatment was 2 weeks (3 injections at one-week interval), followed by an observation period of 6 months. Control visits were carried out at 1, 3 and 6 months. Both patient and the observer (evaluator) were blinded with respect to the treatment administrated (double-blind), as the evaluator and the injector were different. The acceptable margin for non-inferiority was chosen to be 8 mm. This non-inferiority margin is less than the minimum clinically perceptible difference (10mm) and much lower than the clinically important improvement (10 to 20 mm).
Results: 381 patients were randomized. The *per protocol* analysis included 354 patients. There was no significant difference between the two treatment groups concerning the baseline characteristics. The mean improvement in the ia HA group on the WOMAC pain subscore was 33.5 ± 24.6, and 34.5 ± 21.3 in the hylan GF-20 (mean difference = -1; IC interval -5.8 to 3.8). As the 95% CI is above the acceptable margin for non-inferiority chosen, that is the value of -8 mm, the non-inferiority of the ia HA versus hylan GF-20 is accepted for the primary endpoint. Besides, as the 95% CI is within the margins of ±8 mm, the equivalence between the ia HA and hylan GF-20 is also demonstrated.
Conclusions: This formulation of highly purified HA has been an effective treatment of pain and function in painful knee OA.

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