



Medical and Psychosocial Considerations in Older Adults

4

Joanna Preston and Iain Wilkinson

Learning Objectives

- Describe frailty and the impact on resilience to illness in older people.
- Recognise the chronic diseases that are more common in older people.
- Be aware of how medical comorbidities impact oral health and dental care.

Introduction

The demographics of the ageing population is changing, and healthcare will need to adjust accordingly. Older people will access more NHS and private health care services compared to younger age groups. The reasons behind this are multifaceted but are linked to the normal ageing process and the risk of developing chronic illnesses over time. Frailty is a related concept, which is discussed in this chapter. The presence of frailty and the related (but separate) concept of multimorbidity also affects a person's response to the additional strain of acute illnesses.

The medical management of older patients has a specific evidence base, particularly through the processes that form the Comprehensive Geriatric Assessment (CGA). The CGA is defined as a “multidimensional interdisciplinary diagnostic process focused on determining a frail older person's medical, psychological and functional capability to develop a coordinated and integrated plan for treatment and long-term follow up” [1]. This process addresses the problems that accumulate

J. Preston

St. George's University Hospitals NHS Foundation Trust, London, UK

e-mail: Joanna.Preston@stgeorges.nhs.uk

I. Wilkinson (✉)

Surrey and Sussex Healthcare NHS Trust, Surrey, UK

e-mail: iainwilkinson1@nhs.net

when people have multiple medical conditions. The medical treatments and the conditions themselves often overlap and interweave, adding to the complexity of care. In this chapter, the key aspects of the medical management of older people are summarised and a range of common conditions and their effects on older people are discussed with their relevance to dental care.

Frailty

Frailty is a distinct entity to normal ageing. It is important to distinguish frailty from single organ conditions (such as a stroke) associated with advancing age. Frailty is also distinct from multimorbidity, but these can co-exist (see Fig. 4.1). Single organ disease, multimorbidity, and frailty can each impact a person's well-being and function and potentially cause disability, but for very different reasons. Each may require a different approach to any medical and surgical interventions planned, based on their prognosis and complexity.

Frailty is defined as 'a state of increased vulnerability to stressors due to age-related declines in physiological reserve across neuromuscular, metabolic, and immune systems' [2]. Those living with frailty are more susceptible to adverse health outcomes, including worse health and even death. There are two leading schools of thought around frailty. The first is based on Linda Fried's [3] research suggesting that a person may exhibit signs of a frailty phenotype, which is recognisable by the features in Fig. 4.2. The second, from Kenneth Rockwood, is that

Fig. 4.1 Frailty and multimorbidity

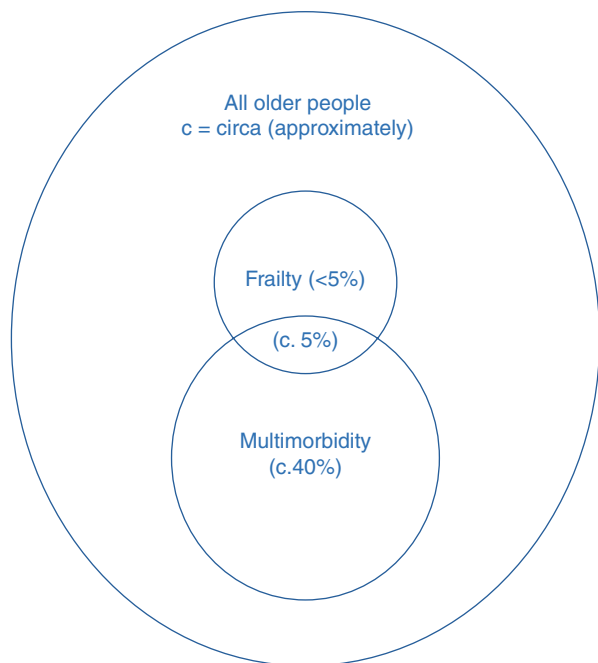


Fig. 4.2 Fried's frailty phenotype	Unintentional weight loss (4.5 kg in last year) Self-reported exhaustion Weakness (measured by grip strength in lowest 20% per age) Slow walking speed (slowest 20% by gender/height) Low physical activity (based on Kcal expended per week in lowest 20%)
	Presence of 3 or more of above – Defined as 'frail': Presence of 1 or 2 of above – Defined as 'pre frail' Nil present – Defined as 'fit'

frailty is a consequence of and defined by an accumulation of deficits that are associated with ageing. This is measured by adding the number of deficits a person has to create a Frailty Index [4]. This is useful in research settings but less clinically useful due to the amount of information required to score it.

Frailty Syndromes

In 1960s, the concept of 'Geriatric Giants' was introduced where an individual may present with a specific symptom masking a more complex medical problem. Frailty syndromes have replaced this concept and are clinical patterns that are commonly seen in those who also have frailty and include:

1. Impaired cognition—either delirium or dementia.
2. Instability/falls (which may or may not be because of immobility).
3. Immobility—reduced muscle power.
4. Incontinence.
5. Iatrogenic (now commonly substituted for polypharmacy).

Comprehensive Geriatric Assessment

Comprehensive Geriatric Assessment (CGA) is the well-established evidence-based approach to managing frail older people [5]. CGA provides a structured assessment and management approach to the patient's medical problems and has been shown to increase the proportion of people living independently at home [5]. Given that the process is multifactorial, it requires the care of a multi-professional team to deliver care in this manner. Traditionally this team was located on specialised geriatric medicine hospital wards with individual assessments linked in a multidisciplinary team meeting (MDT). More recently, the approach has been used in other clinical settings, including the community, to care for older people. There are strong similarities between this approach and the approach advocated in the NICE guideline for multimorbidity management [6].

The CGA process is illustrated in Fig. 4.3. There are several domains of assessment (of which some or all will be needed for each patient—shown in orange). The

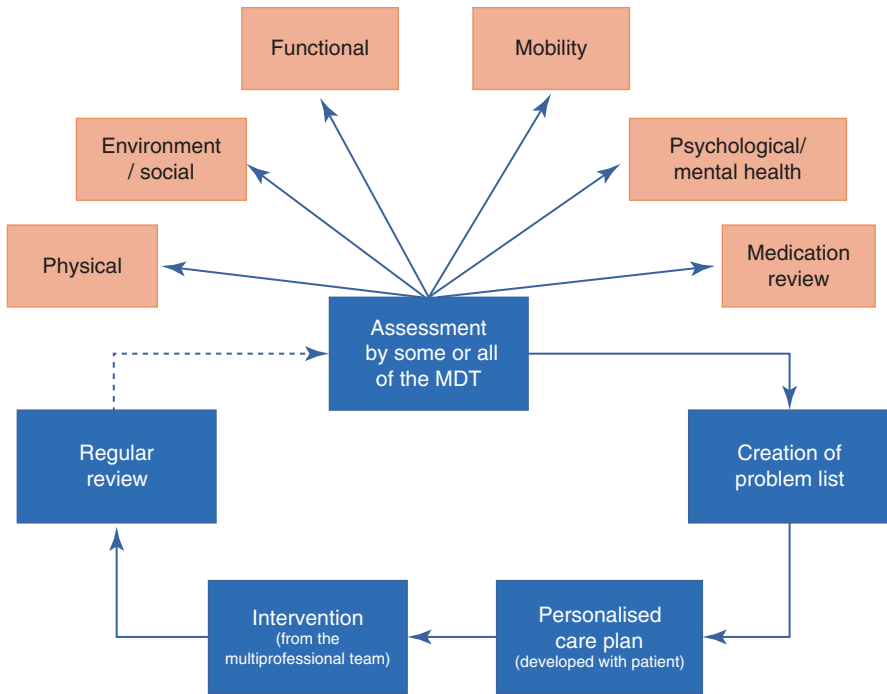


Fig. 4.3 Comprehensive Geriatric Assessment (CGA)

assessments then lead to the CGA process (in blue) to create a problem list that leads to an individualised management plan for the problems identified. The management plan may involve the starting or stopping of medications, onward referrals for specialist input or conservative management. The individualised nature of the management plan is vital as it allows care to be delivered that is personalised to that particular patient in that specific time of their life course. This, therefore, allows for some treatments and treatment plans to be suitable for some patients but not all, so there is no blanket approach to treatment.

A range of health and social care professionals should be involved when completing a CGA. For example, a patient may need to see a physiotherapist, a doctor, an occupational therapist, a dietician, a nurse, a speech and language therapist, and a pharmacist. Dentists can have a role in the wider multi-professional team in completing the CGA. If someone has chronic pain from their teeth, they may not eat as well, which will, in time, affect their physical function. Unfortunately, there are often poorer links between dental professionals compared with other multi-professional team members. A greater awareness of the poor levels of oral health in vulnerable older people amongst non-dental professionals will support the use of appropriate models of care which include dental professionals [7]. Understanding frailty is important for dental professionals as it helps explain the knife-edge on which some older people live. In frailty, the body is struggling to maintain its

homeostasis, and even a small change, such as dental pain or infection, can cause decompensation in their physical or mental health, which in turn can affect a whole range of body systems.

The remainder of this chapter provides a series of short, focused summaries for a range of topics pertinent to older people.

Polypharmacy

Polypharmacy is often described as taking five or more medications. This is based on one cohort study where at the age of 69, 22.8% of individuals were taking more than five medications [8]. However, it should be noted that there is no consensus on the exact numbers of medications defining polypharmacy. Polypharmacy may be appropriate (when all the medicines are needed and the patient wants to and can take them correctly) or inappropriate (when the medications are not required, the patient does not want to take them, or the patient is incapable of following all the dosing requirements). When following the national and local guidelines for individual conditions, a large number of medications can be used; for example, a patient may be started on 5–7 medicines following a myocardial infarction. As patients are diagnosed with more conditions, it is not uncommon for them to be prescribed more drugs, which brings a greater complexity of timings, instructions, and organisation.

The more medications an older patient takes, the more likely there are to be adverse side effects, drug–drug interactions, and problems associated with the changes in pharmacodynamics in older people. Therefore, it is worth thinking about these potential interactions when adding any medications to those taken by an older person, and the pharmacist's role is critical in managing older people.

As more medications are taken, a patient is more likely to encounter oral side effects related to oral health, some of which are discussed in Chap. 8. For example, a patient with epilepsy, hypertension, diabetes, and ischaemic heart disease may be affected in many ways: they may develop xerostomia (diuretics), oral ulcerations (beta-blockers), gingival hyperplasia (phenytoin), or a metallic taste (metformin), for example. The recognition of polypharmacy can lead to a proactive approach to tailoring management to the individual. Medication reviews can be conducted in either primary care by a patient's General Medical Practitioner, pharmacist, or nurse specialist or in secondary care by a geriatrician. Signposting patients to these professionals is a good first step when patients report problems with their medication regime, including impacts on their oral health.

Contenance

Older people may experience difficulties in maintaining their continence. Between three and six million people in the UK have some form of urinary incontinence [9]. The most common way to categorise urinary continence is stress, urge, overflow, or functional forms.

In stress incontinence, the sphincter around the urethra is no longer strong enough to overcome additional pressure from the abdomen (such as that which comes about when coughing or sneezing). When this happens, the patient may leak a small amount of urine. Individuals are often very aware of this and may well be very embarrassed.

In urge incontinence, the most common cause is an overactive bladder. Here the neuromuscular system is abnormal. As the bladder fills, signals are sent to the micturition centre too early in the filling process, creating an urgent need to pass urine. The bladder is still relatively empty on passing urine, meaning a person only passes small volumes. This urgency can be highly significant and can lead to urinary incontinence. One treatment is anti-muscarinic medication, but this has the side effect of xerostomia. If a dry mouth is very troubling for the person, there are other newer treatments that their general medical practitioner or oral medicine specialist could consider (see Chap. 8).

Overflow incontinence is more common in men with enlarged prostate glands, and there may be a continual small volume of leaking urine. This is often treated with a urinary catheter inserted into the bladder, which drains the urine into a bag attached to the patient's leg. There is no problem with the urogenital system in functional incontinence, but the person cannot get to the bathroom to pass urine on time. The risk is greater for people with mobility difficulties, such as arthritis or following a stroke. For all older patients, it is essential to understand their needs and work with them to maintain their dignity wherever possible.

The dental team should be aware that patients may need to leave the surgery to pass urine mid-way through lengthy dental procedures and that they may not have much warning for this. To avoid this, patients will often reduce fluid intake before appointments, leading to dehydration and making their mucus membranes appear less moist than usual. Exploring this with patients before longer consultations and procedures may make it easier for older people to describe how incontinence impacts them and how dental teams can support their care. Patients should have access to toilets in dental settings that are suitable in terms of design for older people. Specifically, there may be a need for higher toilet seats, grab bars and handles on doors, and adequate access for mobility aids or wheelchairs. Clear signage to toilets in all areas can help.

Falls

Falls can be a sign of more complex underlying problems that should be addressed to reduce the risk of further falls and associated injuries. Falling is very common, with around 1 in 3 people over 65 falling per year [10]. This rises to 1 in 2 people over the age of 80 [11]. It is helpful to think of falls as being due to either intrinsic or extrinsic related factors. Intrinsic factors are related to the individual, e.g., postural hypotension, and extrinsic factors are related to their environment, e.g., trip hazards in the home. Targeted management or treatment can significantly reduce the rate of falls in older people. Distinguishing between the two can help determine

which kind of intervention and support the person may need. For example, if someone were to fall and injure their face or teeth as part of their presentation, more serious causes and urgent interventions may be required. Injuries sustained to the face from falling often signifies either a loss of brain function through a reduction in cardiac output (e.g., low blood pressure or arrhythmia) or abnormal brain activity, (e.g., seizure or a loss of righting reflexes seen in those with Parkinson's disease) or due to more significant physical frailty. Dental teams may also be the first to see some patients who have fallen and sustained dental trauma. This should lead to questioning about the cause of the fall and prompting the patient to seek assistance from the healthcare team to reduce the risk for further falls.

Due to the interaction between intrinsic and extrinsic factors, falls management is an example of CGA in action. Table 4.1 shows what a CGA for falls might typically include.

Sarcopenia is a change in muscle fibres as we age, reducing explosive muscle power and increasing the risk of falls. It is treated through a combination of nutrition and exercise. There is evidence that vigorous exercise in older people reduces the risk of ongoing frailty than gentle exercise [12]. The combination of balance and strength training has a strong evidence base for reducing future falls and improving confidence in older adults. The role of healthcare professionals is to encourage a focus on a good diet and adequate exercise for all age groups in each interaction.

Dental teams should note that patients may have difficulty getting on and off the dental chair, that space is needed in the dental surgery for wheelchairs and mobility aids, and that patients may need physical assistance moving around the practice (particularly rising from a seated position). Knee-break dental chairs are much more suitable for the ageing population than standard dental chairs. Care should be taken when older patients have been supine for an extended period during dental treatment, and they should be sat up slowly due to the risk of orthostatic hypotension. Some patients may not leave their homes due to an increased risk, or fear of falling, meaning consideration should be given to domiciliary dental care. Chapter 12 discusses adaptations to support patients in the dental surgery who may be at higher risk of falls and the role of domiciliary dental care.

Table 4.1 Falls in Comprehensive Geriatric Assessment (CGA)

Physical symptoms	Pain Arthritis Continence
Sensory impairments	Vision
Mental health	Cognition, e.g., risk awareness
Functional assessment	Activities of daily living Strength Balance
Environment	Trip hazards Adaptations Mobility aids
Social	Support networks Care needs

Bone Health

Osteoporosis is a disease characterised by low bone mass and deterioration of bone tissue that leads to compromised bone strength and an increase in the risk of fractures. The prevalence of osteoporosis increases sharply with age: from approximately 2% at 50 years to more than 25% at 80 years [13]. There is a greater incidence among females than males due to oestrogen withdrawal during menopause which will impact on bone density. There is abnormal bone production in osteoporosis, and the bone becomes “thinned”; thus, there is an increased risk of fractures. Falls from a standing height leading to a fracture are commonly called “fragility fractures” and are pathognomonic for osteoporosis in people over 75 (there are around 500,000 of these per year in the UK) [14]. As the population ages, so will the incidence of osteoporosis and fragility fracture.

Bone density is controlled, in part, by the calcium cycle and from a physiological standpoint, the human skeleton’s primary function is as a calcium storage site. The calcium level absorbed from the gut is determined by the hormone vitamin D formed from sunlight falling on 7-dehydrocholesterol in the skin. The resulting hormone is then further activated in the kidney (so normal kidney function is needed), and it acts on the gut to modulate calcium and phosphate absorption. The parathyroid hormone then helps control the calcium level in the serum and the bone. Older adults are at risk for lower vitamin D levels due to decreased synthesis and dietary vitamin D intake, so nutritional supplementation is often recommended [15].

There are good, long-established treatments for osteoporosis, and the most common of these are bisphosphonates. There is a balance between bone resorption (by osteoclasts) and bone formation (by osteoblasts) in normal bone. Bisphosphonates have a very high affinity for bone minerals and reduce bone resorption by the osteoclasts. Due to their impact on bone formation and resorption, bisphosphonates reduce the risk of further vertebral or hip fractures by order of 50%; however, they are associated with side effects. The most common of which is a feeling of reflux, so patients are asked to take the medication on an empty stomach and remain upright for some time following to reduce the acidic effects of the treatment. There is often concern about the risk of osteonecrosis of the jaw, however, this is more common in patients on high dose bisphosphonates to treat a malignancy (the incidence here is between 1 and 12%). For the osteoporosis treatment dose, the incidence is less than 1 case per 100,000. The risk of jaw osteonecrosis increases in people taking corticosteroid medications alongside bisphosphonates and those who have been taking bisphosphonates for longer than 5 years [16, 17].

Several newer treatments affect the interactions between osteoblasts and osteoclasts. Denosumab is one such example, and it also has a lower risk for osteonecrosis of the jaw [18] compared to when prescribed as part of oncology treatment, where a higher dose is prescribed.

Dentists may be asked to review the patients’ oral health before the initiation of anti-resorptive or anti-angiogenic drugs. In addition to the osteonecrosis risk to the jaw, patients with osteoporosis may have reduced bone density and more significant periodontal disease, especially if they are smokers. Patients with low bone density

may also have experienced a bone fracture that affects their mobility, potentially delaying their attendance. Chapter 7 discusses the dental management of patients taking these medications in further detail.

Nutrition and Weight Loss

Dental teams will be well aware of the importance of good oral health in maintaining good nutrition. Functional teeth or good fitting dentures are necessary for chewing various foods leading to a broader food selection. There are two main considerations for older adults and poor nutrition: sarcopenia, which is addressed earlier in this chapter, and unintentional weight loss.

Unintentional weight loss is recognised as part of the frailty phenotype but would usually only be attributed to frailty as a diagnosis of exclusion by someone able to assess the root causes thoroughly. Although cancer is a primary concern to anyone with this symptom, most of those seen in rapid diagnostics clinics for suspected cancer of an unknown primary have an alternative diagnosis. The end stages of many chronic conditions, including frailty, dementia, COPD and heart failure, will lead to a catabolic state or insufficient nutritional requirements to meet the body's metabolic demands [19]. Living in poverty can also lead to inadequate nutrition and weight loss. Dementia is another common cognitive cause of weight loss in older people. The person may not recall that they have not eaten, prepared, or bought food due to disruption in executive function required for complex planning of tasks.

The older generation may have had poorer childhood nutrition than children experience today. Poor nutrition may have affected teeth formation, including enamel hypoplasia and delayed eruption of teeth that can have lifelong consequences. Inadequate nutrition in later life can also cause delayed healing, or tooth erosion, depending on the nature of the consumed diet. Restriction in food choices due to an impaired dentition may lead to a high sugar diet lacking many essential nutrients and increasing the risk of developing caries. In addition, there has been a recent focus on the role of supplemental micronutrients to reduce oral inflammation (vitamins A to E and omega 3 fatty acids) [20].

Ageing Systems

Musculoskeletal

As we age, the musculoskeletal system ages with us. A “wear and tear” failure can develop in many areas of the body. For example, the development of osteoarthritis can cause pain and stiffness in the large and small joints of the body. The effects of osteoarthritis on joints may be focused on a few areas or be more generalised, affecting an older person's mobility. Getting onto and off dental chairs may prove difficult for people with mobility issues, especially after a

Table 4.2 Causes of reduced mobility

Bones/joints:	Arthritis, reduced range of movement
Muscles:	Sarcopenia and loss of muscle strength
Nerves:	Peripheral neuropathy, proprioceptive loss
Brain:	Ataxia, apraxia, impaired executive function, stroke

prolonged period of inactivity. Large joints (hip and knee) can be replaced with artificial joints, which are very successful in reducing the pain of osteoarthritis but may result in patients not being able to kneel comfortably. Osteoarthritis of the temporomandibular joint (TMJ) is more common in older people and can lead to pain and restriction of jaw movement, impacting dental treatment and oral hygiene [21].

There are many reasons that someone's mobility may be impaired, as listed in Table 4.2. The patterns are helpful to recognise and understand so that adaptations can be made during or after a consultation. Physiotherapy and occupational therapy can provide interventions and adaptations to reduce or treat the associated functional impairment. It may be necessary to refer those with significant physical disabilities to special care dentistry services in the community or hospital with access to specific equipment, including wheelchair recliners and hoists, as discussed in Chap. 12.

Cardiac Conditions

The commonest cardiac conditions encountered in the UK include atrial fibrillation (AF), hypertension, postural hypotension, heart failure, and ischaemic heart disease. Cardiovascular disease is associated with high morbidity and mortality rates. Normal ageing causes the heart and blood vessels to stiffen, leading to these conditions in later years. As general function and mobility decrease, the heart muscles weaken. By and large, changes to medications are not required for dental procedures, Chap. 7 provides details on when this may be appropriate for direct oral anticoagulants (DOACs). For patients taking DOACs, atrial fibrillation is a relatively low-risk indication, where stopping anticoagulation for a short period is unlikely to lead to a stroke. However, if a patient had a recent or recurrent pulmonary embolus or cardiac surgery within the last 6 months, it would be far less appropriate to alter or discontinue medication regimes. Approaching the prescriber can be sensible so advice can be sought about medication changes. Elective dental care should be postponed when there is any uncertainty about medication regimes and the need to adjust these. If higher risk urgent procedures are required, there is the potential to bridge anticoagulation with heparin; however, this should be planned by hospital-based dental teams in collaboration with medical teams.

Generally, the closer to an ischaemic event, whether cardiac or neurovascular, the higher the risk for recurrence. The risk depends on the type of stent used for those with coronary stents, but all are at increased risk for further thromboembolic events. This risk is highest in the first 6–12 months with drug-eluting stents and 6–12 weeks after a bare-metal stent. Dental management of patients on antiplatelet and anticoagulants is discussed in detail in Chap. 7. Chapter 9 discusses the importance of good local anaesthesia for patients with cardiovascular disease to minimise stress and when adjuncts such as conscious sedation may be indicated.

Respiratory Conditions

Dyspnoea (breathlessness) is a common symptom in older adults, with 32% of over 70-year-olds reporting it to some extent [22] and is linked to poorer functional abilities. The forced expiratory volume in 1 s (FEV1) is the volume of air exhaled in the first second during forced exhalation after maximal inspiration and categorises several pulmonary diseases. There can be a small margin between the FEV1 experienced as part of the expected physiological decline associated with ageing and the figures that indicate a disease state. Cardiac and respiratory causes account for approximately 70% of cases of dyspnoea in older adults [23].

In more advanced stages of conditions such as COPD and heart failure, breathing dysregulation is often more pronounced. This can respond well to controlled breathing exercises and specialist prescribing of opioids and anxiolytics to reduce the work of breathing. This dysregulation can increase the risk of aspiration pneumonia due to the loss of coordination of the swallow reflex, which could also affect saliva management during a procedure. Aspiration pneumonia is associated with poorer oral health [24], so good oral hygiene has a preventative role in reducing this risk of pneumonia from inhaled oral contents.

Evidence is still emerging regarding the impact of COVID-19 on the respiratory system. What is known to date is that there is a significantly higher risk of pulmonary embolism in the short-to-medium term for those who require hospital admission. There is also a higher risk of developing fibrosis in the medium to long term and an increased incidence of breathing pattern disorders. These are when breathlessness is not driven by respiratory or cardiac physiological triggers but results in a discoordination in breathing, making it feel out of sync.

The consideration for the dental team is that many patients seeing dental teams will have some degree of breathlessness. This may be worse when they lie flat (particularly in some cardiac disease patients). The usual procedure or positioning may need to be adapted for these patients. Some patients may need to use long-term oxygen (in pulmonary fibrosis, for example); flames should not be used as part of root canal obturation or denture construction. Patients may get quite out of breath moving around the practice or getting on and off the dental chair. They may require

time to catch their breath before procedures start or may not be able to hold open their mouth for a prolonged period if they predominantly mouth breath.

Specific Conditions

Parkinson's Disease

Parkinson's disease (PD) is the second most common neurodegenerative condition after Alzheimer's dementia. In PD, the accumulation of alpha-synuclein protein causes the formation of Lewy-bodies in cerebral neurons. The Lewy-bodies disrupt the production of the neurotransmitter dopamine. Patients have a wide range of potential symptoms, divided into those associated with movement (motor) and those that do not affect movement (non-motor).

During the early stages of PD, patients present with a tremor, stiffness or slowness of movement. The non-motor symptoms (drooling, cognitive changes, hallucinations, and constipation) become more prominent with disease progression. Drooling is a particularly common complaint and can be managed non-pharmacologically with boiled sweets (but with an increased risk of dental disease) that can stimulate swallowing or with topical medications such as anticholinergics or botulinum toxin injections to the salivary glands. The change in salivary flow substantially impacts the oral microbiome [25].

As the disease progresses, PD can affect a patient's cognition and the risk of falls and other complications of the disease increase. In the later stages of the disease, patients may become very sensitive to the replacement of dopamine and exhibit unwanted movements (as opposed to too little movement—which is the norm). These movements are called dyskinesias and result in the patient moving parts of their body in an uncontrolled manner. This may be common at certain times of the day and again should prompt discussions with the patient and carers about how best to approach dental treatment in this situation.

When taking treatment, the regimens of medications become highly personalised, and the timing of medicines becomes critical. For some patients, the difference in timing of taking medication of only 5–10 min can result in them not moving, swallowing, or functioning. Therefore, when planning dental procedures, it is essential to be aware of the timing of a patient's medication and try to schedule treatment around this. A break may need to be planned for lengthy procedures, and patients may need to be instructed to bring their medication to take mid-procedure. Dental treatment may need to be planned around medication times to ensure the patient is not in an "off state" (where movement and swallowing can be challenging). Chairside oral suctioning is very important. Finally, some patients with dyskinesias may find it impossible to sit or lie still at peak times around their medication regime. As discussed in Chap. 9, IV sedation with midazolam for muscle relaxation to reduce movement can help to enable the safe delivery of dental treatment.

Dementia

Alzheimer's disease is the commonest neurodegenerative condition in the UK. The World Health Organisation suggest it accounts for 60–70% of all dementias [26]. It is associated with a decline in cognitive function across various cognitive domains that progresses over time, and many patients will have problems with memory loss. Vascular dementia is less common (around 15% of patients with dementia) and classically follows a stepwise pattern of deterioration. Further information on dementia is presented in Chap. 10.

Some patients, though, will not already have a diagnosis of dementia. Patients who may appear to have an undiagnosed cognitive impairment (for example, forgetting about appointments or appearing disorientated) should be signposted to their GP for a formal assessment. A sudden change in a level of confusion is rare in dementia and is much more likely to be due to delirium. Delirium can be caused by several conditions (from constipation to infection) and should always lead to a more detailed patient assessment by an appropriate healthcare team.

Dementia and frailty states show significant overlap and often co-exist, especially in the later stages of dementia. In the moderate to severe stages of dementia, weight loss is common. As discussed earlier, this can be multifactorial, from either the practicalities of obtaining or preparing food to reduced appetite or catabolic nutritional states. Maintaining a good dentition can significantly optimise a person's intrinsic eating abilities, essential in those who may lack such awareness, such as those with dementia.

Mental Health in Older People

One in four older people live with a mental health disorder, and despite recent attempts to reduce stigma, there is still a risk that mental health problems are not explored as fully as physical illnesses. Fewer older people are referred to NHS services for their mental health problems than younger adults, with over 65's making up 15% of people receiving NHS support for mental health conditions [27]. People living in care homes are especially at a high risk of mental illnesses, with up to 40% having depression [28]. Overall, depression is the most common mental health problem (around 25% of people over 65) in older adults, followed by anxiety [27]. Cognitive-behavioural therapy works well for older people, and not everyone needs medications to help treat their depression. When patients have multimorbidity and mental health conditions are part of the conditions, they have higher mortality and morbidity rates. Healthcare professionals, including the dental team, should be alert to the possibility of mental health problems and ask patients about this as part of their consultation and discuss referral to their general medical practitioner.

The consideration for the dental team is that patients living with mental health conditions may neglect their physical health, including their oral health, and so may present later to dental services or only when there is an acute problem. Poor oral health such as lost dentures, poor appearance of teeth or chronic pain and infection

can contribute to mental health issues, including depression. The number of older people substance-abusing will increase with demographic changes, including heavy drinking, misuse of prescription medication and recreational drugs. Older people may have started substance abuse in their younger age and continued to do so as they got older, or it can be a new pattern in older age. The distinction is important because each requires different assessment, intervention, and treatment regimens [29].

Other Conditions

In addition to the specific conditions outlined above, many illnesses are more common as people get older. The incidence of chronic kidney disease (CKD), usually related to reno-vascular disease caused by diabetes and hypertension increases in older age. CKD stage 3–5 affects 1.9% of people aged 64 and under, 13.5% of people aged 65–74, and 32.7% of people aged 75 and over [30]. The presence of renal disease may affect choices of medications for other conditions and dosing of antibiotics.

Ageing also affects the health of the liver. As we age, we have a greater risk of damage to the liver from medications (including alcohol) and an increase in the risk of this damage leading to liver fibrosis and longer-term effects on liver function. Again, this is important in consideration of medications that undergo hepatic metabolism and the impact on clotting factors and surgical procedures.

Haematological conditions are more common in older people. Anaemia is often related to a non-haematological condition (such as CKD, bleeding from the GI tract or malignancy). Anaemia may make patients lethargic, short of breath on exertion or pale looking (particularly mucous membranes) for which signposting patients to see their GP would be appropriate). Haematological malignancies are discussed alongside other cancers below.

Stroke

Stroke is a condition that occurs in around 100,000 people in the UK per year, and 1.3 million people live with the after-effects of a stroke [31]. In a stroke, there is a sudden onset of focal ischaemic changes in the brain. Ischaemia is most commonly caused by a blood clot occluding an artery (85% of all strokes). Risk factors include atrial fibrillation, where blood clots may form in the heart's upper chambers, hypertension, diabetes, and smoking. An ischaemic area can also result from a rupture in the blood vessel wall leading to haemorrhage (around 15% of all strokes). In both situations, whatever function the affected area of the brain is responsible for will be affected (for example, a stroke affecting the left hemisphere would give rise to a right-sided weakness). Following a stroke, a patient can have a wide range of neurological problems, from complete one-sided paralysis with higher cognitive dysfunction, loss of speech, poor swallowing function, and one-sided visual loss (a total anterior circulation stroke) to a relatively minor weakness. For some people, the sequencing of tasks may be affected.

Speech may be affected in several ways:

Expressive dysphasia—where the forming of language is difficult—the patient may know what they want to say but cannot “get the words out”.

Receptive dysphasia—where understanding of language is affected. Patients may vocalise, but understanding what others are saying may be lost.

Dysarthria—where there is difficulty with the physical formation of words, and speech may appear slurred or harder to understand.

The consideration for the dental team is threefold following a stroke: the patients understanding may be affected if they have higher cortical involvement. Secondly, movement and mobility around the surgery onto and off the dental chair may be affected, and finally, speech and swallowing may be impaired. If a person’s swallowing is affected, they may have a feeding tube inserted into their stomach; in this situation, they may not take food or drink orally. Adaptions may need to be made to toothbrush handles for people with limited dexterity, as described in Chap. 5. After a stroke, people may be at a higher risk of dental diseases due to poor oral clearance and limited dexterity for oral hygiene, so prevention is critical. When carrying out dental care for a patient with dysphagia, excellent chair side oral suction is essential, keeping them more upright, taking time with treatment, and allowing the person to rest when needed is important.

Visual Impairment

As we age, there is an increase in the number of conditions that affect our eyes (diabetic retinopathy, glaucoma, cataract, and age-related macular degeneration). This means visual loss becomes more common; 1 in 5 people over the age of 75 have a visual impairment, which rises to 1 in 2 people over the age of 90 [32]. 50% of visual loss is treatable [33]. Visual loss can significantly impact the quality of life (one-third of older people living with sight loss also have depression) [34]. Any reported sudden onset of visual loss should be referred for urgent assessment as it may be treatable.

Visual impairments can impact access to dental services and oral health. By law, dental services need to make adjustments to their practices for people with disabilities [35]. For people with visual impairments, this should include appropriately sized signage to and from and in clinics, the size of printed information available for patients, and some patients may need additional assistance in safely moving around the clinic areas.

Hearing Loss

Hearing loss is the fourth leading cause of disability globally, and the prevalence doubles with every 10-year increase in age [36]. 50% of 60-year-olds have some hearing impairment, which rises to 85% in 85-year-olds. Hearing loss is usually benign, but as it becomes more severe, communication can be affected, which may

lead to social isolation and is a risk factor for depression. Age-related hearing loss is usually slowly progressive with an initial loss of high-pitched sounds and difficulty understanding speech.

The dental team should make reasonable adjustments for these patients according to the Equality Act 2010 to improve communication [37]. This can include reducing background and other noises in the dental surgery, facing the patient when speaking to them and speaking clearly and slowly if they lip read. Face masks can be a barrier to communication and using transparent masks or face visors for consultations is important for people with a hearing impairment. Patients with hearing aids may prefer to switch them off during treatment as high-pitch noises can cause interferences. Dental staff should consider writing things down or using apps that can transcribe, some of which allow access to a British Sign Language (BSL) interpreter on a video call. Should patients use BSL, access to interpreters is advised. Since 2016, all NHS services are legally required to follow the Accessible Information Standards, and make services accessible for people with sensory loss, including identifying and recording communication needs [38]. For example, patients might prefer text messages or email reminders rather than telephone calls or require information in leaflets rather than verbal instruction.

Diabetes

Diabetes is a condition where the regulation of blood sugar is affected. Insulin usually is produced by the body to move sugar from the blood into the cells. When the blood sugar level is raised, sugar is excreted into the urine, which pulls water with it, leading to polyuria and polydipsia—the hallmark symptoms of diabetes. There are two main types. In type 1 diabetes, the pancreas does not produce insulin and is often a condition that older people have lived with for many years and would be treated with insulin injections. Type 2 diabetes is the most common form (around 90% of cases) and is where the body becomes less responsive to insulin. This develops over time and is associated with obesity. Treatment can be via insulin injections but is often initially managed with tablets to modulate the response to endogenous insulin. The longer patients live, the longer people live with diabetes and its potential complications. Diabetic related complications, as explored below, may be commonly encountered in older patients.

People with diabetes may have a range of complications—mostly related to its effect on small blood vessels. Renal, retinal, and peripheral small blood vessels can become damaged leading to, chronic kidney disease, visual loss, and peripheral neuropathies. These conditions can contribute to significant disability and adjustments to patients care. For example, written information in larger font size, or providing support with transfer from wheelchairs when the peripheral vascular disease has significant impacts on mobility or has led to amputation. Wound healing can be compromised with diabetes, and infections can progress rapidly in uncontrolled diabetes, requiring aggressive management. Dental wounds and infection risk are no exception. Type 1 diabetic patients or those needing insulin for type 2 diabetes undergoing general anaesthesia for dental procedures may need modifications to

their insulin regime in the pre-operative and peri-operative period, especially as fasting is required before anaesthesia. Medical teams should support the planning of care in such situations.

Cancer

The rising age of the population has led to a greater incidence of cancers as these are more common in older age groups. Cancer Research UK reports that age-specific incidence rates rise steeply from around age 55–59, with the highest rates of cancer diagnoses occurring in the 85–89 age group [39]. Common cancers in older people are shown in Table 4.3. Cancer may be treated by surgery, radiotherapy or chemotherapy. In some instances, the older person and their oncology team may decide not to investigate or treat further.

Head and neck cancer is the eighth most common cancer in the UK, and incidence rates are highest in people aged 70–74 [39]. Dental teams, health care professionals and the public need to be vigilant for signs and symptoms of oral cancer and refer to head and neck cancer services as discussed in Chap. 8. Cancer treatments may affect the oral cavity ranging from mucositis, xerostomia, and candida infections. Bisphosphonates, often used for metastatic secondary bone cancer, is associated with an increased risk of jaw necrosis, and implications for the dental team is discussed in Chap. 7.

Haematological malignancies are common in older patients, such as acute or chronic myeloid leukaemia, chronic lymphocytic leukaemia, or multiple myeloma. As with other malignancies, older patients may not tolerate aggressive chemotherapy treatments, and outcomes are less favourable. There is increasingly a role in the CGA process for these patients. Dental treatment is affected by such conditions. Firstly, patients may require an infusion of bisphosphonate drugs as part of their haem-oncology treatment. For example, patients diagnosed with multiple myeloma should have a dental examination and extraction of teeth of poor prognosis before commencing the bisphosphonate drug due to the increased risk of medicine-related osteonecrosis of the jaw (discussed in detail Chap. 7). Similarly, when chemotherapy is planned, teeth of poor prognosis should ideally be managed before starting to allow teeth with chronic infections or at risk of infection to be managed before a patient becomes neutropenic. When patients with existing haematological malignancies require surgical management; they should be assessed for bleeding,

Table 4.3 Types of cancer in people >75 years (Cancer Research UK 2021)

Male (%)		Female (%)	
Bladder	6	Bowel	14
Bowel	14	Breast	21
Lung	16	Unknown primary	4
Melanoma	4	Lung	16
Prostate	25	Uterine	4
Other	36	Other	40

infection, and osteonecrosis risk. Advice should be sought from their haematology team alongside appropriate blood tests, and the timing of treatment carefully planned.

Immunocompromise

The immune system acts as a defence system against infections and detects and destroys malignant or autoreactive cells. Immunosenescence refers to the changes in the immune system with increasing age. As the immune system ages, it functions less well and the risk of cancer, autoimmune disease, and risk of infections increases. Some infection risk is due to changes in mucous membranes (for example, urinary tract infections in older females partly due to the changes in vulval mucosa) and the way the immune system functions. Macrophages work slower, T-cells respond less well, and less complement protein is produced. As a result, bacterial infections are more common in older people (particularly respiratory, urinary and skin infections). Viral infections, such as flu and COVID-19, also have a more significant effect due to this immunosenescence. Vaccination helps to mitigate against these effects for some viral illnesses. As well as a less agile immune system, many older people may be taking medications that affect the function of their immune system. These medications are broadly in four groups. Firstly, oral corticosteroids for treating a range of inflammatory autoimmune conditions (e.g., prednisolone for asthma or temporal arteritis). Secondly, disease-modifying medications for more severe autoimmune diseases (e.g., methotrexate for rheumatoid arthritis or mycophenolate for systemic lupus erythematosus). Thirdly chemotherapy agents for cancer treatment [e.g. 5-fluorouracil (5-FU) capecitabine for bowel cancer]. Finally, immunomodulatory treatment for cancer treatment (e.g., rituximab to treat non-Hodgkin lymphoma or chronic lymphocytic leukaemia). For the dentist, this is relevant as patients taking such medications are more at risk of dental infections and prolonged healing if invasive procedures are required. Management of immunocompromise for patients undergoing dental surgical procedures is detailed in Chap. 7.

Conclusion

With ageing, there is a greater risk of physical and mental health conditions, often overlapping and interacting. We, therefore, need to be cognizant of the underlying ageing process and understand the effects that this can have on the ability of our bodies to maintain homeostasis and on individual organ function. Looking after older people is more complex than caring for other patients who often have single organ disease. It also requires the ability to assess the whole patient and involve them and their family and care team in decision making in developing truly personalised care plans.

References

1. Rubenstein LZ, Stuck AE, Siu AL, Wieland D. Impacts of geriatric evaluation and management programs on defined outcomes: overview of the evidence. *J Am Geriatr Soc.* 1991;39(S1):8S–16S.
2. Walston J, Hadley EC, Ferrucci L, Guralnik JM, Newman AB, Studenski SA, et al. Research Agenda for frailty in older adults: toward a better understanding of physiology and etiology: summary from the American Geriatrics Society/National Institute on Aging Research Conference on Frailty in Older Adults: Research Agenda for Frailty. *J Am Geriatr Soc.* 2006;54(6):991–1001.
3. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J, et al. Frailty in older adults: evidence for a phenotype. *J Gerontol Ser A Biol Med Sci.* 2001;56(3):M146–57.
4. Rockwood K, Mitnitski A. Frailty defined by deficit accumulation and geriatric medicine defined by frailty. *Clin Geriatr Med.* 2011;27(1):17–26.
5. Ellis G, Gardner M, Tsiachristas A, Langhorne P, Burke O, Harwood RH, Cochrane Effective Practice and Organisation of Care Group, et al. Comprehensive geriatric assessment for older adults admitted to hospital. *Cochrane Database Syst Rev.* 2017;9(6):CD006211. <https://doi.org/10.1002/14651858.CD006211.pub3>.
6. National Institute for Health and Care Excellence. Multimorbidity: clinical assessment and management [NICE Guideline 56]. London: NICE; 2016. <https://www.nice.org.uk/guidance/ng56>.
7. Roller-Wirnsberger R, Kossioni A. Interprofessional collaborative practice (ICP) in gerodontology. In: Kossioni A, editor. *Gerodontology essentials for health care professionals*. Cham: Springer International; 2020. p. 175–84. https://doi.org/10.1007/978-3-030-41468-9_9.
8. Rawle MJ, Richards M, Davis D, Kuh D. The prevalence and determinants of polypharmacy at age 69: a British birth cohort study. *BMC Geriatr.* 2018;18(1):118.
9. Irwin DE, Milsom I, Kopp Z, Abrams P, Cardozo L. Impact of overactive bladder symptoms on employment, social interactions and emotional well-being in six European countries. *BJU Int.* 2006;97(1):96–100.
10. Kalache A, Fu D, Yoshida S, Al-Faisal W, Beattie L, Chodzko-Zajko W et al. World Health Organisation Global Report on Falls Prevention in Older Age. Geneva http://www.who.int/ageing/publications/Falls_prevention7March.pdf; World Health Organization, 2007. (Geneva: WHO 2007).
11. National Institute for Health and Care Excellence. Falls in older people: assessing risk and prevention [CG161]. 2013. <https://www.nice.org.uk/guidance/cg161>. Accessed 20 Dec 2021.
12. McPhee JS, French DP, Jackson D, Nazroo J, Pendleton N, Degens H. Physical activity in older age: perspectives for healthy ageing and frailty. *Biogerontology.* 2016;17(3):567–80.
13. National Institute for Health and Care Excellence. Osteoporosis: assessing the risk of fragility fracture. Report No.: Clinical guideline [CG146]. 2012. <https://www.nice.org.uk/guidance/cg146/chapter/introduction#:~:text=Because%20of%20increased%20bone%20loss,at%2080%20years%20in%20women>. Accessed 14 Dec 2021.
14. National Institute for Health and Care Excellence. NICE impact falls and fragility fractures. 2018. <https://www.nice.org.uk/media/default/about/what-we-do/into-practice/measuring-uptake/nice-impact-falls-and-fragility-fractures.pdf>.
15. Meehan M, Penckofer S. The role of vitamin D in the aging adult. *J Aging Gerontol.* 2014;2(2):60–71.
16. Khan A. Bisphosphonate-associated osteonecrosis of the jaw. *Can Fam Physician.* 2008;54(7):1019–21.
17. Scottish Dental Clinical Effectiveness Programme. Oral health management of patients at risk of medication-related osteonecrosis of the jaw. *Br Dent J.* 2017;222(12):930.
18. Watts NB, Grbic JT, Binkley N, Papapoulos S, Butler PW, Yin X, et al. Invasive oral procedures and events in postmenopausal women with osteoporosis treated with denosumab for up to 10 years. *J Clin Endocrinol Metabol.* 2019;104(6):2443–52.

19. Pasini E, Aquilani R, Dioguardi FS, D'Antona G, Gheorghide M, Taegtmeier H. Hypercatabolic syndrome: molecular basis and effects of nutritional supplements with amino acids. *Am J Cardiol*. 2008;101(11A):11E–5E.
20. Kaur K, Sculley D, Wallace J, Turner A, Ferraris C, Veysey M, et al. Micronutrients and bioactive compounds in oral inflammatory diseases. *J Nutr Intermed Metab*. 2019;18:100105.
21. Yadav S, Yang Y, Dutra EH, Robinson JL, Wadhwa S. Temporomandibular joint disorders in older adults: temporomandibular disorders in older adults. *J Am Geriatr Soc*. 2018;66(6):1213–7.
22. Ho SF, O'Mahony MS, Steward JA, Breay P, Buchalter M, Burr ML. Dyspnoea and quality of life in older people at home. *Age Ageing*. 2001;30(2):155–9.
23. Van Mourik Y, Rutten FH, Moons KGM, Bertens LCM, Hoes AW, Reitsma JB. Prevalence and underlying causes of dyspnoea in older people: a systematic review. *Age Ageing*. 2014;43(3):319–26.
24. van der Maarel-Wierink CD, Vanobbergen JNO, Bronkhorst EM, Schols JMGA, de Baat C. Oral health care and aspiration pneumonia in frail older people: a systematic literature review. *Gerodontology*. 2013;30(1):3–9.
25. Mihaila D, Donegan J, Barns S, LaRocca D, Du Q, Zheng D, et al. The oral microbiome of early stage Parkinson's disease and its relationship with functional measures of motor and non-motor function. *PLoS One*. 2019;14(6):e0218252.
26. World Health Organisation. Global action plan on the public health response to dementia 2017–2025. 2017. <https://www.who.int/publications-detail-redirect/global-action-plan-on-the-public-health-response-to-dementia-2017%2D%2D-2025>. Accessed 12 Jan 2021.
27. Age UK. Policy position paper mental health (England). 2019. https://www.ageuk.org.uk/globalassets/age-uk/documents/policy-positions/health-and-wellbeing/ppp_mental_health_england.pdf.
28. British Geriatrics Society RC of P. Collaborative approaches to treatment depression among older people living in care homes. 2018. <https://www.bgs.org.uk/sites/default/files/content/attachment/2018-09-12/Depression%20among%20older%20people%20living%20in%20care%20homes%20report%202018.pdf>.
29. Rao R, Roche A. Substance misuse in older people. *BMJ*. 2017;358:j3885.
30. Public Health England. Chronic kidney disease prevalence model. 2014. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/612303/ChronicKidneyDiseaseCKDprevalencemodelbriefing.pdf. Accessed 20 Dec 2021.
31. Stroke Association. Stroke statistics. <https://www.stroke.org.uk/what-is-stroke/stroke-statistics>. Accessed 20 Dec 2021.
32. Royal National Institute for Blind People. 'Access Economics'. The economic impact of sight loss and blindness in the UK adult population [Internet]. RNIB; 2019. <https://www.rnib.org.uk/professionals/knowledge-and-research-hub/research-reports/general-research/economic-impact-sight-loss>. Accessed 20 Dec 2021.
33. Royal National Institute for Blind People. Eye health and sight loss stats and facts [Internet]. 2018. <https://www.rnib.org.uk/sites/default/files/Eye%20health%20and%20sight%20loss%20stats%20and%20facts.pdf>. Accessed 20 Dec 2021.
34. Hodge S, Barr W, Bowen L, Leeven M, Knox P. Exploring the role of an emotional support and counselling service for people with visual impairments. *Br J Vis Impair*. 2013;31(1):5–19.
35. UK Public General Acts. Disability Discrimination Act [Internet]. 1995. <https://www.legislation.gov.uk/ukpga/1995/50/contents>. Accessed 14 Dec 2021.
36. Lin FR, Thorpe R, Gordon-Salant S, Ferrucci L. Hearing loss prevalence and risk factors among older adults in the United States. *J Gerontol Ser A Biol Med Sci*. 2011;66A(5):582–90.
37. UK Public General Acts. Equality Act 2010. 2010. <https://www.legislation.gov.uk/ukpga/2010/15/contents>.
38. NHS England. Accessible information standard. 2017. <https://www.england.nhs.uk/publication/accessible-information-standard-specification/>. Accessed 20 Dec 2021.
39. Cancer Research UK. Cancer incidence by age. <https://www.cancerresearchuk.org/health-professional/cancer-statistics/incidence/age>. Accessed 13 Dec 2021.