Miscellaneous Conditions with Manifestations in the Hand and Wrist

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Contents

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Abstract

In any textbook dealing with conditions affecting a particular anatomical site, there will be some which do not fit conveniently under the standard chapter headings. The purpose of this chapter is to review these miscellaneous localised and systemic disorders that may affect the hand and wrist.

1 Introduction

In any textbook dealing with conditions affecting a particular anatomical site, there will be some which do not fit conveniently under the standard chapter headings. The purpose of this chapter is to review these miscellaneous localised and systemic disorders that may affect the hand and wrist.

2 Paget's Disease

Paget's disease of bone is a benign disorder affecting 3–4% of the population over 40 years of age predominantly in Caucasian races (Smith et al. 2002). There is recent evidence of decreasing prevalence (Cundy 2006). The abnormality in Paget's disease is excessive and abnormal remodelling of bone. Three pathologic phases have been described: the lytic phase, the mixed phase and the blastic phase. Initially there is osteolysis, followed by trabecular and cortical thickening and enlargement in the mixed phase of the disease, followed by sclerosis in the blastic phase. Paget's disease is usually polyostotic and asymmetric.

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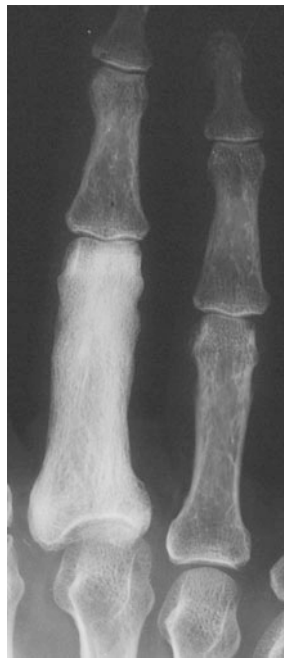

Fig. 1 Paget's disease. There is bony sclerosis and expansion of the proximal phalanx of the middle finger

Polyostotic disease (65–90%) is more frequent than monostotic disease.

Involvement in the hand and wrist has been reported infrequently, although bone scintigraphy studies reveal hand localisation varying from 6.4 to 11.6% (Friedman et al. 1982). Clinically, Paget's disease in the hands is usually asymptomatic; however, several cases with pain in the hands have been reported (Friedman et al. 1982). When Paget's disease occurs in the hand, there is usually a polyostotic involvement (Haverbush et al. 1972). Monostotic localisation in the hand is less frequent (De Smet et al. 1994; Rodriguez-Peralto et al. 1994; Calif et al. 2007). It typically affects the phalanges and metacarpals, with carpal involvement rare and distal phalangeal involvement almost unknown. The most common radiographic pattern of disease in the hand is sclerosis (Fig. 1; Haverbush et al. 1972) and is seen in 45% of cases (Friedman et al. 1982). However, all patterns as found elsewhere in the body (cortical destruction, bone expansion, coarsened trabeculae and bone sclerosis) may be seen in the hand (Friedman et al. 1982). Sarcomatous transformation is the most sinister complication of Paget's disease and is rarely seen in the hand. A review by Lopez et al. (2003) looked at 340 cases of Paget's sarcoma in the literature and identified no cases in the hand and wrist. Isolated cases of malignant transformation have, however, been recorded (Friedman et al. 1982). The MR imaging appearances of Pagetic marrow can be variable (Smith et al. 2002) but a useful diagnostic sign is the preservation of the hyperintense marrow signal on T1-weighted images (Fig. 2; Boutin et al. 1998; Kaufmann et al. 1991; Sundaram et al. 2001; Vande Berg et al. 2001).

3 Sarcoid

Sarcoidosis is a granulomatous disorder of unknown cause that affects multiple organ systems. It is characterised by the presence of multiple non-caseating granulomas, most commonly seen in the lungs, lymph nodes, skin and eyes. The diagnosis is made by a combination of clinical, radiological and histological features.

Skeletal involvement has been reported in 1–13% of patients with the disease. Radiographic evaluation is often limited to the hands or feet, which demonstrate predominantly osteolytic lesions. The hand is the commonest site of skeletal sarcoidosis. The lesions may be unilateral or bilateral, but symmetrical involvement is unusual. Lesions in the hand are most commonly seen in the middle and distal phalanges, and less often in the proximal phalanges and metacarpals (Van Linthoudt and Ott 1986). There are several types of lesion that are seen. The characteristic lesion is the alteration of the trabecular lattice resulting in a honeycomb lytic appearance (Fig. 3). Cystic lesions may also occur leading to a punched-out appearance that may be located centrally or eccentrically (Fig. 3). Osseous destruction may appear rapidly if these lesions are associated with cortical erosion, which can lead to pathological fracture (Neville et al. 1976, 1977). Periosteal new bone formation is uncommon.

Acro-osteolysis (terminal phalangeal resorption) has been reported in sarcoid involvement of the hands (Fig. 4). The finding is non-specific. In both the hand and the wrist, tenosynovitis is a recognised complication of sarcoidosis (Katzman et al. 1997; Moore 2003). Other soft tissue changes can be seen on MR imaging. These include focal and diffuse muscle lesions, soft tissue infiltration and masses (Moore 2003). MR imaging may also be useful in the

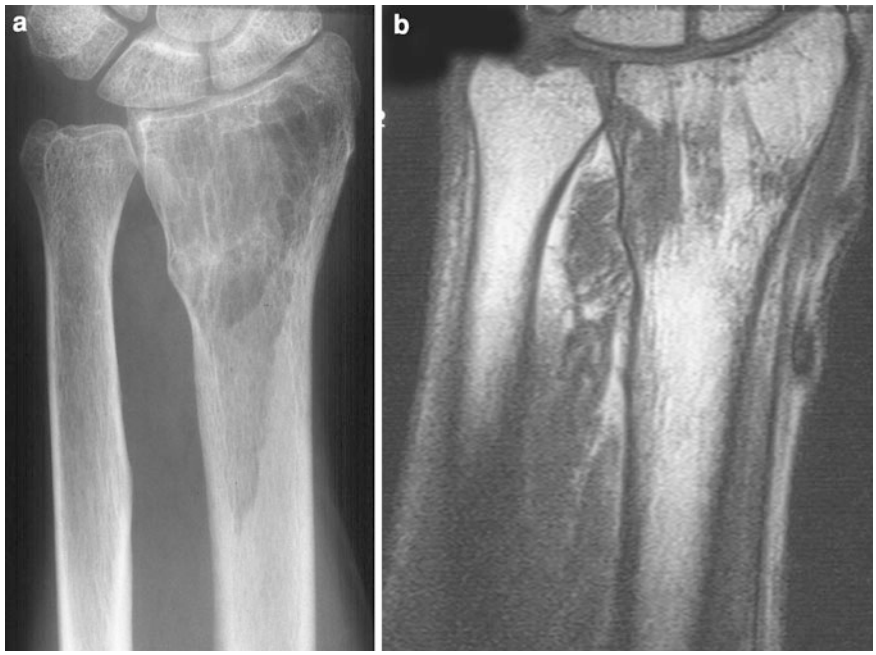

Fig. 2 **a** Radiograph and **b** coronal T1-weighted MR imaging of Paget's disease of the distal radius. The radiograph was initially misinterpreted as showing a giant cell tumour but the preservation of the hyperintense marrow signal in **b** is highly suggestive of Paget's disease

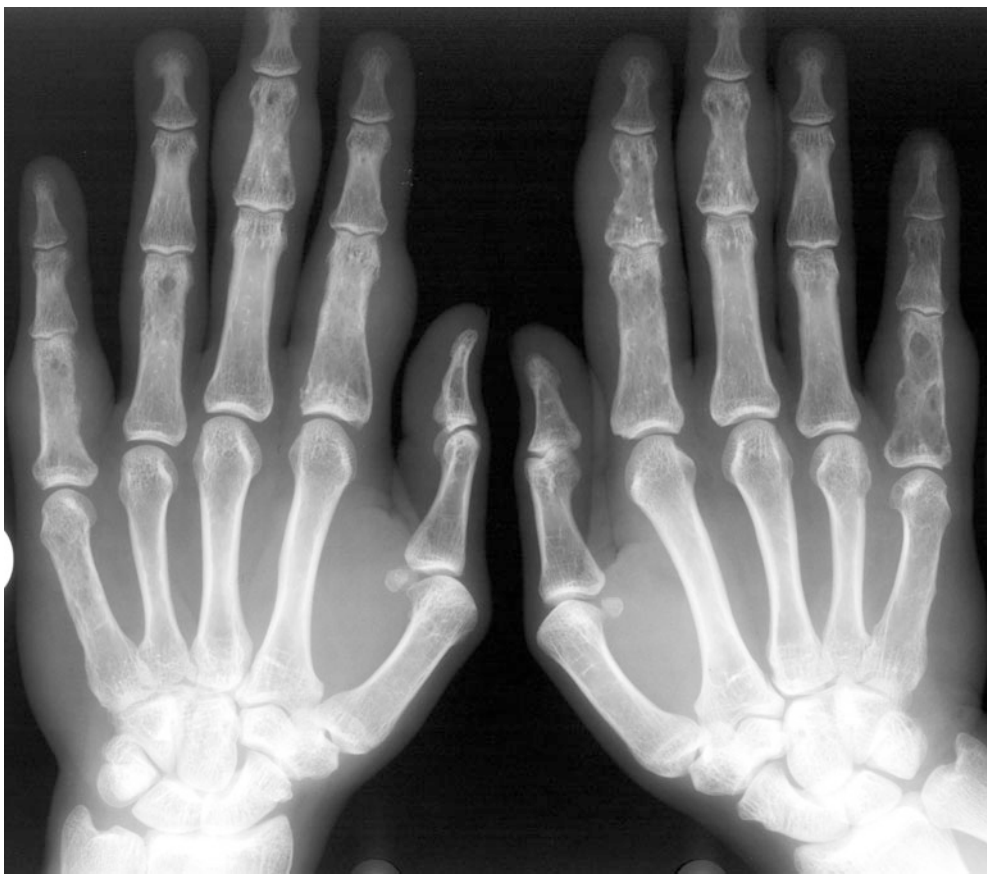

Fig. 3 Sarcoidosis. There is involvement of the proximal and middle phalanges of both hands. The appearances are more punched-out on the *left* with honeycomb osteolysis on the *right*

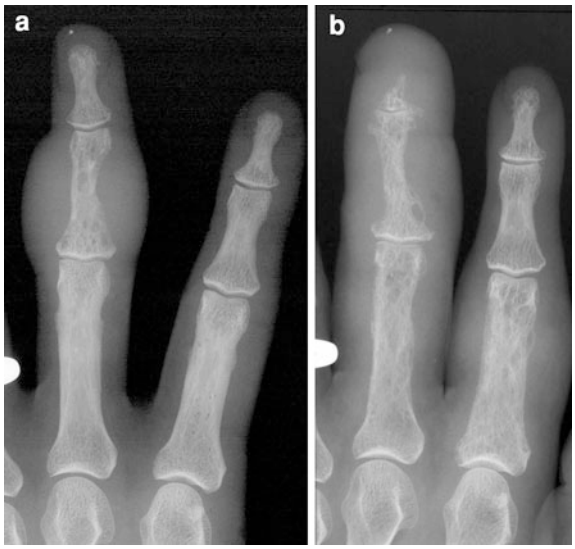

Fig. 4 Sarcoidosis. At presentation, **a** showing eccentric soft tissue swelling and lacy osteolysis of the middle phalanx of the middle finger; 14 years later, **b** showing soft tissue swelling of both index and middle fingers and progression of disease with terminal phalangeal resorption and further destruction of the middle phalanx of the middle finger. There is now also involvement of the proximal phalanges of both fingers

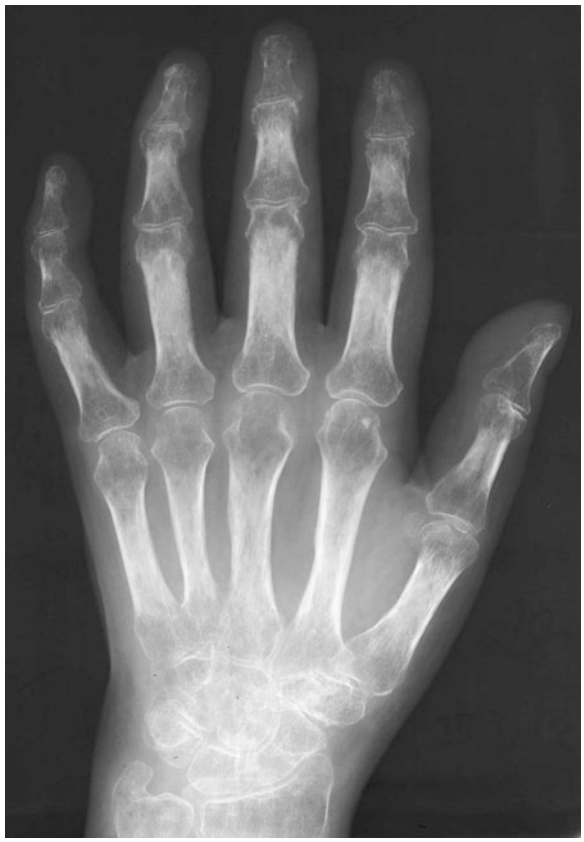

Fig. 5 Reflex sympathetic dystrophy. There is intense juxta-articular osteopenia mimicking an acute inflammatory arthropathy

differential diagnosis, for example in the evaluation of soft tissue nodules distinguishing gout from sarcoidosis. Intermediate-weighted MR images typically show tophi as hypointense, whereas sarcoid nodules will usually be hyperintense.

Lofgren syndrome is a well-recognised manifestation of sarcoidosis, with patients exhibiting arthralgias, erythema nodosum and bilateral hilar lymphadenopathy. Polyarthritis involving the interphalangeal joints, wrists, elbows, knees or ankles is common. Monoarthritis and effusion are uncommon. Ten to thirty-five percentage of sarcoidosis patients will also experience joint symptoms due to granulomatous arthritis with a chronic transient or relapsing arthropathy. Sausage-like dactylitis of the fingers can also occur (Fig. 4). Pain is usually not severe. The uptake of FDG in PET scanning from sarcoid tissue is non-specific. However, Brudin et al. (1994) have described how the degree of FDG uptake correlates with disease activity, and although FDG PET is not useful for initial diagnosis, it could be used for evaluating the extent of active disease and monitoring response to therapy (Love et al. 2005).

4 Reflex Sympathetic Dystrophy

Reflex sympathetic dystrophy (RSD) is a distinct condition that occurs in a variety of clinical situations. There are several terms that are used to describe the same condition including: causalgia, algodystrophy, Sudeck's atrophy, post-traumatic osteoporosis and complex regional pain syndrome. Although the cause is often idiopathic, many visceral, musculoskeletal, neurological and vascular conditions can cause RSD with trauma the most common. The most frequent site for RSD is in the hand. Clinical symptoms include stiffness, pain, tenderness and weakness. Radiographic changes range from soft tissue swelling with juxta-articular osteopenia (Fig. 5) to a more generalised osteopenia (Fig. 6). The former can mimic the

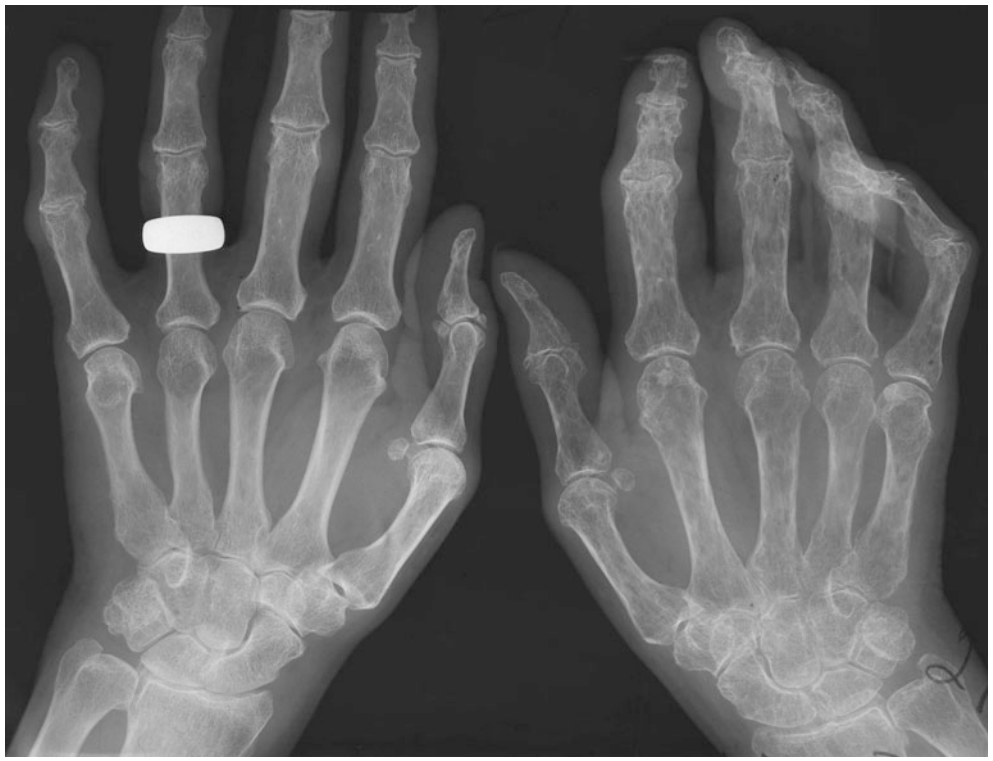

Fig. 6 Reflex sympathetic dystrophy. In this chronic case affecting the right hand, there is intense generalised osteopenia with multiple intracortical lucencies. Note the normal bone density of the unaffected left hand

presentation of an acute inflammatory arthropathy but in RSD there is no joint space narrowing or erosions. Both three-phase bone scintigraphy and MR imaging can be used to assess the "activity" of this disorder over time (Park et al. 2009).

5 Haematological and Marrow Disorders

This section covers the imaging manifestations in the hand and wrist of haematological and marrow disorders including haemophilia, sickle cell anaemia and thalassaemia.

5.1 Haemophilia

Haemophilia and related bleeding disorders are a group of conditions that are characterised by abnormality in blood coagulation caused by deficiency in certain plasma clotting factors. The two most common types associated with intraosseous and intraarticular bleeding are haemophilia A (deficiency in clotting factor VIII) and haemophilia B (deficiency in clotting factor IX). Haemarthrosis occurs in 75–90% of people with haemophilia and in time leads to a haemophilic arthropathy. This begins between the ages of 2–3 years and increases in frequency till the ages of 8–13 years. The joints most commonly affected include the knee, elbow, ankle, hip and shoulder. Usually, a single joint is involved in each episode, though eventually multiple joints become affected in this disease. Intraarticular bleeding is rare in the hand and wrist. A well-recognised but rare complication occurring in approximately 2% of patients with severe haemophilia is the so-called haemophilic pseudotumour. These result from chronic recurrent haemorrhage that may be intraosseous, subperiosteal or arise in the soft tissues. The bones most frequently involved, in order of decreasing frequency, are the femur, pelvis, tibia and the small bones of the hand

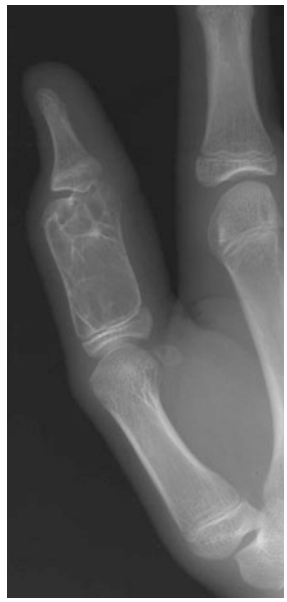

Fig. 7 Haemophilic pseudotumour proximal phalanx of the thumb. The age of the patient and the radiographic appearances mimic an aneurysmal bone cyst

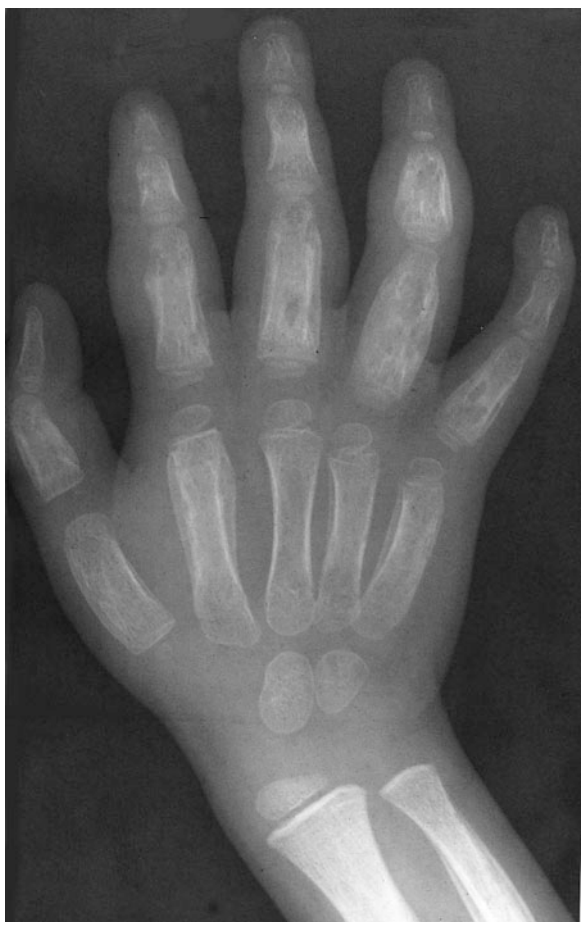

Fig. 8 Sickle cell disease. A young child with severe hand–foot syndrome showing medullary lucencies and periosteal new bone formation involving all the long bones of the hand and the distal ulna. The visible mineralised carpal bones are not involved

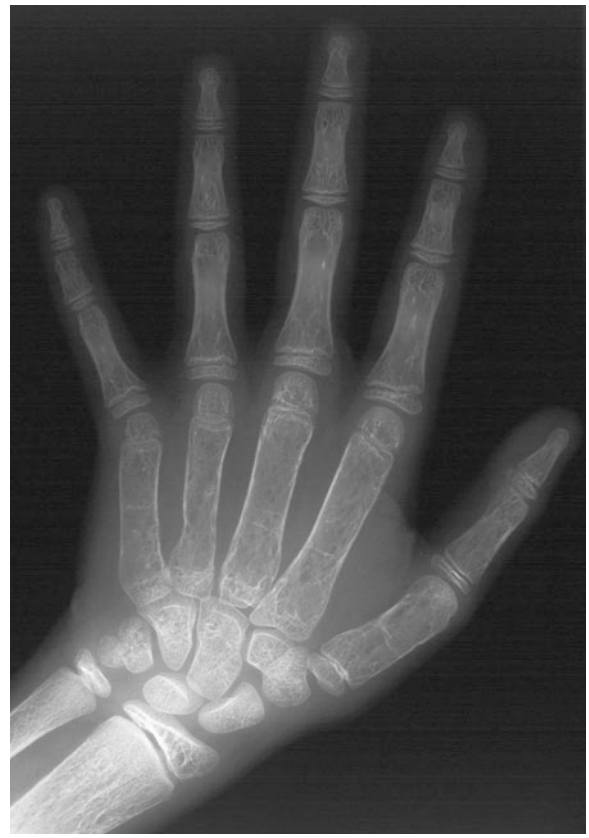

Fig. 9 Thalassaemia. The marrow hyperplasia is causing severe generalised osteopenia, trabeculation and minor expansion of the long bones

(Park and Ryu 2004). Cases have also been reported affecting the distal forearm bones (Ahlberg 1975; Shaheen and Alasha 2005). Cases involving the hand and wrist are usually of intraosseous origin, whereas pseudotumours arising in the lower limbs and pelvis tend to be extraosseous with secondary pressure erosion of adjacent bones. In the long bones of the hand, intraosseous haemophilic pseudotumour shows an expansile benign-appearing lytic lesion mimicking amongst other pathologies an aneurysmal bone cyst (Fig. 7; Shaw and Wilson 1993).

5.2 Sickle Cell Disease

Sickle cell disease is one of the hereditary haemoglobinopathies characterised by an abnormal haemoglobin chain (HbS). Clinical manifestations of the disease include painful crises affecting the bones and joints of the extremities. In children with sickle cell anaemia, 30% will present with hand–foot syndrome

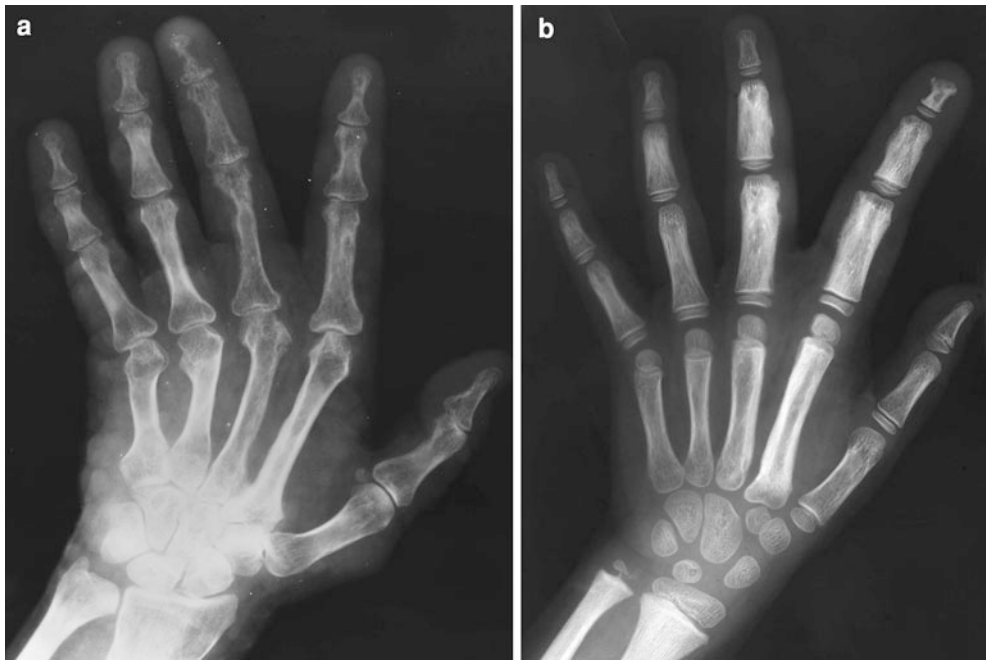

Fig. 10 Two different cases of neurofibromatosis. **a** Multiple soft tissue lumps due to subcutaneous neurofibromas and bone erosions in the index and middle fingers. **b** There is focal gigantism and sclerosis of the index and middle metacarpals and fingers

between the ages of 6–24 months with pain and swelling of the hands due to marrow infarction (Watson et al. 1963). The radiographic changes are those of a dactylitis with osteolysis and periosteal new bone formation (Fig. 8; Bohrer 1970). Hand–foot syndrome is rare after 6 years of age because the red marrow recedes from the distal tubular bones of the hand and is replaced by yellow marrow with reduced oxygen requirements. Severe dactylitis may cause premature growth plate fusion thereby causing relative shortening of one or more long bones of the hand (Cockshott 1963). Ischaemic changes in the carpal bones are uncommon (Lanzer et al. 1984).

5.3 Thalassaemia

Thalassaemia is a hereditary haemoglobinopathy with an abnormality in the globin chain production of the red blood cell. This can involve a deficiency in alpha-globin chain synthesis or beta-globin chain synthesis. In severe untreated cases, there is generalised osteopenia and the tubular bones of the hand are expanded secondary to marrow hyperplasia (Fig. 9; Caffey 1957; Middlemiss and Raper 1966). There is also cortical thinning with a coarse, trabeculated appearance. When MR imaging is used in the assessment of the tubular bones of the hand, the findings may include an indistinct physeal–metaphyseal junction, altered signal intensity in the metaphysis, physeal widening and metadiaphyseal and epiphyseal lesions. Severe radiographic changes are not often seen in the developed world these days as most cases are treated from early infancy with repeated blood transfusions thereby reducing the marrow hyperplasia.

5.4 Other Marrow Disorders

The radiographic appearances in the hands of other marrow and deposition disorders such as Gaucher's disease and Niemann-Pick disease are relatively minor when compared with changes elsewhere in the skeleton. The authors have reported a single case of Erdheim–Chester disease presenting with a lytic lesion in a metacarpal mimicking a giant cell tumour or metastasis (Davies et al. 2010). Marrow malignancies are covered in chapter "Tumours and Tumour-like Leisions of Bone".

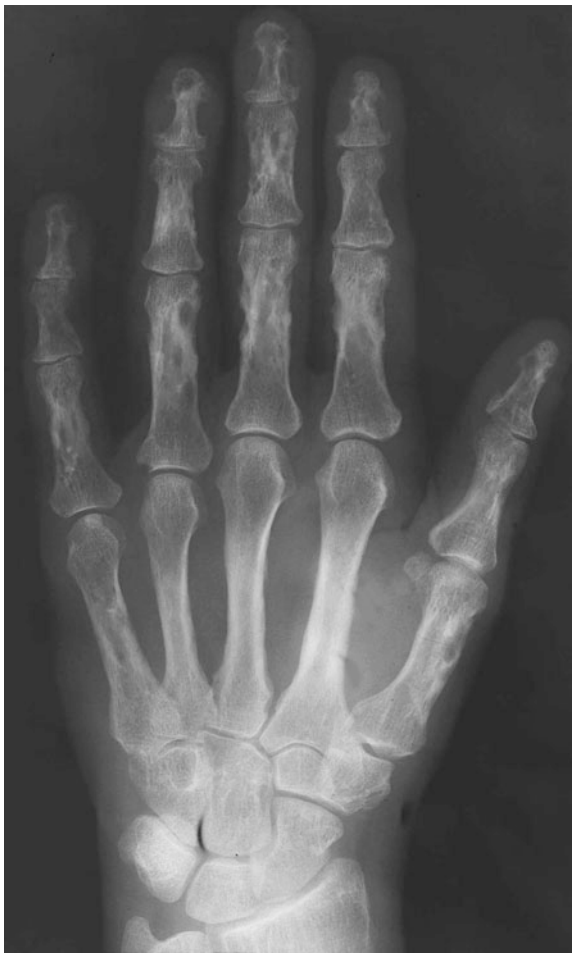

Fig. 11 Tuberous sclerosis. Multiple cyst-like radiolucencies involving the first and fifth metacarpals and all the fingers

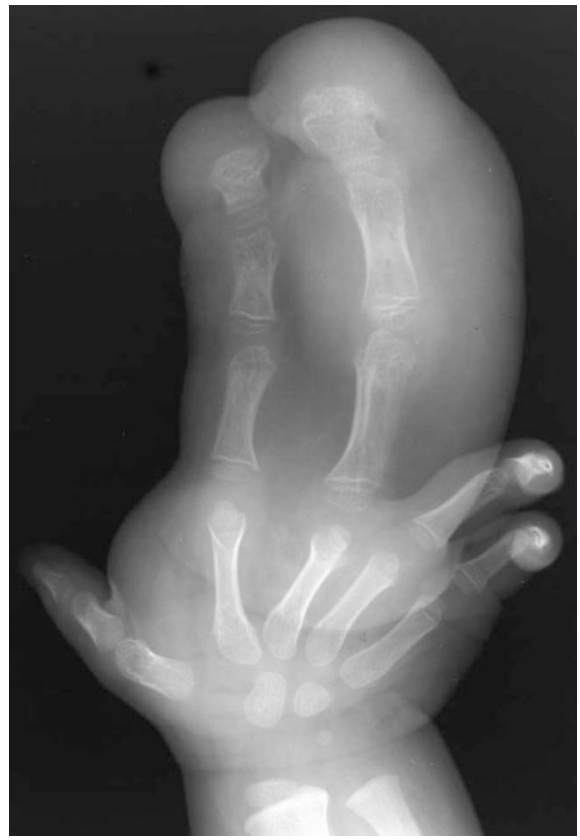

Fig. 12 Macrodystrophia lipomatosa in a child. Focal gigantism of the index and middle fingers with bony overgrowth and soft tissue syndactyly

6 Amyloidosis

Amyloidosis is the deposition of abnormal insoluble proteins in soft tissues and bone. It is not a single disease entity with to-date over 20 variants identified. The World Health Organization has proposed a classification based on the precursor fibril protein (Westermark et al. 2002). This includes primary systemic, secondary systemic, familial, dialysis-related, etc. Soft tissue amyloid deposition produces nodules that are often prominent over the joints of the hand and wrist. Similar deposits in the carpal canal may lead to carpal tunnel syndrome. Ten to thirty percentage of patients with primary amyloidosis have carpal tunnel syndrome. Typically, a bilateral distribution is seen, and signs and symptoms related to carpal tunnel syndrome often precede other manifestations of the disease. Amyloid deposition has also been documented in the wrists of patients on dialysis for chronic renal failure with carpal tunnel syndrome. The radiographic findings of amyloidosis in the hand and wrist include asymmetric soft tissue masses, periarticular osteoporosis, widening of the articular spaces and subchondral cysts and erosions. The appearance differs from rheumatoid disease of the hands and wrist as there is preservation of the joint space with soft tissue nodular masses. Extensive joint destruction is occasionally encountered in amyloidosis resulting from neuropathic arthropathy or osteonecrosis of the epiphyseal surfaces. On MR imaging, the amyloid deposits tend to be iso- or slightly hypointense with respect to muscle (Cobby et al. 1991; Kiss et al. 2005).

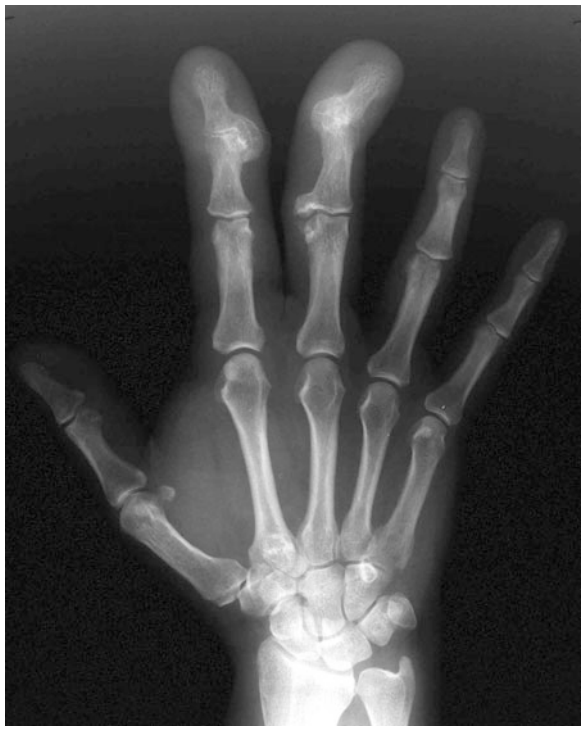

Fig. 13 Macrodystrophia lipomatosa in an adult: focal gigantism of the index and middle fingers with periarticular exostoses

Table 1 Diseases associated with hypertrophic osteoarthropathy (modified from Gibson et al. 2008)

Pulmonary
Bronchogenic carcinoma
Metastases
Mesothelioma
Pulmonary abscess
Tuberculosis
Bronchiectasis
Cystic Fibrosis
Cardiac
Cyanotic heart disease
Bacterial endocarditis
Gastrointestinal
Inflammatory bowel disease
Biliary atresia
Cirrhosis
Miscellaneous
Nasopharyngeal carcinoma
Hodgkin's lymphoma
AIDS

7 Haemochromatosis

Haemochromatosis results from excessive iron storage in the soft tissues. It may be primary, inherited as an autosomal recessive disorder, or secondary to chronic anaemias with multiple transfusions and dietary iron overload. In the hand and wrist, calcium pyrophosphate dihydrate (CPPD) crystal deposition causes chondrocalcinosis of the triangular fibrocartilage in up to 60% cases. In chronic cases, particularly the primary form, a structural arthropathy develops with a predilection for the second and third metacarpo-phalangeal joints with joint space narrowing and hook-like exostoses on the radial aspect of the metacarpal heads (Schumacher 1964).

8 Phakomatoses

The phakamatoses are a group of neurocutaneous syndromes typified by the development of benign tumours and malformations, especially in organs of ectodermal origin. The two such conditions that may manifest in the hands are neurofibromatosis and tuberous sclerosis. In neurofibromatosis, this includes soft tissue masses, bone erosion from adjacent neurofibromas and localised gigantism (macrodactyly; Fig. 10). In tuberous sclerosis, there may be multiple cyst-like radiolucencies, periosteal thickening and localised gigantism (Fig. 11; Bernauer 2001).

9 Macrodystrophia Lipomatosa

This is a rare congenital form of localised gigantism due to overgrowth of the mesenchymal tissues particularly hypertrophy of adipose tissue. This results in enlargement of one or more adjacent digits (Fig. 12; Hildebrandt et al. 1993). Most of the reported lesions are present at birth and are associated with a high incidence of local anomalies including syndactyly, polydactyly and clinodactyly. In the adult, the bony hypertrophy can be associated with periarticular exostoses (Fig. 13). The condition may also be associated with carpal tunnel syndrome (Ranawat et al. 1968).

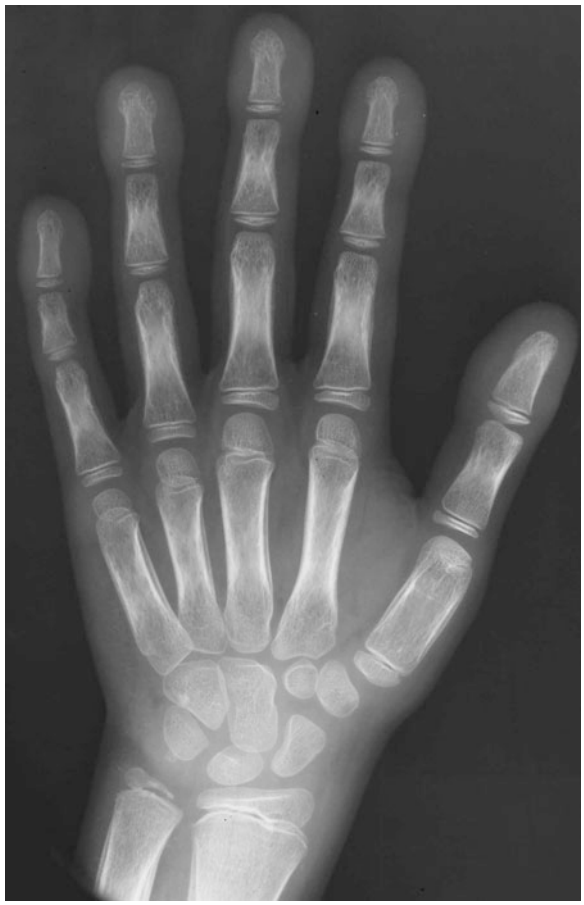

Fig. 14 Hypertrophic osteoarthropathy. Child with long-standing, untreated cyanotic heart disease. There is a single-layer lamellar periosteal reaction along the distal radius and ulna, the metacarpals and to a lesser extent the phalanges. There is also evidence of digital clubbing

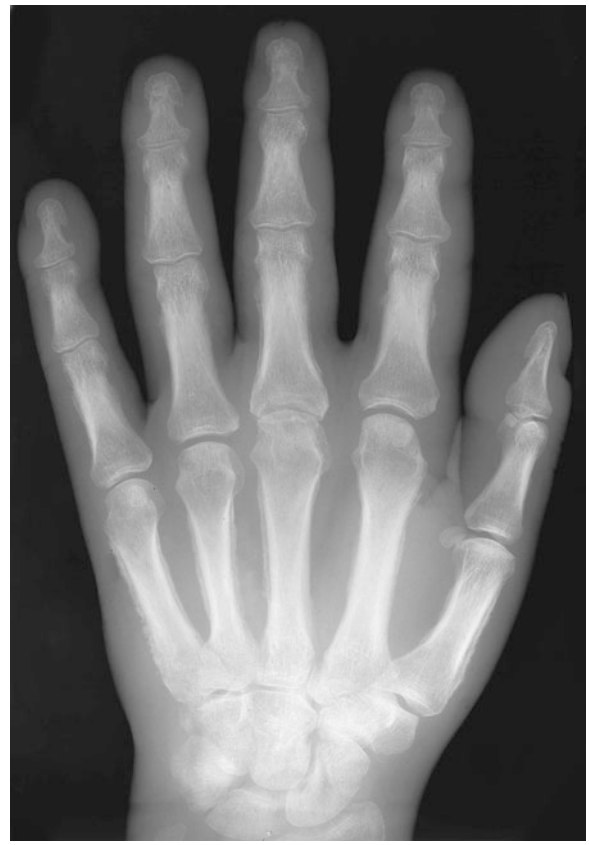

Fig. 15 Hypertrophic osteoarthropathy. Adult with known bronchogenic carcinoma. There is symmetrical coarse periosteal new bone formation along all the metacarpals and to a lesser extent the phalanges

10 Hypertrophic Osteoarthropathy

Originally called hypertrophic pulmonary osteoarthropathy, this condition was first described in the French literature at the end of the nineteenth century (Marie 1890). Clinical presentation is with pain and tenderness of the extremities with digital clubbing. Although most commonly associated with lung diseases, classically bronchogenic carcinoma, the term pulmonary has been dropped in recognition of the non-pulmonary associations (Table 1). The typical radiographic appearance is symmetrical periosteal new bone formation along the tubular bones. This occurs in the diaphyses of the radius and ulna, and less frequently in the metacarpals and phalanges. The severity can vary from simple elevation of the periosteum (Fig. 14), to a lamellated "onion-skin" appearance, to irregular periosteal "cloaking" with an undulating contour (Fig. 15; Ali et al. 1980; Pineda et al. 1987). The differential diagnosis for hypertrophic pulmonary osteoarthropathy includes pachydermoperiostitis sometimes referred to as primary hypertrophic osteoarthropathy. This is a rare, often familial, lesion predominantly of males with a predisposition for Afro-Caribbean populations. Clinically, there is clubbing of the fingers, thickening of the skin and hyperhydrosis. Compared with hypertrophic pulmonary osteoarthropathy, it is relatively pain free. The bones most commonly affected are the radius and ulna, followed by the tubular bones of the hands. The periosteal reaction is similar to hypertrophic pulmonary osteoarthropathy but is more solid and spiculated and also involves the epiphyses to produce outgrowths around joints (Fig. 16).

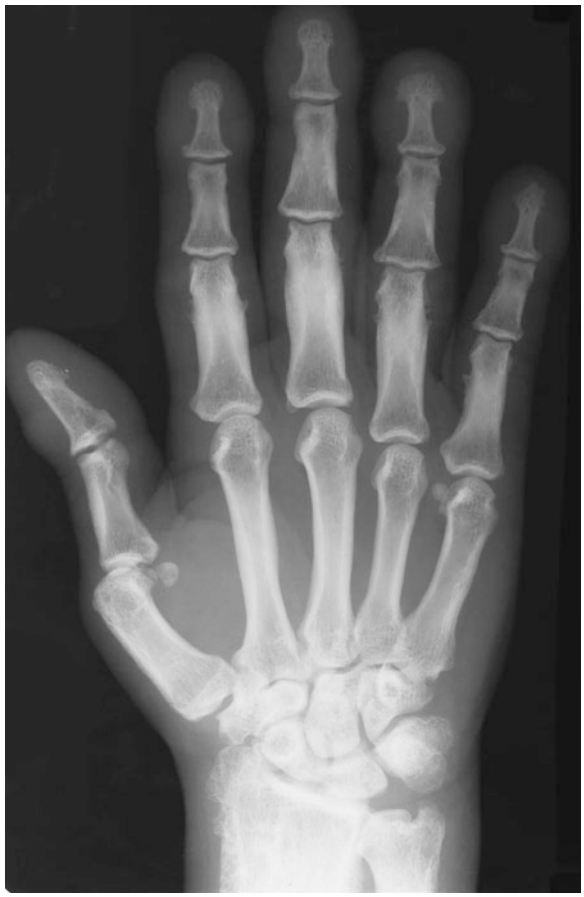

Fig. 16 Pachydermoperiostosis in an adult of Afro-Caribbean ethnic origin. Digital clubbing with coarse periosteal new bone formation along the distal radius and proximal phalanges

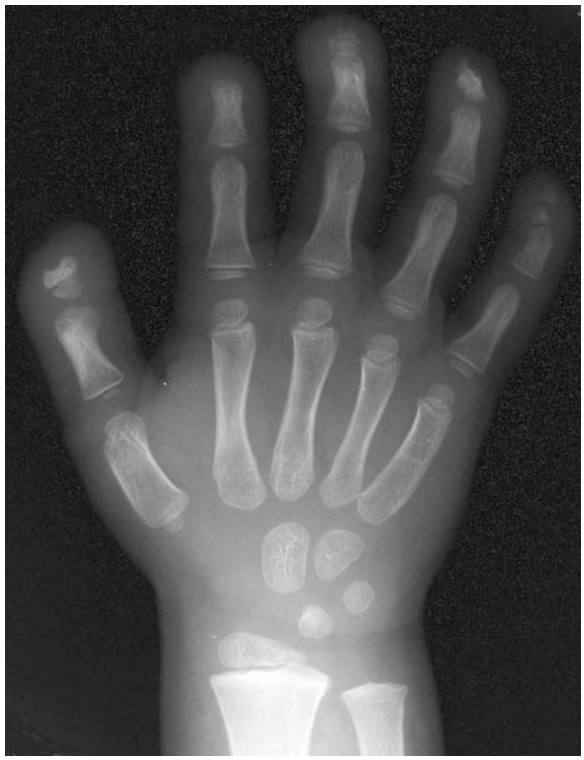

Fig. 17 Congenital insensitivity to pain. There is extensive terminal phalangeal resorption (acro-osteolysis) secondary to the underlying neuropathy. The appearances are non-specific and may be seen in other causes of neuropathy such as leprosy or following "trauma" such as frostbite

11 Congenital Insensitivity to Pain

Congenital insensitivity to pain, first described in 1932 (Dearbon 1932), is a rare hereditary sensory and autonomic neuropathy characterised by the congenital inability to register pain or temperature changes (Rahalkar et al. 2008; Reilly 2009). The principal orthopaedic manifestations are recurrent fractures, neuropathic joints and osteomyelitis (Silverman and Gilden 1959; Siegelman et al. 1966; Karmani et al. 2001). The changes in the hand include acro-osteolysis, amputations and secondary osteomyelitis (Fig. 17; Gwathmey and House 1984). In children, epiphyseal separation and growth plate fragmentation may occur at the wrist.

12 Toxic Agents and Pharmacological Agents

Toxic effects manifested in the hand may be localised or systemic. An example of a localised toxic effect is soft tissue necrosis and contractures secondary to snake bite venom (Huang et al. 1978). Snake and scorpion venom have also both been reported as causing acro-osteolysis (Qteishat et al. 1985). Osteolysis resulting from secondary infections due to animal bites is well recognised. The animals include domestic pets, rodents, exotic animals such as camels (Al-Boukai et al. 1989) and of course humans (Resnick et al. 1985).

Systemic toxic effects include lead poisoning seen in the past in children who had ingested lead-based paints. Radiographs show a radiodense line paralleling the growth plates in the metaphyses of

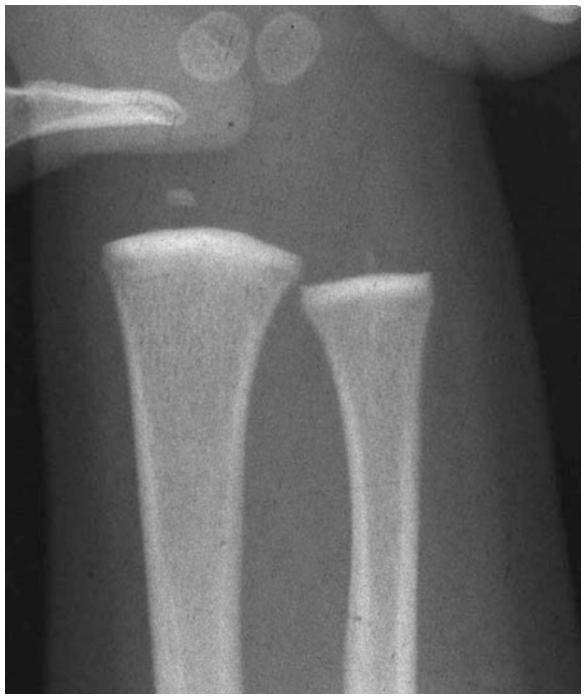

Fig. 18 Lead poisoning. An infant with a radiodense "lead line" in the distal radial and ulnar metaphyses

the distal radius and small tubular bones of the hand (Fig. 18; Leone 1968; Sachs 1981). Multiple lead lines may be seen if the exposure to the lead has been repeated. The differential diagnosis of radiodense lines in the distal radial metaphysis include other forms of heavy metal poisoning (e.g. bismuth and phosphorus) and the healing phase of rickets and scurvy and treated leukaemia. A toxic cause of more generalised bony sclerosis is fluorosis that is endemic in certain areas of India. In children, this may be associated with rickets-like changes (Christie 1980). An unusual form of occupational acro-osteolysis has been described in polyvinylchloride (PVC) poisoning (Gama and Meira 1978). The typical radiographic feature is a band of osteolysis through the terminal phalanges (Fig. 19a). With removal of exposure to the PVC manufacturing process, there is healing of the defects with shortening and widening of the terminal phalanges (Fig. 19b). A similar appearance may be seen with familial acro-osteolysis (Hajdu–Cheney syndrome) and has also been reported in a guitarist (Destouet and Murphy 1981).

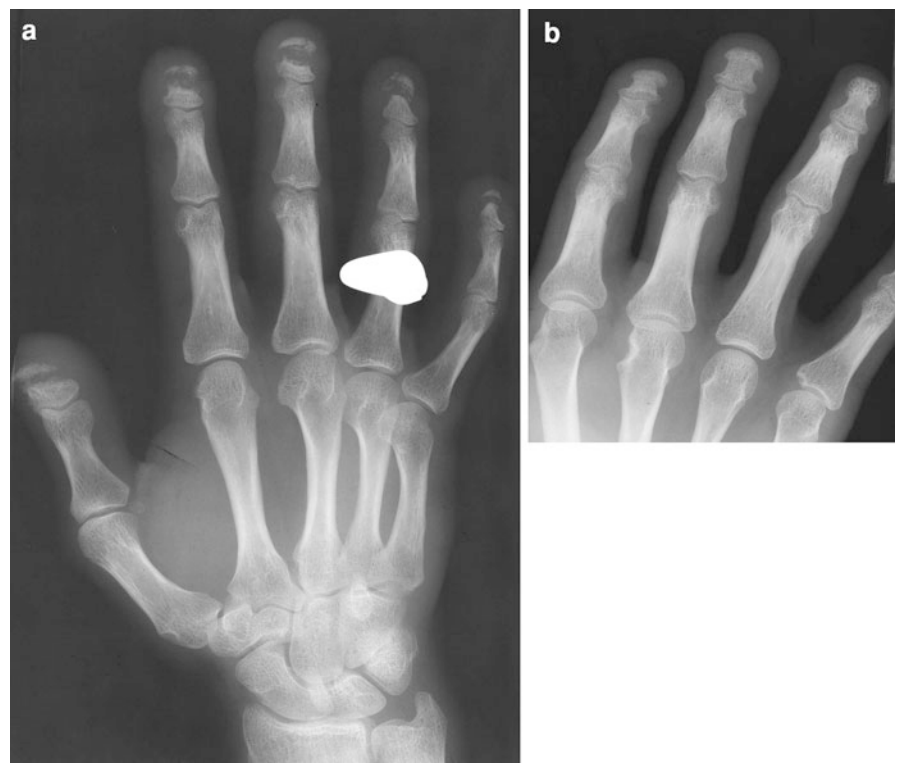

Fig. 19 Polyvinylchloride (PVC) poisoning. **a** Typical band-like acro-osteolysis across the terminal phalanges. **b** On removal from exposure to the PVC manufacturing process, there has been healing of the defects with shortening and widening of the terminal phalanges

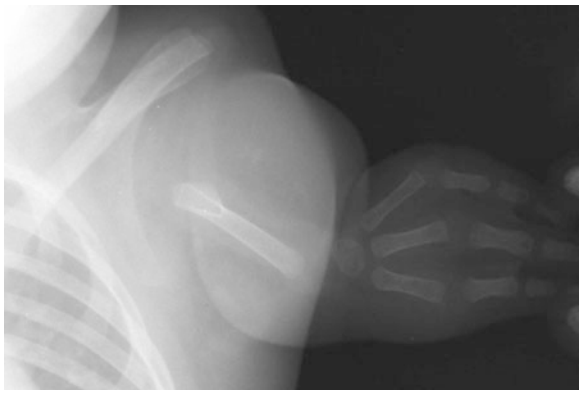

Fig. 20 Teratogenic effects of thalidomide therapy during pregnancy. The child has been born with proximal phocomelia and severe skeletal abnormalities of the hand

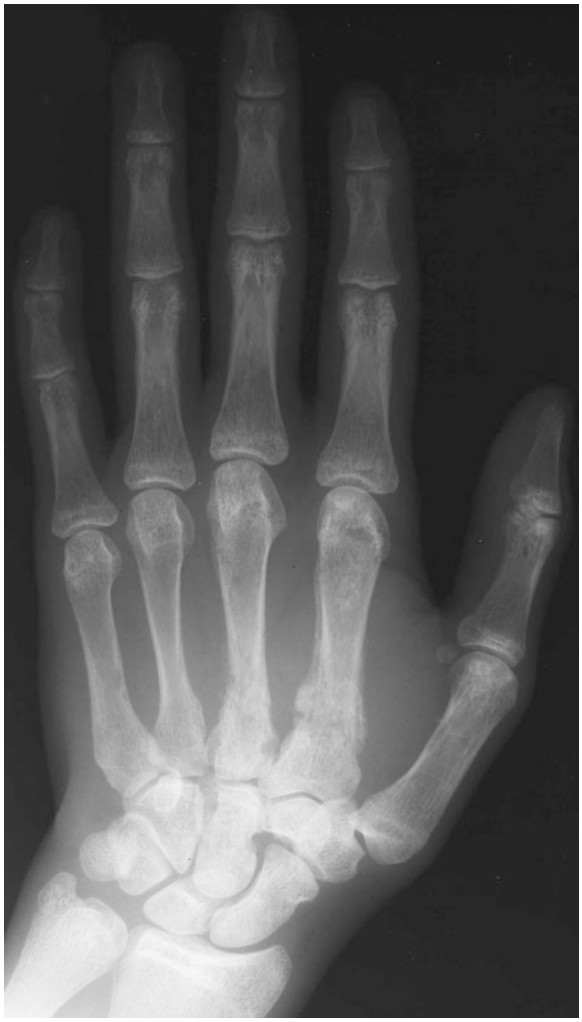

Fig. 21 Dialysis-related aluminium bone disease. Osteomalacic pattern with Looser's zone in the 2nd and 3rd metacarpals

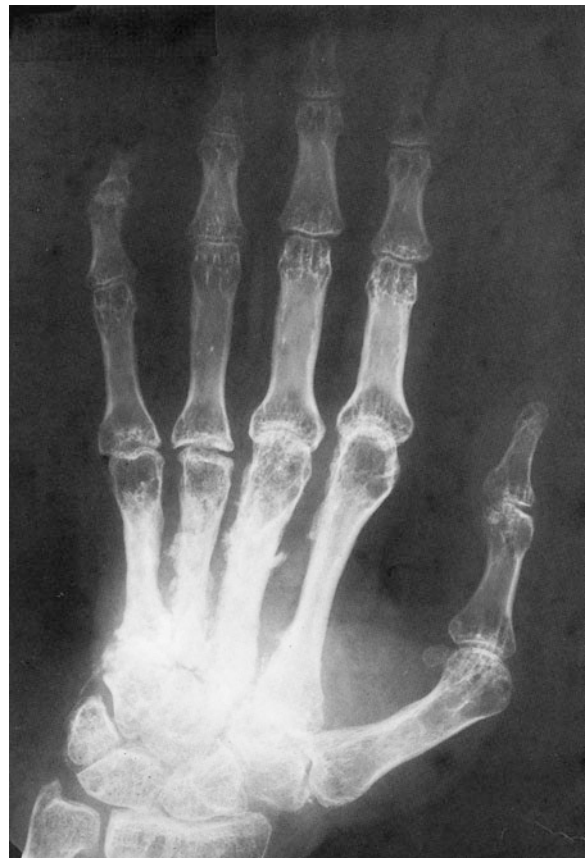

Fig. 22 Radionecrosis. Historical case of a seamstress who underwent protracted fluoroscopy for the removal of a sewing needle embedded in the soft tissues. This caused skin ulceration and contractures and radionecrosis of the metacarpals (from the collection of Dr Philip Jacobs—deceased)

Prolonged and excessive exposure to numerous pharmacological agents may cause skeletal abnormalities identifiable on radiographs of the hand. These range from the devastating teratogenic effects of thalidomide (Fig. 20) to the rickets-like or osteomalacia pattern associated with phenytoin, phenobarbital, deferoxamine, diphosphonates and dialysis-related aluminium toxicity (Fig. 21). Hypervitaminosis A can cause generalised periosteal reactions (Caffey 1951) and hypervitaminosis D sclerotic metaphyseal bands (De Wind 1961).

13 Radiation Changes

It was not long after the discovery of X-rays in 1895 by Wilhelm Roentgen that the deleterious effects were being reported. An eminent British Radiologist,

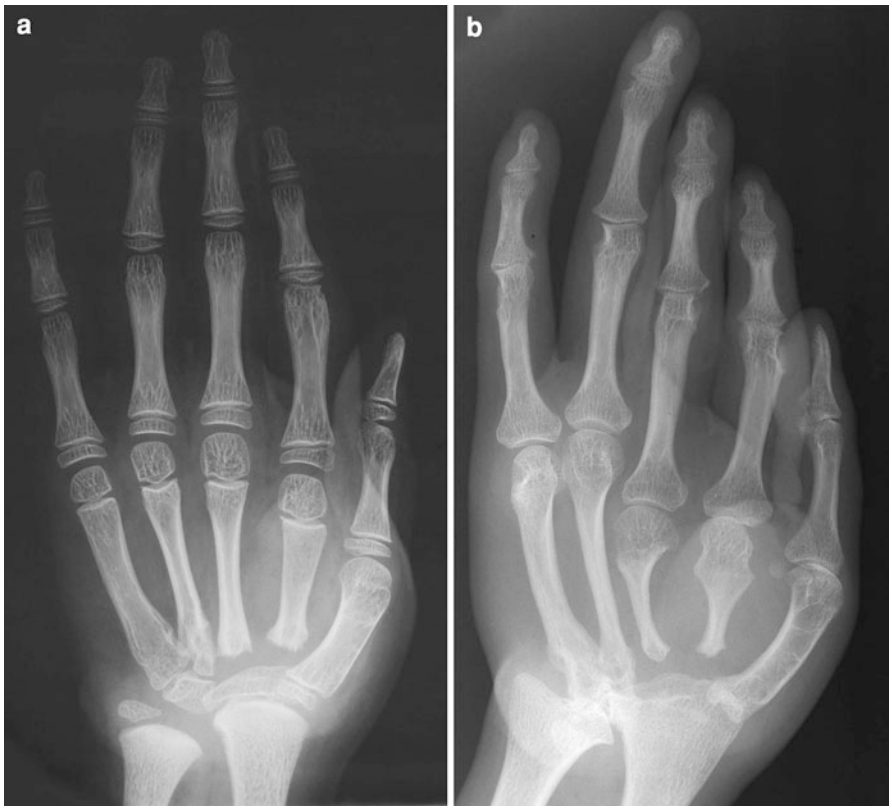

Fig. 23 Idiopathic Multicentric Osteolysis (Carpal-Tarsal Osteolysis). **a** Child showing marked resorption of the carpal bones with involvement of the bases of the 2nd and 3rd metacarpals. **b** Same case as an adult showing disease progression with further involvement of the metacarpals

John Hall-Edwards, working at the General Hospital in Birmingham was one of the first to give a comprehensive description of the adverse effects of X-rays on the bones of the hand—using his own hands for case material (Hall-Edwards 1908). Complications include radiation-induced dermatitis with an increased risk of malignant transformation, growth plate damage in children and radionecrosis of the bones (Fig. 22; Hartwell et al. 1964; De Smet et al. 1976). Radiation-induced damage to the hands from diagnostic X-rays is mercifully rare in this day and age but modern radiologists do need to be aware of the potential increase in radiation dose to the hands when undertaking interventional procedures under either fluoroscopic or CT control. Radiation-induced tumours of the hand following radiotherapy are rare (Libshitz and Cohen 1982). It is possible that the incidence of radiation-induced osteochondromas in the hands may rise due to the increasing use of whole-body irradiation in children as part of the preparative regimen for haematopoietic stem cell (bone marrow) transplantation.

14 Massive Osteolysis

Bone destruction is a non-specific feature of numerous different bone conditions. There is a rare group of idiopathic disorders causing significant bone destruction that can be categorised under the title of primary osteolysis syndromes (Resnick 2002). The commonest is known as Gorham's disease or Massive Osteolysis characterised by uncontrolled, destructive proliferation of vascular or lymphatic vessels within bone and the surrounding soft tissues (Gorham and Stout 1955). Radiographs show dramatic, progressive resorption of bone that can cross joints and involve adjacent bones. The shoulder and the pelvis are the most common sites

of involvement but cases have been reported in the hand (Patel 2005). Another rarer form of primary osteolysis is Idiopathic Multicentric Osteolysis also known as Carpal-Tarsal Osteolysis. Radiographs show progressive carpal bone resorption with in time involvement of the metacarpals (Fig. 23). Cases may be associated with a nephropathy (Warady et al. 1991).

15 Key Points

- the hand is the commonest site of bone involvement with sarcoid.
- the hand is the commonest site for reflex sympathetic dystrophy (complex regional pain syndrome).
- dactylitis may be seen in numerous diseases including sarcoidosis and sickle cell anaemia.
- hypertrophic osteoarthropathy may be associated with both pulmonary and non-pulmonary disorders.

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