# Infection

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Definitions

- Infection is the result of pathogenic organisms invading and multiplying in the body, and it is important to know which organisms are common locally, as this will significantly influence the differential diagnosis of a musculoskeletal infection. In addition, climate and general living conditions need to be taken into account.

- Pre-existing conditions may increase the risk to the patient of developing musculoskeletal infection. These include:
  - Sickle cell disease
  - Intravenous drug abuse
  - Immunosuppression (e.g., HIV)
  - Diabetes
  - Malnutrition, protein deficiency

- Infections of the musculoskeletal system can be subdivided by site;
  - Bone infection (osteomyelitis)
  - Joint infection (septic arthritis)
  - Soft tissue infection (cellulitis and/or soft tissue abscess)
  - Mixed (two or more of the above)
5.1 Introduction of Infectious Agents into the Bone

- bone may be infected by:
  - haematogenous spread (via the bloodstream from infection elsewhere)
  - contiguous infection (infection spread from adjacent soft tissues)
  - direct implantation (either due to trauma or surgery).

- haematogenous spread is common in children and usually starts in the metaphysis. Because of the pattern of blood supply to bone, epiphyseal involvement is usually seen in infants only, whereas in older children, evidence of infectious spread from the metaphysis through the growth plate helps to differentiate infection from tumour.

5.2 Pyogenic Osteomyelitis

- the commonest causative organism in children and adults is *Staphylococcus aureus*. In neonates most such infections are caused by *Streptococcus Type B*.

- osteomyelitis in patients with sickle cell disease an increased incidence of salmonella infection is seen, whereas in drug abusers, *Staphylococcus* is most common although an increased incidence of *Pseudomonas* and *Stenotia* infections are also seen.

5.2.1 Acute osteomyelitis

- if bone infection is suspected, immediate ultrasonography will show localised periosteal oedema at the site of most pain long before radiographic changes appear. Needle aspiration relieves the pressure and pain and allows for identification of the organism and antibiotic sensitivity. This early procedure frequently prevents further development of infection and spread.

- radiographs appear normal in the first 1 to 2 weeks of the infection (fig 5.1a).

- the first abnormal radiographic sign is soft tissue swelling and obliteration of the normal intermuscular fat planes due to the oedema. These changes should also be clinically apparent, i.e. the patient is presenting with a hot and swollen limb.

- after some 2 weeks a periosteal reaction and underlying bone destruction (lysis) involving the medulla and cortex start to develop, and there will be loss of density in the surrounding bone due to the hyperaemia (fig 5.1b).

![Figure 5.1](image)

*Figure 5.1*
Child with acute osteomyelitis of the distal radial metaphysis (a) normal radiograph at first examination; (b) 9 days later there is a destructive lesion in the metaphysis. The rate of progression suggests infection as it is too rapid for even the most malignant of tumours.
• at this stage the lesion can resemble a malignant bone tumour (fig 5.2). However, infection tends to progress more rapidly than tumour, i.e. increasing destruction in infection is evident over days rather than weeks (fig 5.1). A serpiginous (serpent-like) pattern of bone destruction is typical of osteomyelitis.

• if the osteomyelitis is treated promptly healing will be indicated by the reduction in soft tissue swelling, increased sclerosis within the bone (i.e. healing of the lysis) and thickening of the peristomal reaction.

• eventually, a sequestrum and involucrum may develop. A sequestrum is a fragment of necrotic bone, usually linear, isolated from the surrounding living bone by granulation tissue (fig 5.3). It may harbour bacteria, leading to chronic osteomyelitis. An involucrum is the new bone that develops around the sequestrum (fig 5.4).

5.2.2 Subacute osteomyelitis

• due to the gradual development of an abscess within a bone (also known as Brodie’s abscess).
• commonest age group – children.
• commonest site – metaphysis.
• commonest bone affected – tibia.
• the clinical features can be misleading: local pain but little evidence of soft tissue swelling and localised soft tissue inflammation.
• The radiographic changes vary from small abscess cavity close to the growth plate (fig 5.5) to a more extensive metaphyseal cavity with a sclerotic margin (due to reaction in the surrounding bone, fig 5.6).

• The differential diagnosis includes benign bone tumours e.g., eosinophilic granuloma (Langerhans cell histiocytosis), or chronic infection from tuberculosis or fungus.

Figure 5.5
Progress of untreated subacute osteomyelitis (Brodie's abscess) in a child (a) when first examined; (b) 5 months later; and (c) 5 years later.

Figure 5.6
Typical subacute osteomyelitis (Brodie's abscess) in the proximal tibia. The only slightly unusual feature is that the patient is an adult. Tuberculosis must be excluded.

5.2.3 Chronic osteomyelitis

• If the infection persists for months or years the degree of host bone reaction exceeds the destruction from the infection and chronic osteomyelitis develops. The radiographic features include increasing sclerosis with lytic foci, sequestra and involucrum formation (fig 5.7).

— In the form known as sclerosing osteomyelitis of Garré, there is marked sclerosis with cortical thickening and little or no lysis (fig 5.8).
• chronic osteomyelitis may periodically become more active. It can be difficult to identify reactivation of infection on radiographs. Features suggestive of active infection include:
  — change in appearance since previous radiographs (i.e. increasing lysis)
  — immature periosteal reaction (i.e. thin and linear)
  — presence of sequestra
  — presence of draining sinuses (also found in mycotic and tuberculous infection)

• complications of chronic osteomyelitis include,
  — reactivation of infection
  — deformity (due to premature fusion of growth plate or pathological fracture)
  — joint involvement with degenerative joint disease and ankylosis (fusion) (fig 5.9)
  — rare development of malignancy in chronic draining sinus tract (or in tropical ulcer, see Chapter 5.2.4).

![Figure 5.7](image1)
**Figure 5.7**
Adult with osteomyelitis of the fibular shaft. The abscess cavity contains a sequestrum.

![Figure 5.8](image2)
**Figure 5.8**
Sclerosing form of chronic osteomyelitis (of Garré).

![Figure 5.9](image3)
**Figure 5.9**
Adult showing complications of chronic osteomyelitis. There is deformity of the proximal tibia and ankylosis (fusion) of the ankle joint.

### 5.2.4 Tropical ulcer

• an acute localized necrosis of the skin and subcutaneous tissues which is endemic in, but not confined to, tropical regions. Almost all such ulcers develop below the knee.

• superimposed infection may lead to destruction of the deeper soft tissues and involvement of bone. Destructive changes within the bone indicate chronic osteomyelitis (fig 5.10).

• healing or reactive change within the bone can result in a bowing deformity and focal cortical thickening resembling a cortically based osteoid osteoma or healed stress fracture (fig 5.11).
• in some cases malignancy may develop within the ulcer, and in several tropical countries this is a common form of skin cancer.

**Figure 5.10**
Adult with chronic osteomyelitis of the anterior tibia below a tropical ulcer.

**Figure 5.11**
Bony prominence of the anterior aspect of the mid-tibial shaft resulting from a healed tropical ulcer.

### 5.3 Septic Arthritis

• an infection within a joint (septic arthritis) may arise from haematogenous spread or from an adjacent focus of osteomyelitis. The latter is most commonly seen in infants under 12 months of age where the purulent effusion can cause joint subluxation/dislocation (fig 5.12).

**Figure 5.12**
Infant with acute osteomyelitis of the proximal femur. Note that there is also involvement of the hip joint with dislocation. A line drawn along the shaft of the femur passes through the ilium and NOT the acetabulum, as would be normal.
the radiographic features of a septic arthritis include (fig. 5.13):
- soft tissue swelling around the joint and effusion into the joint
- localised osteoporosis (due to increased blood flow)
- joint space loss
- articular erosions
- ankylosis, eventually, when healed
- a late feature

![Radiographic images](image)

Figure 5.13
Adult with rapid progression of septic arthritis of the 2nd metacarpophalangeal joint due to a human "bite". (a) at presentation there is some localized loss of bone density and early narrowing of the joint; (b) 11 days later there has been marked progression of the joint destruction.

5.4 Mycobacterial Infections

5.4.1 Tuberculosis (TB)

- the incidence of skeletal TB is varies considerably from place to place and over time, and factors such as antibiotic resistance and increased infections in immunocompromised individuals, especially HIV-positive, are influencing the occurrence of disease.

- it is assumed that skeletal TB develops by haematogenic spread. Chest radiography shows active disease in less than 50% of the cases, as the organism may lay dormant and become active later.

- lesions may be single or multifocal. Multifocal lesions are most common in the spine (see Chapter 5.8).

- irrespective of the site, tuberculosis may have a slower clinical course and a less rapid host reaction than other infections. Thus, the diagnostic procedures are often delayed, and when performed, the radiographic changes are mostly extensively developed.

- many may, however, behave like any acute infections mimicking pyogenic osteomyelitis.
Tuberculous osteomyelitis

- tends to arise in the metaphysis and occasionally the epiphysis.
- predominantly lytic, honey-combed appearance with limited response from host bone (fig 5.14). Periosteal reaction and surrounding sclerosis are not prominent features. Sequestra are uncommon.
- when one or more of the tubular bones of the hand are involved together with florid soft tissue swelling it is known as tuberculous dactylitis (fig 5.15). This is most commonly seen in children and, and is known as “spina ventosa” when associated with bony expansion (fig 5.16). It is important to recognize that other conditions may present with a dactylitis (see Table 5.1).
- multifocal TB in a middle aged or elderly patient can easily be mistaken for metastatic disease.

Table 5.1 Causes of Dactylitis (inflamed finger/toe).

<table>
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<td>Sickle cell anaemia</td>
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<td>Tuberculosis (spina ventosa)</td>
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<td>Fungal infections (e.g. mycetoma, sporotrichosis)</td>
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<td>Leprosy</td>
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<td>Tumour (osteoid osteoma, metastasis, Ewing's sarcoma)</td>
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<tr>
<td>Syphilis, yaws</td>
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<td>Sarcoidosis</td>
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Figure 5.14
Child with TB osteomyelitis of the distal humerus.

Figure 5.15
Child with multifocal TB. There is involvement of the 5th meta-carpal and proximal phalanx of the 4th finger. There is a dactylitis of the 4th finger.
**Tuberculous arthritis**

- TB arthritis usually affects major joints, especially hip and knee.
- the infection may be synovial or develop from an adjacent bony focus.
- the early signs of synovial TB are similar to those of any monarticular inflammatory arthropathy. The features include (fig 5.17):
  - soft tissue swelling and joint effusion
  - severe juxta-articular osteoporosis
  - relative enlargement of the epiphyses due to hyperaemia
- the next radiographic change to develop is loss of the white line indicating the articular cortex (fig 5.18).
- subsequently there is loss of joint space due to cartilage destruction and fine erosions (fig 5.19).
- if antibiotic treatment is delayed or ineffective, abscess formation with calcification (fig 5.20) and ultimately joint ankylosis will occur. Another complication in children is deformity due to premature fusion of a growth plate (fig 5.21).
Figure 5.17
Synovial TB of the left knee. There is loss of bone density and enlargement of the epiphyses due to the hyperaemia. Compare with the normal knee.

Figure 5.18
Child with TB arthritis of the ankle. There is severe loss of bone density, soft tissue swelling and loss of definition of the articular cortices of the ankle joint.

Figure 5.19
Advanced TB arthritis of the wrist with loss of bone density and erosions of the carpal bones.

Figure 5.20
Late stage TB arthritis of the wrist with destruction of the carpal bones and calcification in the abscess.
5.4.2 Leprosy

- leprosy (Hansen’s disease) is a chronic infection caused by *Mycobacterium leprae*, mainly affecting peripheral nerves and skin.
- the radiographic changes can be classified as:
  
  Specific changes – due to the presence of granulomata in the bones, well defined cyst-like lesions in the phalanges, prominent nutrient foramina, osseous destruction, and deformity (fig 5.22a).
  
  Nonspecific (neurovascular) changes – terminal phalangeal resorption, secondary infection (ostomyelitis), fractures, and bony resorption (fig 5.22b). Due to loss of sensation and impaired/damaged blood supply, the deformities of feet and hands can become severe.
5.5 **Treponemal Infections**

5.5.1 **Syphilis**

- infection with the spirochete, *Treponema pallidum*, occurs in 2 forms – congenital and acquired. Both progress through different stages. Bone infection is usually multiple, always following clinical findings.

**Congenital syphilis**

- results from transplacental infection of the foetus.
- in those that surviving and growing up, osseous lesions are typically seen in the long bones with metaphyseal defects and periosteal new bone formation (fig 5.23).
- involvement of the hands and feet is uncommon but can produce a nonspecific dactylitis (fig 5.24, see Table 5.1).

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**Figure 5.23**
Child with congenital syphilis. There is periosteal new bone formation and metaphyseal defects of the medial aspect of the proximal tibiae.

**Figure 5.24**
Child with dactylitis of the 1st metacarpal due to congenital syphilis. The features are non-specific.

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**Acquired syphilis**

- any bone may be affected, including the skull bones. Usually a mixed pattern of sclerosis and lysis with periosteal new bone formation (gummatous osteitis, fig 5.25) is seen. Longstanding cases with periods of healing and reactivation of disease can be associated with bone deformity e.g. tibial bowing and anterior thickening (sabre tibia).
- chronic syphilis (tabes dorsalis) can be associated with neuropathic joints most commonly in the lower limbs (fig 5.26, see Chapter 6.6).

![Figure 5.25](image1)

*Figure 5.25*
Adult with acquired syphilis of the tibia. There is a mixed pattern of lysis and sclerosis.

![Figure 5.26](image2)

*Figure 5.26*
Neuropathic knee secondary to neurosyphilis, with total destruction of the joint and bone fragmentation (From Pettersson, H and Allisson, D: The Encyclopaedia of Medical Imaging, Vol III, ISIS Medical Multi-Media/The Nicer Institute, Oslo, 1999, with permission)

### 5.5.2 Yaws

- it is caused by the non-venereal spirochete, *Treponema pertenue*, and is mainly seen in countries with warm and humid climate.

- bone changes are seen in the secondary and tertiary stages. The radiographic appearances are similar to those of acquired syphilis i.e. mixed pattern of lysis and sclerosis with florid periosteal new bone formation principally affecting the tubular bones (fig 5.27). Dactylitis may also develop (fig 5.28, Table 5.1 (pg. 111)).

- longstanding cases will show healing with marked thickening and bowing of the bone (fig 5.29 and 5.30). On radiographs it is often difficult to distinguish between yaws and syphilis.
Figure 5.27
Yaws of the distal radius. There is a mixed pattern of lysis and sclerosis.

Figure 5.28
Child with a dactylitis of the little finger due to yaws.

Figure 5.29
Child with a predominantly sclerotic lesion of the 3rd metacarpal due to healed yaws.

Figure 5.30
Sclerosis and anterior bowing of the tibia in an adult with healed yaws.
5.6 **Fungal Infections**

- fungal infections can involve bone and joints. Most important are:
  - blastomycosis
  - nocardiosis
  - coccidiomycosis
  - histoplasmosis
  - sporotrichosis
  - actinomycosis (a filamentous bacteria)

5.6.1 **Mycetoma**

- an indolent fungal infection, usually with secondary bacterial infection. Most are chronic. The infecting organism varies between different regions.
- there are multiple abscesses, fistulae and sinuses. It commonly affects the foot and ankle (Madura foot) and less commonly the arm and hand.
- there is gross soft tissue swelling, with bone destruction and periosteal new bone formation at a late stage (fig 5.31 and 5.32).

![Figure 5.31](image)

*Madura foot. There is severe soft tissue swelling with early erosion of the 4th metatarsal.*

![Figure 5.32](image)

*Child with mycetoma of the hand. There is severe soft tissue swelling, loss of bone density and a dactylitis of the 4th finger.*

5.6.2 **Coccidioidomycosis**

- it is a chronic granulomatous condition. Most commonly seen in the Southwestern parts of North America, but can also occur elsewhere in the world.
- bone lesions tend to be multiple with the predilection for the spine, pelvis, hands and feet. Bone lesions resemble pyogenic infections and joint lesions may resemble tuberculous arthritis.
5.7 Parasitic Infections

- parasitic infections are endemic in many parts of the world. Most of them affect soft tissues, but some also cause bone lesions. It is important to know which parasites are most common in a local environment.

5.7.1 Hydatid disease (Echinococcosis)

- a parasitic infection that it is commoner in temperate than in tropical zones. Often found in sheep, but also in several other species such as reindeers, dogs, wolves and foxes.

- there are two different forms of hydatid disease. The most common form is caused by Echinococcus Granulosa (cystic hydatid disease), whereas the type caused by Echinococcus multilocularis is much less widespread. Bone infection is uncommon in both varieties, but the latter can cause almost untreatable bone disease, especially affecting spine and pelvis (alveolar or multilocular hydatid disease).

- most common sites are spine, pelvis and long bones. Long bone lesions may mimic fibrous dysplasia.

- radiographic features are lytic, expansive, septated (“soap-bubble”) medullary lesions without periosteal reaction or sclerosis (fig 5.33).

- complications include:
  - pathological fracture
  - secondary infection
  - spinal cord compromise from spinal involvement

![Figure 5.33](image)

Hydatid disease. Extensive involvement of the humerus.
5.7.2 **Calcified helminthic infections**

- A variety of helminthic infections can produce soft tissue calcifications when the worm is dead. In endemic areas these are frequently an incidental finding on radiographs. Common examples follow below.

**Cystercercus cellulosae (cysticercosis)**

- Due to ingestion of the ova of Taenia solium.

- Dead cysts within the muscles can calcify to produce oval, 10–15 mm long shadows oriented in the direction of the muscle fibres (fig 5.34).

![Figure 5.34](image)

Typical calcification of cysticercosis

**Dracunculus medinensis (guinea worm)**

- As with cysticercosis, this parasite only becomes visible in soft tissues when the dead worm calcifies.

- Fine linear or coiled calcification which, over time, may become fragmented by the action of the muscles (fig 5.35). Some may be very long.

- May cause abscess or joint infection when alive.

- Similar linear spotty calcifications may also occur in the nerves of patients with leprosy. Although it resembles guinea worm, the patient will have other clinical and radiographic signs of leprosy.

![Figure 5.35](image)

Typical calcification of guinea worm.
5.8 Infections of the Spine

- Infections of the spine merit separate mention because of the special anatomy and the risk of serious damage to the spinal cord.

5.8.1 Pyogenic spinal infection

- There is a communication between the pelvic and thoracolumbar venous systems. Therefore, genitourinary infections may spread to the spine, and especially to the lower thoracic or lumbar spine.

- Most infections of the spine are bacterial and caused specifically by staphylococci. Percutaneous aspiration or biopsy is, however, advised where possible to confirm the infective organism and to ensure that appropriate antibiotic treatment is given.

- Although frequently referred to as "discitis", spinal infection is a form of osteomyelitis which arises within the vertebral endplate (margin) and involves the disc secondarily. The term "discitis" is best reserved for the self-limiting condition arising in children (see Chapter 5.8.4).

- The radiographic appearances of a pyogenic spinal infection include (fig 5.36),
  - No changes for up to 6 weeks after onset of symptoms
  - First sign is reduced density and destruction of one vertebral endplate
  - Disc space narrowing and destruction of the adjacent endplate follow
  - Spreading of the infection causes increasing destruction of the vertebral bodies and development of a paravertebral soft tissue mass (e.g., psoas abscess)
  - Healing is indicated by increasing sclerosis eventually with deformity if destruction was severe

- The differential diagnosis of discectomy includes:
  - Other infections e.g., tuberculous spondylitis (see Chapter 5.8.2) and brucellosis (see Chapter 5.8.3)
  - Discectomy pseudarthrosis in ankylosing spondylitis (see Chapter 6.3.1)
  - Spinal trauma

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Figure 5.36
Pyogenic spinal infection at C3/4 (a) normal appearances at presentation; (b) destruction of the vertebral endplates and disc space narrowing 6 weeks later.
5.8.2 Tuberculous spondylitis

- the spine is one of the common sites for TB of the musculoskeletal system. It may progress more rapidly in immunosuppressed patients and may then resemble a pyogenic infection.

- 3 patterns of vertebral involvement of which the first (a) is the most common, can be seen:
  a. Discovertebral destruction – similar to pyogenic infection but the changes are often well established at presentation (fig 5.37). Disc involvement is a relatively late feature. Large paravertebral abscess with later calcification and multiple level involvement is often seen (5.38). Late cases often develop a severe angular spinal deformity (kyphotic gibbus), as the vertebrae collapse.
  
  b. Subligamentous – the infection begins anteriorly under the periosteum and spreads under the anterior longitudinal ligament. There are erosions of the anterior aspects of one or more vertebral bodies (fig 5.39). The disc space is preserved. Bony spurs may develop.
  
  c. Central – the infection develops within the vertebral body without involvement of the disc space (fig 5.40), until late in the course. The infected vertebra often collapses.

---

**Figure 5.37**
TB spondylitis with discovertebral destruction and the “ghost” of a paravertebral abscess extending anteriorly.

**Figure 5.38**
Chronic TB spondylitis of the thoracic spine. The spine is largely obscured by the massive bilateral calcified paravertebral/psoas abscesses. This does not always mean that the infection is now completely healed.
5.8.3 Brucellosis

- granulomatous condition also known as “undulant” or “Malta” fever. Transmission mostly from unpasteurised milk or direct contact with infected cattle.
- the bones are affected in 10% of the cases, most often the lumbar spine and pelvis.
- the radiographic appearances resemble pyogenic spinal infection although there tends to be a greater degree of bony sclerosis and large bridging osteophytes (marginal bony projections) when healing. Abscesses occur, but not as often as in tuberculosis.

5.8.4 Discitis

- probably a direct haematogenous infection of the disc (at this age the disc is vascularized).
- frequently no infective organism can be cultured.
- slow progression of radiographic changes with loss of disc height and vertebral endplate irregularity and sclerosis.
- clinical and radiographic follow up is necessary to exclude tuberculous infections.

5.9 Soft Tissue Infections

- infections of the soft tissues are mostly seen in:
  - penetrating injuries
  - intravenous drug abusers
  - immunosuppression
  - diabetes
  - leprosy
• frequently the only radiographic sign is soft tissue swelling and obliteration of normal intermuscular fat planes.

• gas within the soft tissues can be identified as small dark (black) areas as compared to the greytone of surrounding soft tissues. Gas within the soft tissues may be introduced at the time of an injury or as a result of a gas forming organism. Features which favour the diagnosis of infection are:
  — gas appearing several days after injury
  — increase in the amount of gas

• wide spread gas formation tracking along muscle and fascial planes is highly suggestive of a clostridial infection (gas gangrene) which, if not treated promptly, is associated with significant morbidity and mortality.

• gas-forming infection is particularly liable to occur in uncontrolled diabetes, resulting in a number of small gas bubbles in an area of tissue necrosis (fig 5.41).

![Image](image_url)

**Figure 5.41**
Diabetic with extensive gas forming infection of the soft tissues. Old amputation of the great toe. Recent fracture of the proximal phalanx of the 3rd toe.

### 5.10 Paget's Disease (Osteitis Deformans)

• a disease of unknown cause although infective origin is being considered (e.g. "slow" virus).

• it is a disease of the elderly and is common in the UK, parts of the USA, Australia and New Zealand but extremely rare in Africa and Asia.

• less than 20% of cases have single bone involvement. Overall, Paget's disease is found in the lumbar spine, followed by skull, pelvis and femur.

• 3 patterns of bone involvement are seen depending on the stage of the disease:
  a. Lytic phase – initial stage dominated by marked bone resorption. Lysis (loss of bone trabeculae) commences at a bone end and extends down the shaft. In a long bone the interface between the normal and abnormal tissue is sharply demarcated with a V-shaped configuration. In the skull large confluent area of lysis principally affecting the outer table (osteoporosis circumspecta) is seen.
b. Mixed phase – intermediate stage in which lytic areas start to be replaced by sclerosis (fig 5.42). There is also expansion of the affected bone with abnormally coarsened trabeculae.

c. Sclerotic phase – the bone becomes increasingly sclerotic (fig 5.43).

- pain may proceed any radiographic change.
- in the majority of people Paget's disease is asymptomatic and discovered as an incidental finding on a radiograph. Complications of Paget's disease include:
  - deformity (bowing of long bones as bone "soft", fig 5.43)
  - insufficiency fractures (usually transverse due to weakening of the bone)
  - degenerative joint disease adjacent to affected bones
  - malignant transformation (to an osteosarcoma, fig 5.44)

- despite recent advances in the treatment of bone sarcomas, malignant transformation in Paget's disease is rapidly fatal.

**Figure 5.42**
Specimen radiograph of the femur from the 1100 year old remains of an Anglo-Saxon. There is sclerotic Paget's disease of the proximal femur. There is a small residual area of lytic Paget's distally with the typical V-shape.

**Figure 5.43**
Sclerotic form of Paget's disease of the radius with bowing and a transverse fracture of the diaphysis.
5.11 **Sarcoidosis**

- a granulomatous disorder more common in young adults than in children or elderly.
- cause remains unknown but some evidence suggests infective aetiology.
- changes in the bones are found in less than 10% of the cases, and where present, focal bony destruction with a honeycomb or lattice-like appearance in the tubular bones of the hands and feet (fig 5.45) is seen.
- sclerotic bone involvement is very rare.

![Figure 5.44](image1)  
Extensive Paget's disease of the left hemipelvis. There is malignant transformation with an osteosarcoma arising from the left ischium.

![Figure 5.45](image2)  
Sarcoidosis of the 2nd and 3rd fingers.
5.12 Kaposi's Sarcoma

- Kaposi's sarcoma is a multicentric vascular tumour with a viral aetiology.
- There is an increased incidence in immunosuppressed patients. Therefore, it is commonly found in AIDS patients.
- There are three clinical categories of Kaposi's sarcoma:
  a. Relatively slow progression is seen in older patients without immunosuppression living in temperate climates. If they then become immunosuppressed, the disease will progress rapidly, as in (b).
  b. Rapidly progressive/multifocal disease leading to death within 6 months to 3 years. This form is most common in younger people living in tropic countries, and often not associated with AIDS.
  c. Chronic disease associated with the development of other malignancies, especially lymphoma.
- Radiographic features include:
  - Multiple cutaneous nodules which may ulcerate
  - Generalized oedema of the extremity
  - Bone changes in advanced disease
  - Osteoporosis
  - Well defined cortical erosions
  - Progression to bone destruction (fig 5.46)