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Radiographic Pathology Book (Fracture bones and Joints)

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Abstract: ***This book provides an overview of all aspects of radiographic Pathology . It is written to Radiology Specialists and practitioners within the Diagnostic Radiology . Areas covered range from Fractures and Joints, through to the Diagnostic Imaging . also covered, ensuring the text is a complete introduction to radiograpgic pathology definations. Image provides reading for Full Diagnosis in Details. It is very structured text with clear headings and relevance to practice indicated throughout. This book will enable students to dip into text to find relevant information as an aid to revision. All contributors currently teach Diagnostic radiology specialist and student in radiogy field***

Keywords: Fractures and joints

1. Introduction

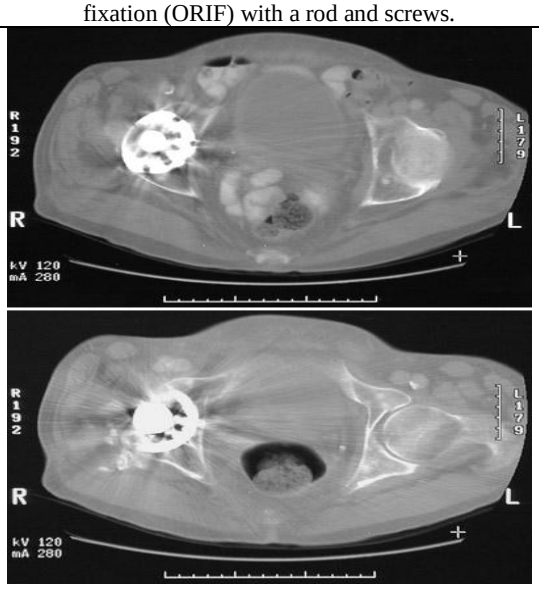
Fracture is a medical condition in which there is a loss in the continuity of the bone.

2. Types of Fractures

1) **Closed Fracture:** one that does not produce an open wound . Called also simple fracture
2) **Compound Fracture** (**Open Fracture**) **:** one in which a wound through the adjacent or overlying soft tissue communicates with the outside of the body
3) **Transverse Fracture:** one at right angles to the axis of the bone.
4) **Longitudinal Fracture:** one extending along the length of the bone.
5) **Colles' Fracture:** fracture of the lower end of the radius, the distal fragment being displaced backward
6) **Smith's Fracture:** reversed Colles' fracture fracture of the lower end of the radius, the distal fragment being displaced forward
7) **Greenstick Fracture:** one in which one side of a bone is broken and the other is bent, most commonly seen in children.
8) **Bennett's Fracture:** fracture of the base of the first metacarpal bone, running into the carpometacarpal joint, complicated by subluxation
9) **Fissure Fracture:** a crack extending from a surface into, but not through, a long bone.
10) **Complete Fracture:** one involving the entire cross section of the bone.
11) **Incomplete Fracture:** one that does not involve the complete cross section of the bone.
12) **Compression Fracture:** one produced by compression.
13) **Comminuted Fracture:** one in which the bone is splintered or crushed, with three or more fragments.
14) **Monteggia's Fracture:** one in the proximal half of the shaft of the ulna, with dislocation of the head of the radius
15) **Impacted Fracture:** fracture in which one fragment is firmly driven into the other.
16) **Depressed Fracture:** fracture of the skull in which a fragment is depressed
17) **Dislocation Fracture:** fracture of a bone near an articulation with concomitant dislocation of that joint
18) **Double Fracture:** fracture of a bone in two places.
19) **Jefferson's Fracture:** fracture of the atlas (first cervical vertebra).
20) **Avulsion Fracture:** separation of a small fragment of bone cortex at the site of attachment of a ligament or tendon.
21) **Spiral Fracture:** one in which the bone has been twisted and the fracture line resembles a spiral.
22) **Pathologic Fracture:** one due to weakening of the bone structure by pathologic processes such as neoplasia or osteomalacia; Called also **spontaneous fracture**.
23) **Oblique Fracture:** one in which the break extends in an oblique direction. See illustration
24) **Barton's Fracture:** fracture of the distal end of the radius into the wrist joint.
25) **Transcervical Fracture:** one through the neck of the femur.
26) **Intrauterine Fracture:** fracture of a fetal bone incurred in utero.
27) **Stieda's Fracture:** A fracture of the internal condyle of the femur.
28) **Blow-Out Fracture:** fracture of the orbital floor caused by a sudden increase of intraorbital pressure due to traumatic force; the orbital contents herniate into the maxillary sinus so that the inferior rectus or inferior oblique muscle may become incarcerated in the fracture site, producing diplopia on looking up.
29) **Le Fort Fracture:** bilateral horizontal fracture of the maxilla.
30) **Duverney's Fracture:** fracture of the ilium just below the anterior inferior spine.
31) **Pott's Fracture:** fracture of lower part of the fibula with serious injury of the lower tibial articulation.
32) **Pertrochanteric Fracture:** fracture of the femur passing through the greater trochanter.

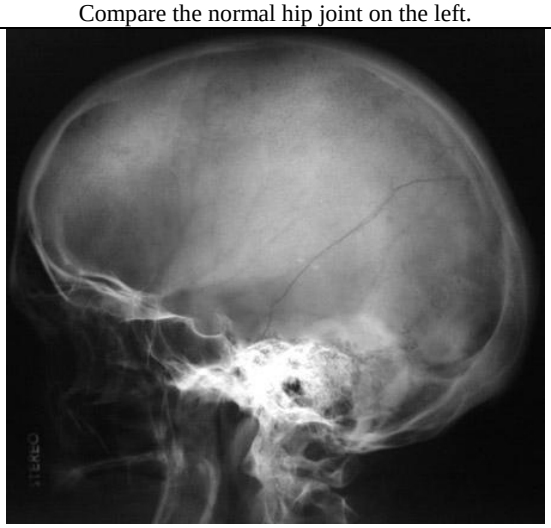
Fracture of the humeral neck in the left panel and the post-operative radiograph following open reduction and internal fixation (ORIF) with a rod and screws.

Following a femoral fracture, a right hip prosthesis has been



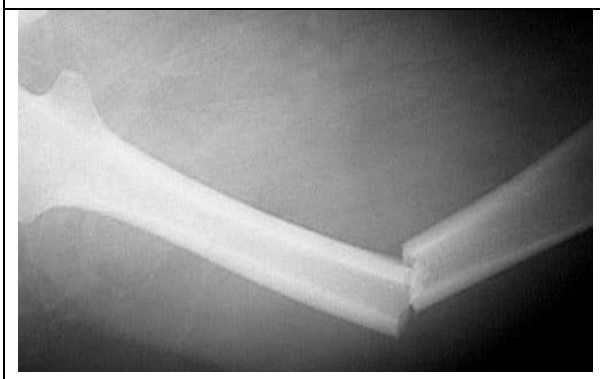
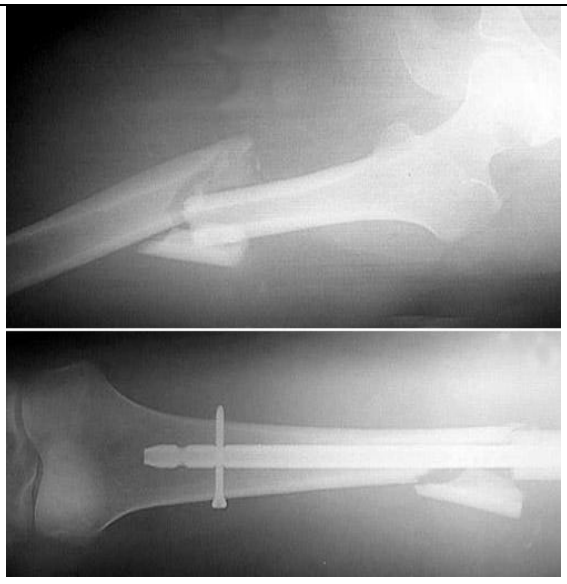
Following a femoral fracture, a right hip prosthesis has been placed here. This is the appearance on CT scan, with attenuation reduced. Even so, the radiodense metallic prosthesis scatters the x-rays, obscuring other structures. Compare the normal hip joint on the left.

These two radiographic views of the hand demonstrate a recent fracture of the fifth metacarpal bone.



Following a fall, this patient incurred a linear skull fracture seen in this plain film. (The fainter branching grey lines represent the normal cranial vascular pattern.)

This head CT scan in "bone window" demonstrates a skull fractures on the right with diastasis of the sutures. However, this is not a depressed skull fracture. There is marked overlying soft

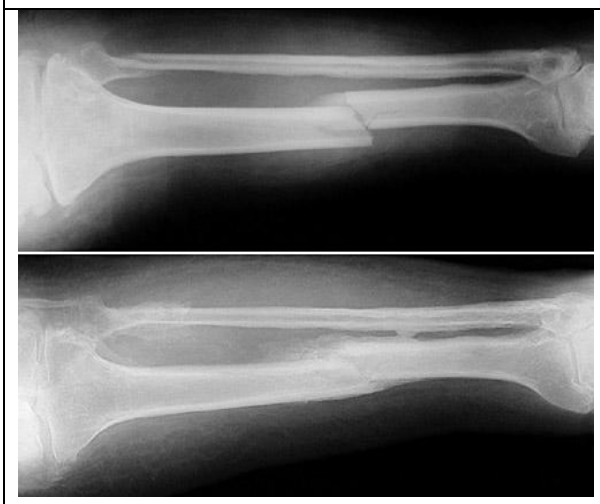
	tissue swelling in the scalp, and a small laceration has been closed with staples. In the view below following craniotomy for removal of an epidural hematoma, the swelling has diminished and the posterior fracture has been stabilized with a short metal plate
	
There is an obvious fracture of the midportion of the femur	There is a marked intertrochanteric fracture of the right femur.
	
Greenstick fractue	Galeazzi fracture
	
The radiograph above demonstrates a "comminuted" fracture of the femur in the upper panel, with the postoperative radiograph in the lower panel demonstrating placement of the intramedullary rod.	This radiograph reveals a highly comminuted spiral fracture of the distal femur with displacement of bone fragments. This was the result of a high speed vehicular accident.

comminuted fracture of the calcaneum caused by a fall from a height (so-called lover's fracture or Don Juan fracture)

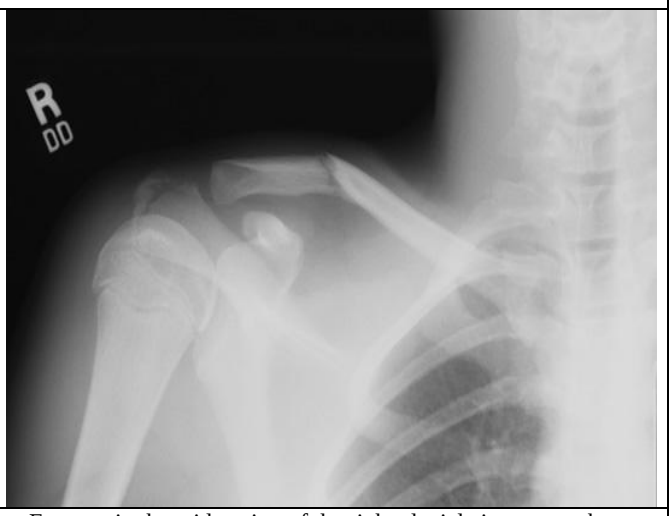
A spiral fracture is an obliquely orientated fracture in the shape of a spiral. These fractures sometimes have a very distinctive spiral shape. This is a spiral fracture of the mid/distal 1/3 of the femur.

A pathological fracture
The white arrows identify the fracture line through the tibial metaphysis weakened by the bone cyst

Rolando fracture - comminuted intra-articular fracture of the first metacarpal bone.



The radiograph in the upper panel reveals a tibial fracture as well as a fibular fracture. In the lower panel, there is healing with callus formation.



Fracture in the midportion of the right clavicle in a young boy.

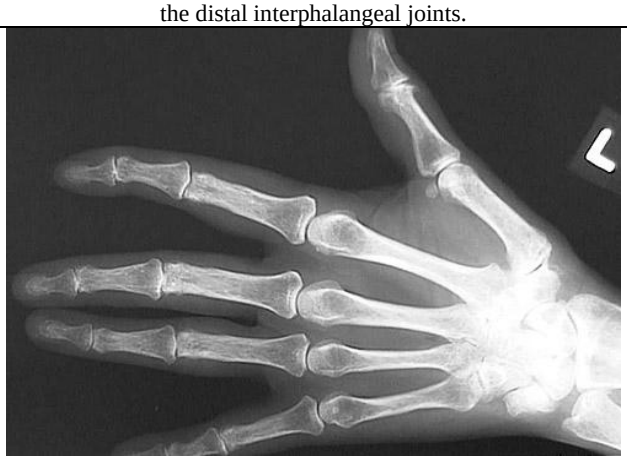
Arthritis, Inflammation, and Joint Disease

MRI scan of the left shoulder demonstrating a full thickness tear of the supraspinatus tendon.

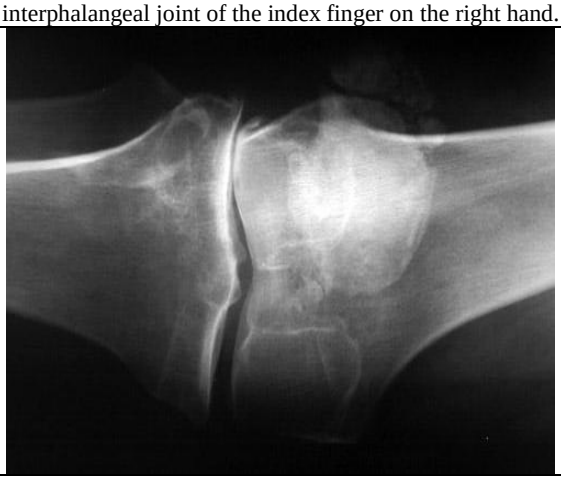
calcified Baker's cyst. Baker's cysts arise from herniation of the synovial lining of a joint into soft tissue behind the knee, most often in association with rheumatoid arthritis .

The two radiographic views seen here demonstrate changes of osteoarthritis of the left hand, with narrowing of joint spaces of the distal interphalangeal joints.

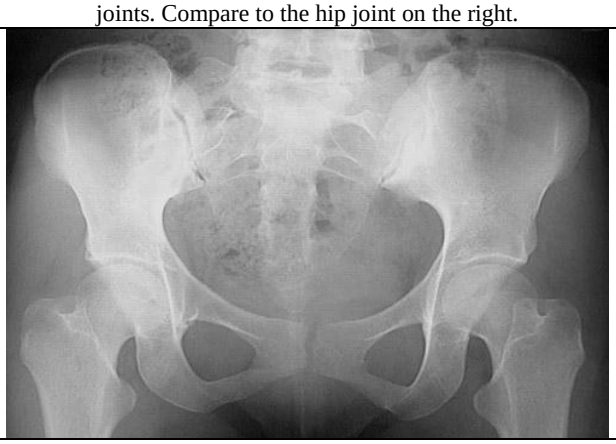
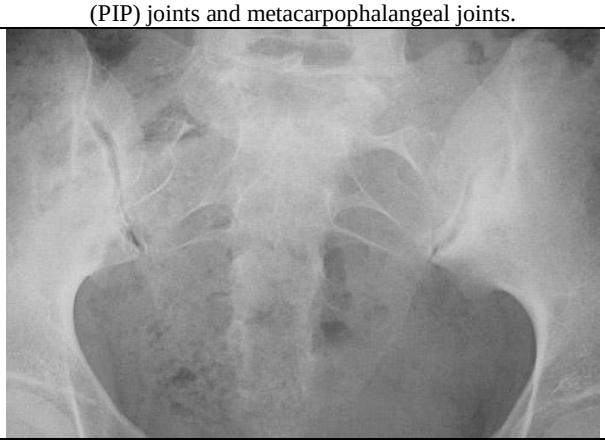
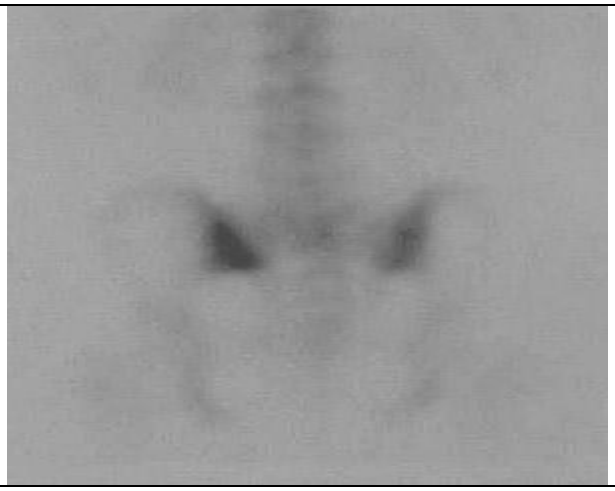
This radiographic view of the hand demonstrate changes of osteoarthritis with loss of the joint space of the distal interphalangeal joint of the index finger on the right hand.



This hand demonstrates changes of degenerative osteoarthritis, with joint space narrowing and widening at the distal interphalangeal joints (DIP) than in the proximal interphalangeal joints.. The base of the thumb has marked osteoarthritis.



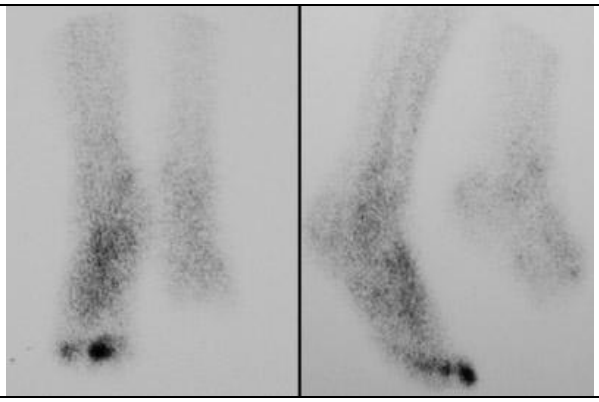
The knee shown here demonstrates joint space narrowing in a patient with marked osteoarthritis. The knee, a prime weight-bearing joint, is a common area of involvement with degenerative osteoarthritis

	
The plain film of the pelvis demonstrates joint space narrowing of the left hip in a patient with osteoarthritis. Hip joints are commonly involved, because they are heavy weight-bearing joints. Compare to the hip joint on the right.	This hand demonstrates changes of rheumatoid arthritis. There is joint narrowing with marginal erosions and osteoporosis, mainly involving the proximal interphalangeal (PIP) joints and metacarpophalangeal joints.
	
This radiograph of the pelvis demonstrates a Sacroiliitis on the left, with narrowing and sclerosis of the sacroiliac joint. The SI joint on the right appears relatively normal by comparison.	This radiograph of the pelvis demonstrates a Sacroiliitis on the left, with narrowing and sclerosis of the sacroiliac joint. The SI joint on the right appears relatively normal by comparison.
	
This nuclear medicine scan reveals increased uptake in the region of the left sacroiliac joint in a patient with a spondyloarthropathy.	Chronic gout leads to deposition of urates into a chalky mass known as a "tophus". The great toe (first metatarsophalangeal joint) is a common location. Such tophi can appear around a joint and adjacent bone as seen here radiographically. Tophaceous deposits consist of sodium urate crystals, and there is a surrounding destructive inflammatory response.

Chronic gout leads to deposition of urates into a chalky mass known as a "tophus". Seen here radiographically in sequential radiographs of the same foot (the patient did not have two right feet) is a tophaceous deposit that has destroyed the 1st MP joint and adjacent bone. In most, but not all, cases the patient has hyperuricemia.

Here is gouty arthritis involving a hand. Note the tophus with destruction of the bone. Unlike rheumatoid arthritis, the bone at the margins of the destruction is sclerotic with gout. This process has already led to the loss of parts of three digits.

osteomyelitis involving the great toe of the foot. Note the sclerosis with adjacent rarefaction of bone. This condition can be difficult to treat, since bone is not highly vascular, so high antibiotic concentrations can be difficult to attain.



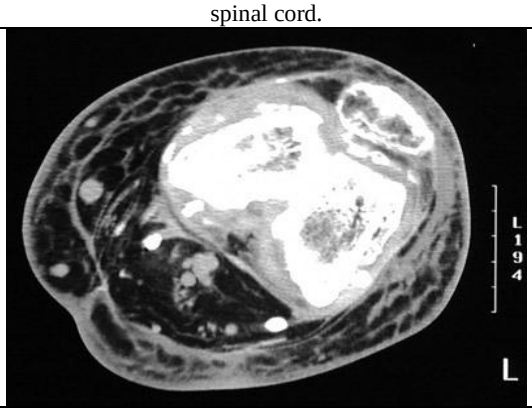
The appearance of osteomyelitis with a technetium (Tc99) nuclear medicine scan is shown here. Note the increased uptake in the region of the great toe in these views.

These two views of the tibia reveal an area of bony destruction with remodelling as a consequence of chronic osteomyelitis.

There is bony destruction of T8 and 9, consistent with osteomyelitis in this MRI scan in sagittal view. This is a case of tuberculous osteomyelitis (Pott's disease).

There is bony destruction of T8 and 9 in these two sagittal MRI views in a case of tuberculous osteomyelitis (Pott's disease). The vertebral destruction has resulted in impingement upon the spinal cord.

There is extensive bony destruction of the vertebral body in this axial MRI view in a case of tuberculous osteomyelitis (Pott's disease).



This CT scan of the knee reveals irregularity of the femoral condyles along with calcifications in the joint and joint effusion in a patient with paraplegia who has developed a "neuropathic" joint from repeated trauma.

CT scan demonstrates a compression fracture of the L1 vertebral body

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[4] http://en.wikipedia.org/wiki/Joint

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