Bone Neoplasms and Misc Bone Pathology

Bone Neoplasms

- Benign Bone Tumours
  - Bone cyst
  - Osteochondroma
- Malignant Bone Tumours
  - Osteosarcoma
  - Ewing's Sarcoma
  - Multiple Myeloma (review from 1st semester)

Simple Bone Cyst (Unicameral)

- Fluid-filled cyst in the bone
- Most often occur in proximal humerus(50-60%) or femur(30%) at the metaphysis
- Asymptomatic, can be an incidental finding or found after pathologic fracture

Simple Bone Cyst

- On imaging, appears as a lucent lesion with a rim of sclerosis
- Oval in shape, with long axis parallel to the long axis of the long bone
- Large cysts are more likely to cause fracture, so may be treated with steroid injection into the cyst, or surgical curettage and bone graft



Case courtesy of Dr. Michael Sargent,
Radiopaedia.org, rID: 5980



Case courtesy of Dr. Benoudina Samir, Radiopaedia.org,
rID: 47790

Osteochondroma

- Also called exostosis
- Occurs in childhood/ teen years, which are times of rapid skeletal growth
- It occurs in the epiphyseal plate and grows laterally from the epiphysis
- Once formed it does not change or go away
- If it grows or causes pain after skeletal maturity, can indicate malignant changes

Osteochondroma

- On imaging, the cortex of the osteochondroma should blend with the cortex of the bone



Case courtesy of Dr. Aditya Shetty, Radiopaedia.org, rID: 27292



Case courtesy of Assoc. Prof. Frank Gaillard,
Radiopaedia.org, rID: 5844

Osteosarcoma

- Malignant bone-forming tumour
- Most common form of primary bone cancer
- Most commonly found in teenagers and young adults
- Arises from osteoblasts in the metaphyses of long bones
- Aggressive cancer, as lung metastases develop early

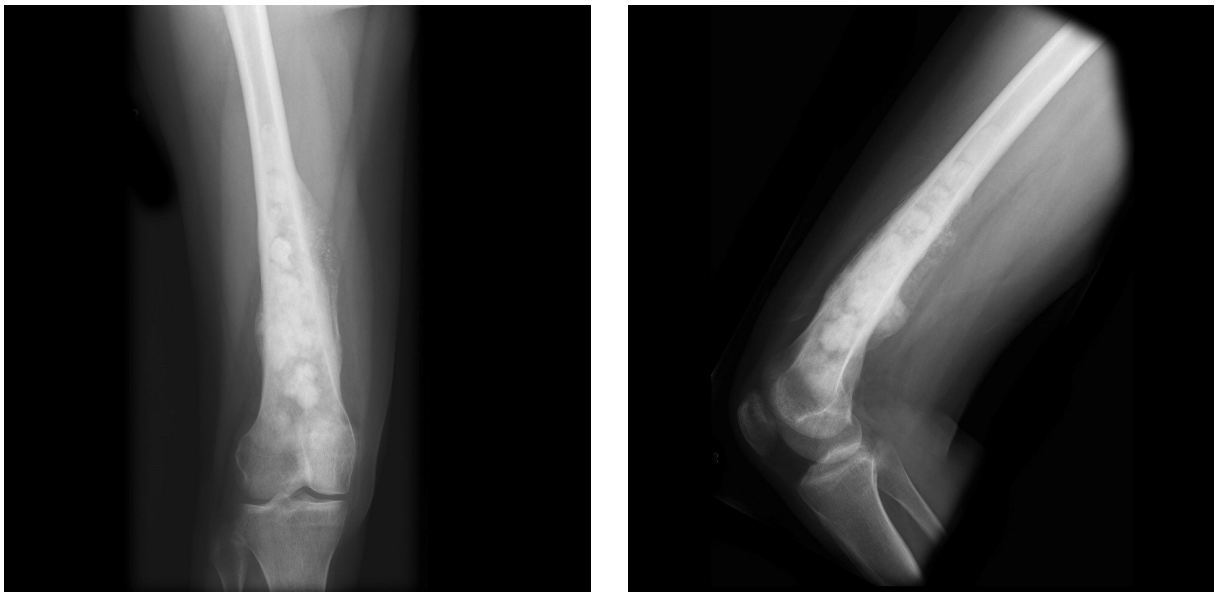
Osteosarcoma

- Also called osteogenic sarcoma

- On imaging, there is medullary and cortical bone destruction, moth-eaten appearance, soft tissue mass

Osteosarcoma

- Also called osteogenic sarcoma



Case courtesy of Assoc. Prof. Frank Gaillard, Radiopaedia.org, rID: 7529

Osteogenic Sarcoma (Osteosarcoma)



Fig 4-73 – Eisenberg (6th ed.)

Ewing's Sarcoma

- Primary malignant tumour arising from bone marrow of long bones
- Occurs in children and teens typically between 10 and 20 years old, rarely seen in adults over 30

Ewing's Sarcoma

- On imaging, shows as large tumours with ill-defined margins
- Some extend into soft tissue as well

Ewing's Sarcoma





Case courtesy of Dr Jeremy Jones, Radiopaedia.org, rID: 27379

Multiple Myeloma

- Cancer of plasma cells (remember B lymphocytes/plasma cells, and memory cells?)
- Associated with bone destruction, bone marrow failure, hypercalcemia, renal failure and recurrent infections
- Affects individuals between the ages of 40 – 70
- Primarily attacks the intermedullary canal of the diaphysis
- The CA cells accumulate in the bone marrow preventing healthy blood cells from reproducing.
- Symptoms include bone pain, loss of appetite, frequent infections, weight loss, weakness in legs

Multiple Myeloma

- Appearance includes multiple punched out osteolytic lesions scattered throughout the skeletal system
- Chemotherapy, radiation treatment, bone marrow transplant
- Survival rate is 3-4 years

Multiple Myeloma



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Fig 4-77 - Eisenberg

Metastasic bone lesions



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- Metastases is the most common cause of carcinoma of the skeleton
- Most common in flat and long bones, and spine, as they contain red bone marrow
- Alters bone density
- Best seen with NM

Bone Metastases

Palliative radiation therapy and chemotherapy are only treatments at the moment

A



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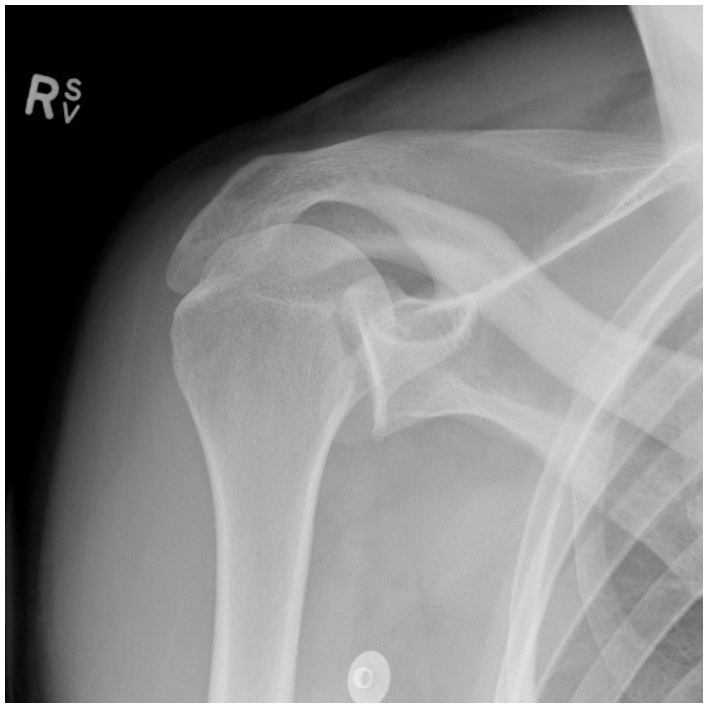
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Fig 4-83 - Eisenberg

Dislocation

- Caused by abnormal separation of a joint
- Usually caused by trauma with sudden force to a joint
- Larger joints often need to be reduced by a doctor

Dislocation





Case courtesy of Dr Andrew Dixon,
Radiopaedia.org, rID: 12478

Subluxation

- Partial dislocation
- Commonly caused by trauma
- Symptoms include pain around the joint, a sensation of not being stable, swelling or limited mobility, may see deformity if in appendicular skeleton
- Treatment includes reduction, rest, ice, elevation, NSAIDs, splints/supports/braces

Joint Effusion

- Increased amount of fluid within the joint
- Can result from inflammation, infection, trauma

Spondylolysis

- Defect in pars interarticularis
- Can result from repeated microtrauma, such as high impact sports
- No displacement of bone
- Scottie dog wearing a collar

Spondylolysis



Case courtesy of Dr. Praveen Jha,
Radiopaedia.org, rID: 17847



Case courtesy of Assoc. Prof. Frank Gaillard,
Radiopaedia.org, rID: 7164

Spondylolisthesis

- Defined as slipping of one vertebra over the one below it
- Often due to spondylolysis, usually L5-S1

Spondylolisthesis





Case courtesy of Dr. Tim Luijkx, Radiopaedia.org, rID: 38766

Scoliosis

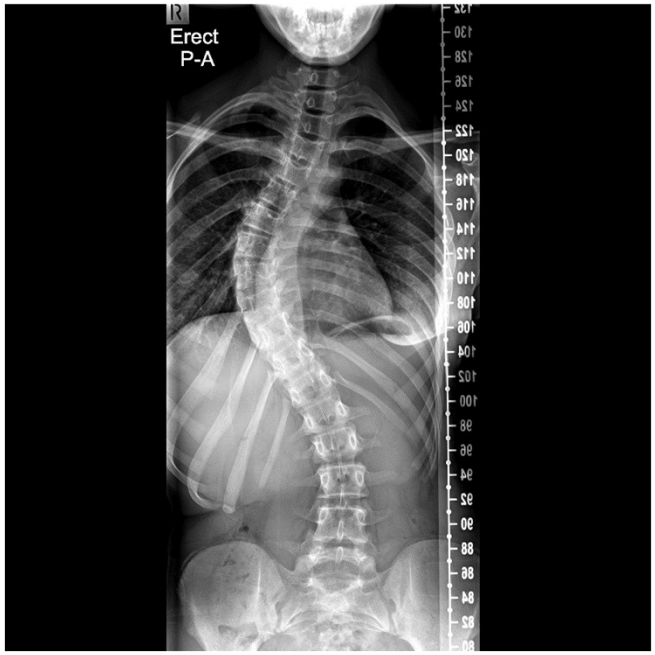
Scoliosis is an abnormal lateral curvature of the spine, classifies as follows:

- Idiopathic
- Functional – Caused by a mechanical problem outside of the spine (one leg being shorter and body has to compensate)
- Neuromuscular – caused by incomplete formation of vertebrae
- Degenerative – adult form associated most often with arthritis

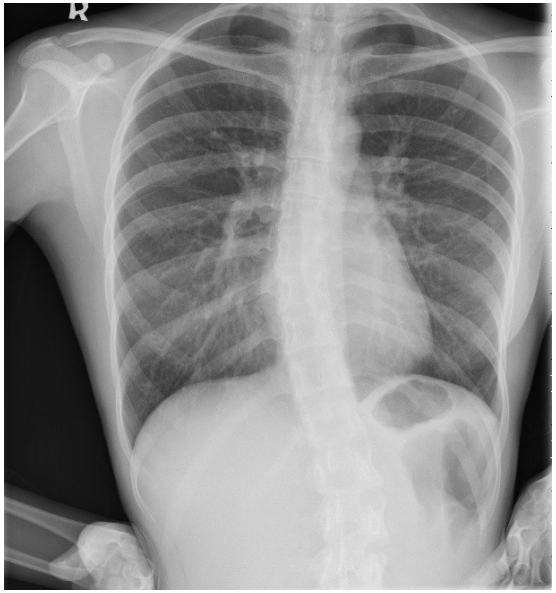
Scoliosis

- Cause is unknown although genetics is a factor
- Patient is imaged upright; PA projection is preferred as it reduces dose to radiosensitive tissues.
- Spinal curvature is monitored for signs of progression or stability
- Curvatures < 20 degrees are normal
- Curvatures 25-40 degrees requires a brace to be worn for 12 hours a day
- Curvatures > 40 degrees require surgery

Scoliosis



Case courtesy of Assoc. Prof. Frank Gaillard, Radiopaedia.org, rID: 49513



Case courtesy of Dr. Ian Bickle, Radiopaedia.org, rID: 48642

THANKS