X-Ray Initial Evaluation
Workshop #2 – Plain Bone Films

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4 Basic Densities on Radiograph
- Air – absorbs little radiation – black
- Fat - gray, darker than muscle
- Bone – most dense so white
- Water (Soft tissue/blood) – gray, but lighter than fat.

Remember – where different densities intersect…….. an interface will exist

Plain Bone Films – Ordering the Films
• Remember – Give the radiologist a brief history.
• Order the study - with the appropriate views
• Remember – The radiologist is a consult, a specialist, a colleague and a friend.

Plain Bone Films
• Remember – x-rays present a 2 dimensional view of a 3 dimensional object, so “1 view is 1 too few.”
• AP and lateral views always, add oblique for trauma to joints, hands, feet!!!
• Special views are indicated for particular injuries.

Plain Bone Films - Projections
Anterior-Posterior(AP) Lateral Oblique

Viewing the X-Ray
- Make sure the correct patient, the correct/ordered film, the correct date, and the correct extremity.
- Place the film on the view box or computer screen as if the patient is facing the provider in anatomical position.
- Hands and feet always point upwards.
- Always check for anatomical markers (R & L) to assure the correct extremity.
Bone Film – Long Bone Anatomy

- Epiphysis – end of bone
- Epiphysial line/physis – growth plate
- Metaphysis - area between the epiphysis and the diaphysis
- Diaphysis – shaft of the bone
- Apophysis – outgrowth of bone for the attachment of a ligament or tendon

Long Bone Anatomy

Sesamoid Bones

- Definition – Bone which ossifies within a tendon
- The largest sesamoid bone ... what do you think?
- Clue...It develops within the quadriceps tendon?
- Others
  - 1st MTP joint of foot
  - 1st MCP joint of hand

ABCs of Plain Bone Film - Interpretation

- A – Alignment
  ➢ Note size, shape and numbers of bones.
- B – Bone density
  ➢ Assess soft tissue, bone, swelling, fat,
  ➢ Note cortical and cancellous (spongy/trabecular) bone – check for fractures
  ➢ Assess bone density – osteoporosis
  ➢ Assess for osteolytic changes
- C – Cartilage
  ➢ Assess joint space
  ➢ Assess epiphysis and growth plates

Cortical vs Trabecular Bone

Joint Space Evaluation
Joint Space Evaluation of the Hands

Joint Space Evaluation Hip

Osteolytic Lesions

Fractures Classified

Transverse Fracture

Comminuted Fracture
Avulsion Fracture

Torus Fracture

Compound Fracture

Greenstick Fracture

Oblique Fracture

Spiral Fracture
Common Fractures

- **Upper extremity**
  - Radial head fracture
  - Colles fracture
  - Scaphoid fracture
  - Radius/ulna fracture
  - Boxer fracture
  - Finger fractures
- **Clavicular fracture**

- **Lower Extremity**
  - Distal fibula (lateral malleolar) fracture
  - Distal tibia (medial malleolar) fracture
  - Bimalleolar fracture
  - 5th metatarsal fracture
  - Toe fracture

Elbow - normal

Radial Head/Radial Neck Fracture

Forearm Anatomy

Fracture Forearm

Torus Fracture Forearm
Ankle Anatomy

Ankle Mortise

Ankle Ligaments

Ankle Sprain

Medial Malleolar Fracture – Normal Mortise

Fracture of the Distal Fibula (Lateral Malleolus)
Bimalleolar Fracture (With Mortise Widening)

Ottawa Ankle Rules

Foot Anatomy

Base 5th Metatarsal Fracture (Jones Fracture)

5th Metatarsal Fracture

Foot/Toe Anatomy
Toe Fractures

Salter Harris Fractures

Growth Plate Fractures

Salter Harris Fractures

Osgood-Schlatter’s

Sever’s

References

- Jacoby, D. B. (2018). Primary Care Radiology Workshop – Plain Bone Film Interpretation