Bone Cases
Normal Anatomy
Normal Anatomy

- 5th & 4th metacarpal bases
- Hook of hamate
- Hamate
- Triquetrum
- Pisiform
- Lunate
- Ulnar styloid
- Ulnar fossa
- Ulnar head
- Sigmoid notch
- 3rd, 2nd & 1st metacarpal bases
- Trapezoid
- Trapezium
- Capitate neck
- Scaphoid waist
- Radial styloid
- Scaphoid fossa
- Lister tubercle
- Lunate fossa
Normal Anatomy (cont)
Normal Anatomy (cont)
Case 1
- Hand radiographs show a fracture of the base of the 1st metacarpal bone; note that a fragment of the 1st metacarpal continues to articulate with the trapezium.

- Mechanism of injury: **forced abduction** of the thumb.

- Difficult to keep in normal alignment (as can be seen above), because of abduction of the shaft of the 1st metacarpal by the abductor pollicis longus – Therefore, needs **ORIF**.

- Possible complication (if not pinned): pseudarthrosis.
The **Rolando** fracture (above) is similar, but is a **comminuted intra-articular fracture** of the base of the 1\textsuperscript{st} metacarpal.

- Difficult to reduce—**worse prognosis** than Bennett’s fracture.
Mallet finger

- avulsion at base of distal phalynx
Rotary subluxation
Rotary subluxation

- Rupture of scapholunate ligaments causing scaphoid to rotate dorsally
- The lateral film is not especially helpful for diagnosing this injury
Perilunate dissociation
Perilunate dissociation
lunate dissociation
lunate dissociation
**Spectrum of lesser-arc injuries:**
Grade 1: Scapholunate dissociation (= rotatory subluxation)
Grade 2: Perilunate dislocation
Grade 3: Midcarpal Dislocation (disruption of lunate/triquetrum)
Grade 4: Lunate dislocation
* Typical mechanism is **severe dorsiflexion** (e.g., fall on outstretched hand)
Navicular fracture
Scaphoid fracture

- Initial Radiographs showed a questionable fracture of the scaphoid waist, in a patient who is symptomatic in that area
- MRI and bone scan confirmed scaphoid fracture present (alternatively, re-examine after 2 and 6 weeks in short-arm spica cast)
- Most frequent (90%) carpal fracture, missed from 25-65% of time!
- Prognosis depends on location of Fx: 90% nonunion if Fx involves proximal 1/3
- Complications: AVN, degenerative arthritis
Forearm
Colles
- Radial shaft fracture that most commonly occurs near the junction of the distal & middle 3\textsuperscript{rd}, with dorsal angulation
- Mechanism: fall on outstretched hand with elbow flexed
- High incidence of nonunion, delayed union, malunion (unstable Fx) may result in limited pronation / supination
Next case
Monteggia Fracture

- Forearm is a solid ring and cannot break in only one place
- Fracture of the ulna
- Dislocation of the proximal radius
  - Missed dislocated radial head will develop into AVN, with subsequent elbow dysfunction
Elbow

Which one is abnormal?
Case
Radial Head Fracture

- Fat pads are indicative of a fracture
- Even without seeing the fracture line on the radiographs, it should be surmised to be present when the posterior fat-pad is visualized.
Normal Shoulder
Case
Shoulder Dislocation

Humeral head is medial to the glenoid and inferior to the coracoid process.
- Initial film (in external rotation) was essentially normal, except for a sclerotic area in the mid-humerus; axillary view was normal as well.
- Internal Rotation reveals a “hatchet deformity” in the lateral humeral head = **Hill-Sach’s lesion**
- Subsequent films showed a previous anterior dislocation, which is the mechanism of formation for the Hill-Sach’s lesion
Posterior shoulder dis
Posterior shoulder dislocation

- Sclerosis in the medial portion of the humeral head ("Reverse Hill-Sachs" lesion)
- Uncommon (~3% of shoulder Dislocations).
- Typical causes include electrical shock, convulsive seizures
Miscellaneous (non-traumatic) Bone
Case
Osteoarthritis

- aka degenerative joint disease
- Joint space narrowing
- Sclerosis
- Osteophytes
**Osteoporosis**

*FIGURE 45.1. Normal Mineralization.* The cortical width (arrows) at the mid-second metacarpal in this patient with normal mineralization is greater than one third of the total width of the metacarpal.

*FIGURE 45.2. Osteoporosis.* Severe cortical narrowing (arrows) at the mid-second metacarpal cortex is seen in this patient with severe osteoporosis. Note the intracortical tunneling, which occurs in more aggressive forms of osteoporosis.

Copyright © 2007 by Lippincott Williams & Wilkins, a Wolters Kluwer company.
AVN

- **Primary**
- **Secondary**
  - Trauma, corticosteroid use, alcohol abuse, lupus, sickle cell disease,
  - Orthopedic disorders (slipped capital femoral epiphysis, congenital dysplasia of the hip, Legg-Calve-Perthes disease)
  - Infection
  - Gaucher disease
  - Pregnancy
- **Mild-to-moderate disease**
  - sclerosis
- **Advanced disease**
  - bone deformities, such as flattening, subchondral radiolucent lines
Case
Multiple Myeloma

- Multiple lytic lesions
- Differential consideration: metastatic disease
Bone Cases
Lower extremity
Case 1

Initial Presentation

1 week later
Hip Fracture

- Hip fractures in the elderly can be very difficult to detect.
- Negative plain film in an elderly patient with hip pain after even relatively minor trauma does not exclude a femoral neck fracture.
- MR is very useful in demonstrating occult femoral neck fractures.
Femoral Neck Fractures & Risk of AVN

*http://emedicine.medscape.com/article/86659-overview*
Case 2
Avulsion Fracture

• Avulsion of the anterior inferior iliac spine: attachment of straight tendon of rectus femoris

• Avulsion fractures affect pelvis often

• Common sites of avulsion include ischium, superior and inferior anterior iliac spines, and iliac crest
Case 3

Normal knee
Tibial Plateau Fracture

• Can be difficult to exclude on plain films
Spiral Fracture of the Fibula
Trimalleolar Fracture

- Fractures of the medial, lateral, and posterior malleoli
Ankle
Fracture of the Base of the 5th Metatarsal

• aka Jones fracture
Case 8

- 12-year-old cheer leader with leg pain
Tibial Stress fracture

- 12-year-old cheer leader with leg pain
- What are the plain-film findings
Tibial Stress fracture

• 12-year-old cheer leader with leg pain
• What are the plain-film findings

MRI Correlation
Tibial stress fracture

Images above are from a different patient who continued to exercise.