Ankle Fractures

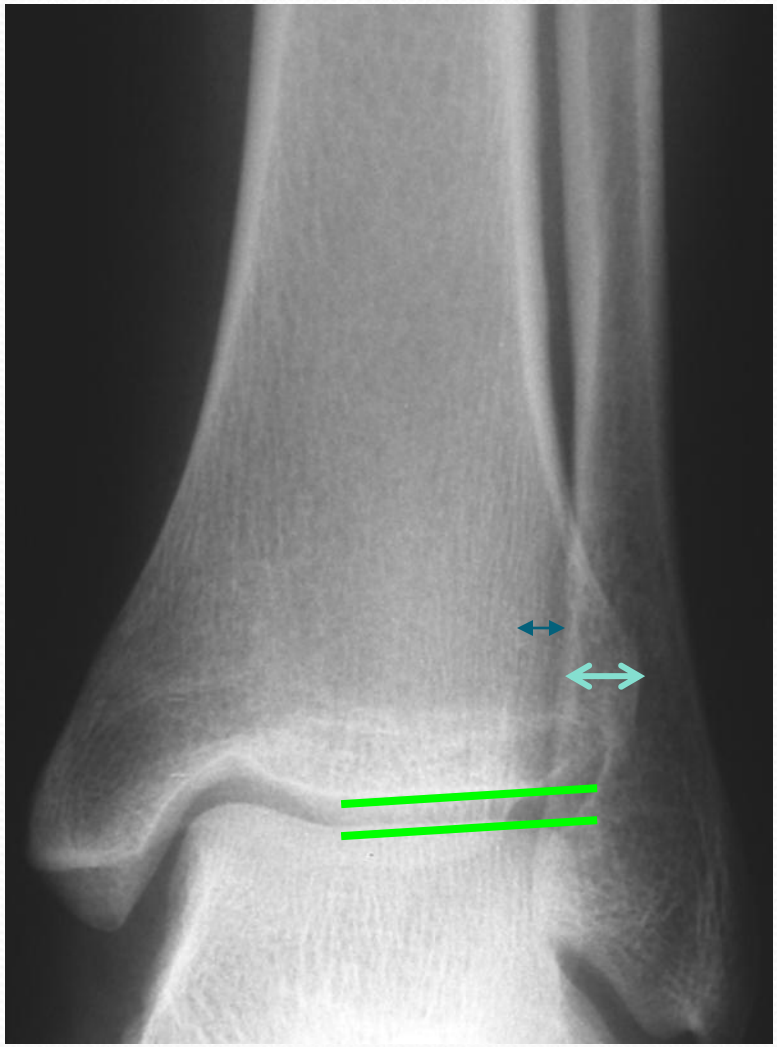
- History
  - Mechanism of injury
  - Time elapsed since the injury
  - Soft-tissue injury
  - Has the patient ambulated on the ankle?
  - Patient's age / bone quality
  - Associated injuries
  - Comorbidities (DM, smoking)

Ankle Fractures

- Physical Exam
  - Neurovascular exam
  - Note obvious deformities
  - Pain over the medial or lateral malleoli
  - Palpation of ligaments about the ankle
  - Palpation of proximal fibula, lateral process of talus, base of 5^{th} MT
  - Examine the hindfoot and forefoot

Ankle Fractures

- AP Ankle
  - Tibiofibular overlap
    - <10mm is abnormal and implies syndesmotic injury
  - Tibiofibular clear space
    - >5mm is abnormal - implies syndesmotic injury
  - Talar tilt
    - >2mm is considered abnormal



Ankle Fractures

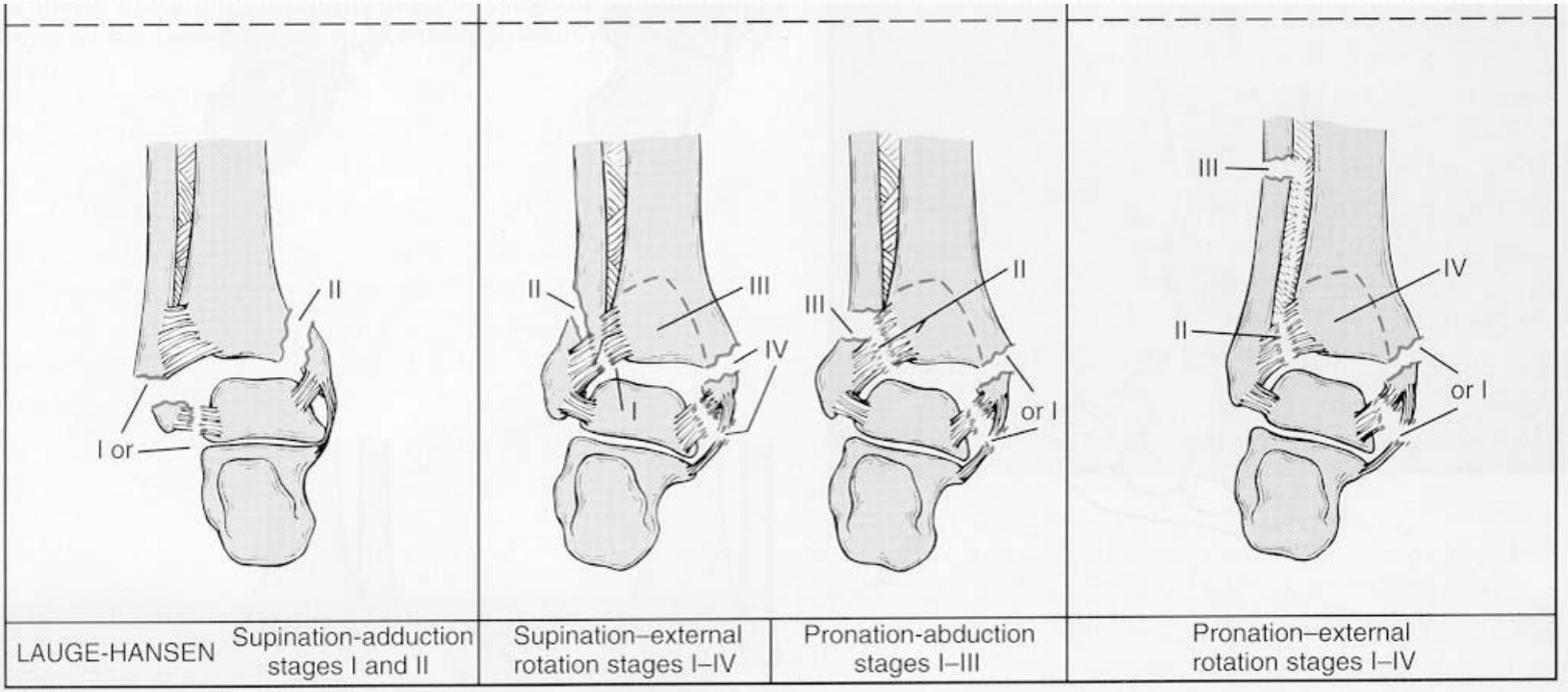
- Ankle Mortise View
  - Foot is internally rotated and AP projection is performed
  - Abnormal findings:
    - Medial joint space widening
    - Talocural angle <8 or >15 degrees (compare to normal side)
    - Tibia/fibula overlap <1 mm

Ankle Fractures

- Lateral View
  - Posterior malleolar fractures
  - Anterior/posterior subluxation of the talus under the tibia
  - Displacement/Shortening of distal fibula
  - Associated injuries

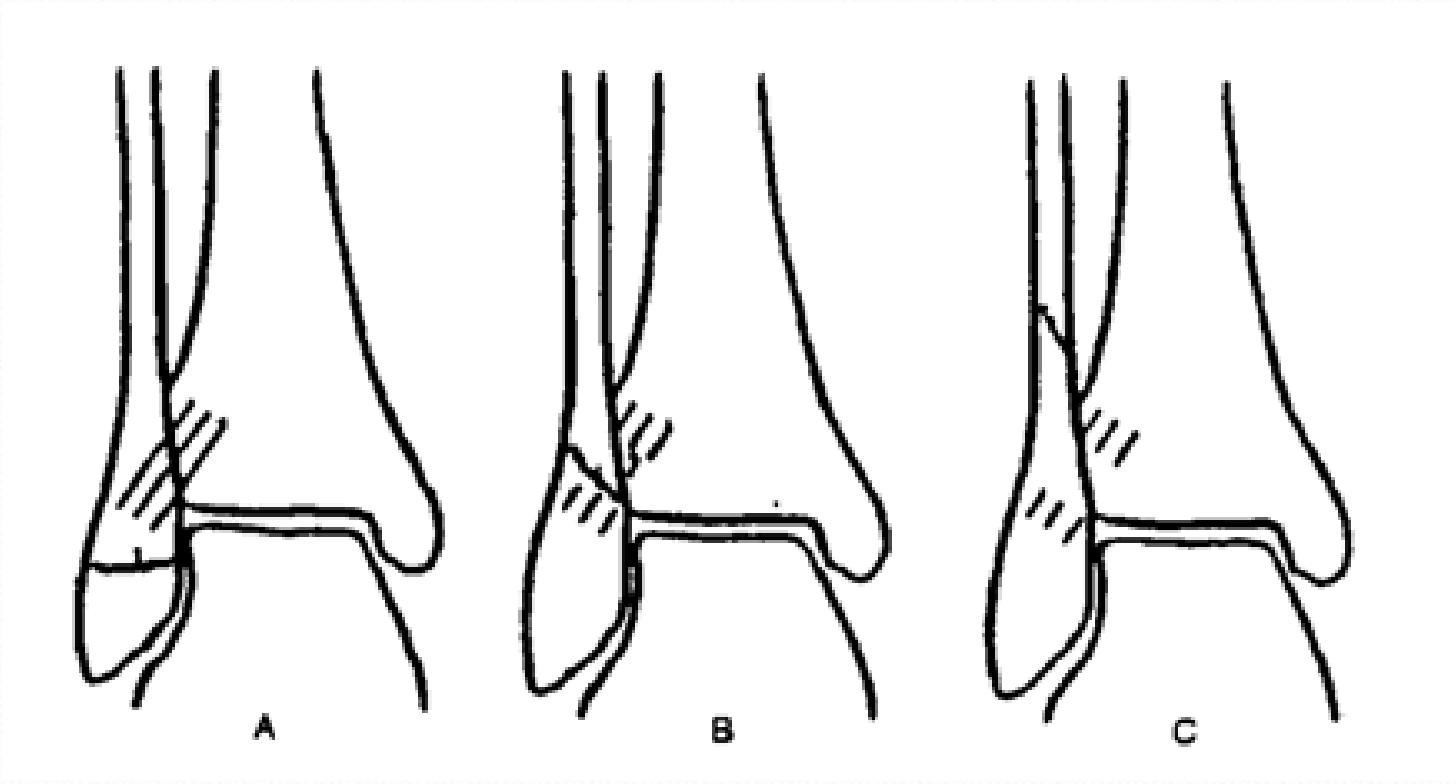
Ankle Fractures

- Classification Systems (Lauge-Hansen)
  - Based on cadaveric study
  - First word refers to position of foot at time of injury
  - Second word refers to force applied to foot relative to tibia at time of injury



Ankle Fractures

- Classification Systems (Weber-Danis)
  - A: Fibula Fracture distal to mortise
  - B: Fibula Fracture at the level of the mortise
  - C: Fibula Fracture proximal to mortise



Ankle Fractures

- Initial Management
  - Closed reduction (conscious sedation may be necessary)
  - Splint
  - Delayed fixation until soft tissues stable
  - Pain control
  - Monitor for possible compartment syndrome in high energy injuries

Ankle Fractures

- Indications for non-operative care:
  - Nondisplaced fracture with intact syndesmosis and stable mortise
  - Less than 3 mm displacement of the isolated fibula fracture with no medial injury
  - Patient whose overall condition is unstable and would not tolerate an operative procedure
- Management:
  - WBAT in short leg cast or CAM boot for 4-6 weeks
  - Repeat x-ray at 7–10 days to r/o interval displacement

Ankle Fractures

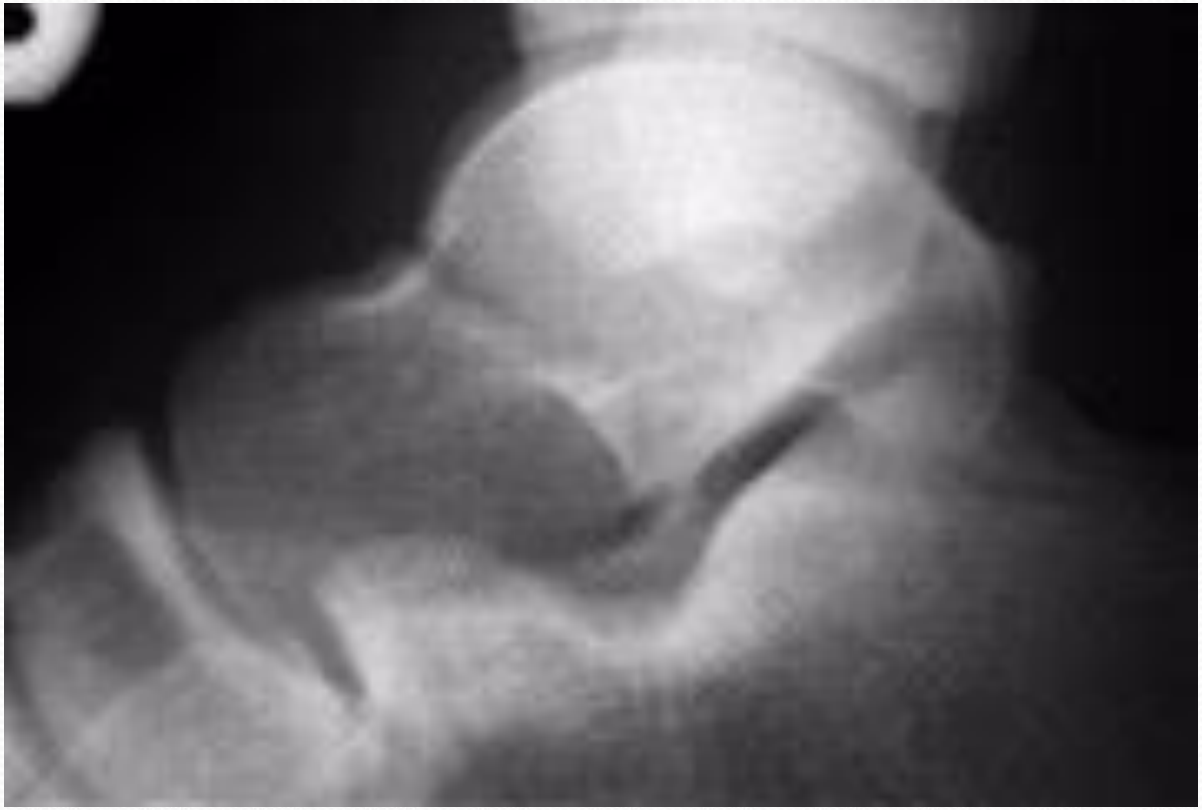
- **Indications for operative care:**
  - Bimalleolar fractures
  - Trimalleolar fractures
  - Talar subluxation
  - Articular impaction injury
  - Syndesmotic injury

Ankle Fractures

- **ORIF:**
  - Fibula
    - Lag Screw if possible + Plate
    - Confirm length/rotation
  - Medial Malleolus
    - Open reduce
    - 4-0 cancellous screws vs. tension band
  - Posterior Malleolus
    - Fix if >30% of articular surface
  - Syndesmosis
    - Stress after fixation
    - Fix with 3 or 4 cortex screws

Hindfoot Fractures:

- Talus
- Calcaneus



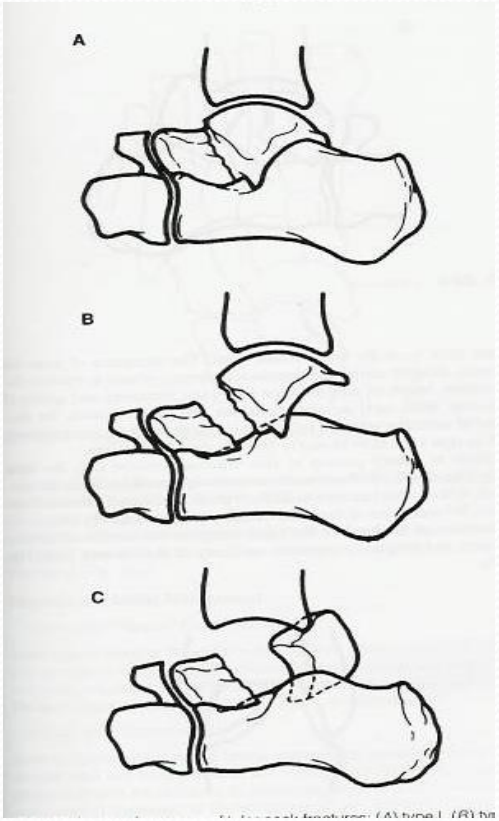
Talar fractures:

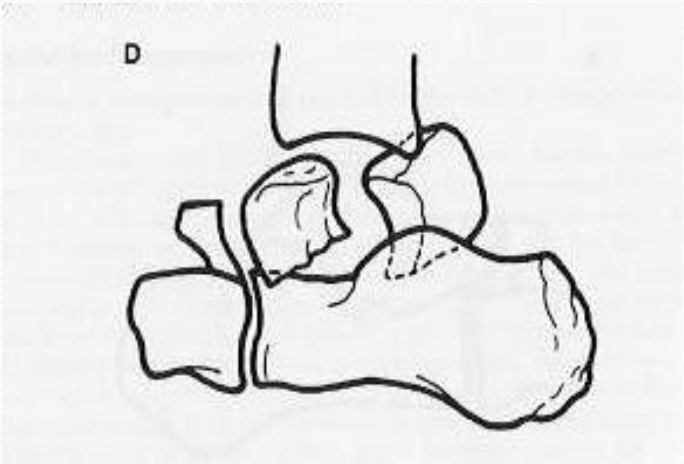
- Rare
- Poor blood supply → high incidence of AVN

Major Talar fractures:

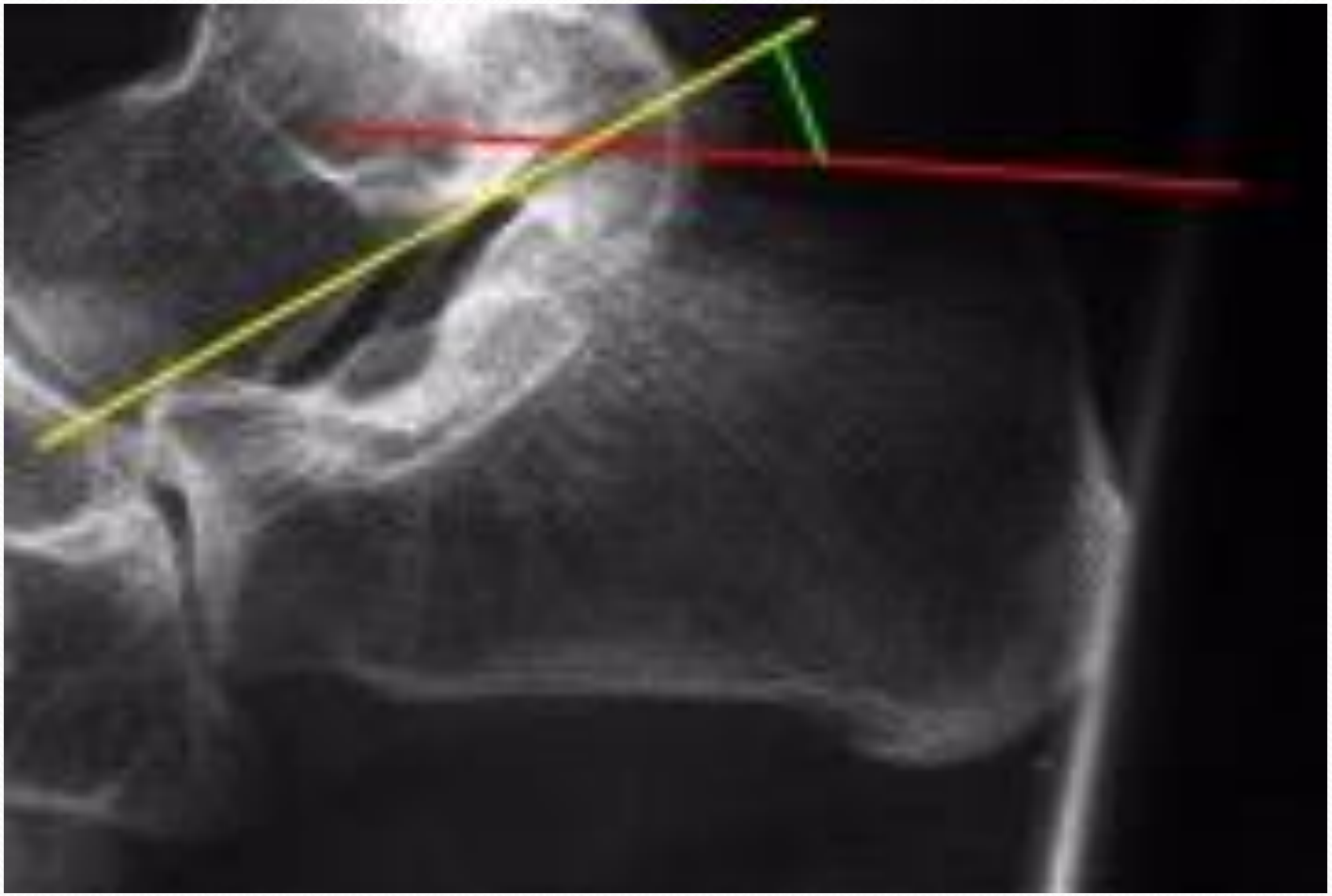
- Neck, head, body (& lat process)
- Talar neck fractures = 50%
  - Hawkins type1= non displaced + no joint inv.
  - Type II = displaced with subluxation or dislocation of the subtalar joint BUT ankle joint is OK
  - Type III = Type II +dislocation of ankle joint
  - Type IV = Type III + talar head dislocation

Talar Neck





Bohler’s angle (30-40 deg)



Treatment:

- Extraarticular=
  - 25-35%
  - Anterior process, tuberosity, medial process, sustenaculum tali, and body
  - If not displaced nor involving subtalar jt may treat with compressive dressings/casting

* Intraarticular= post facet involved

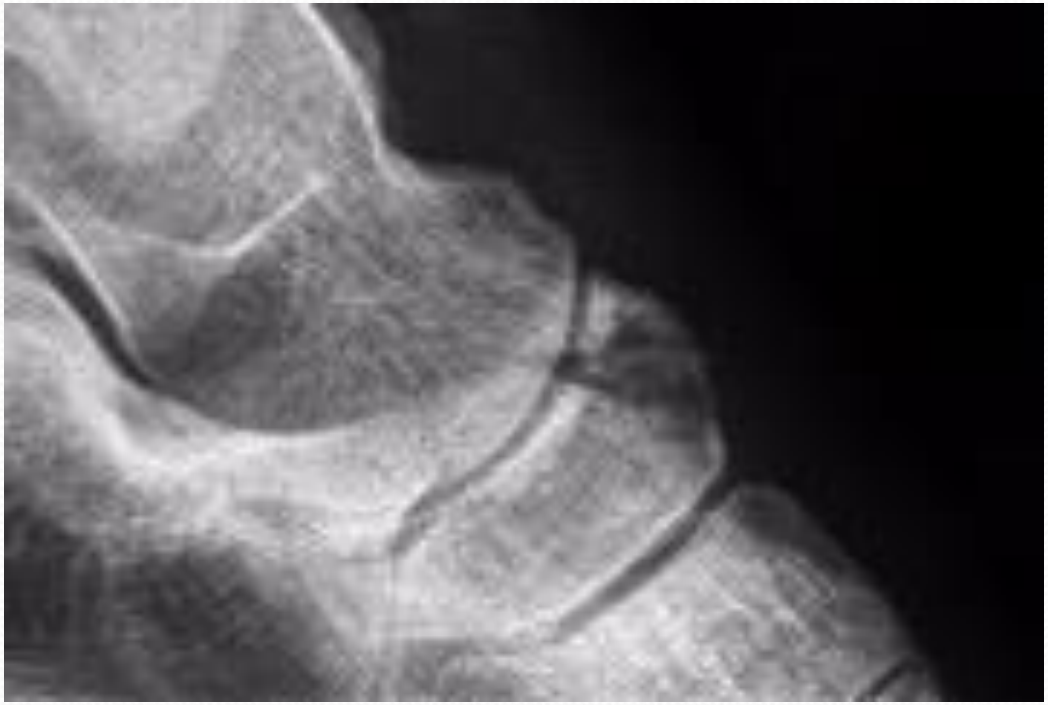
  - well padded post splint or surgery

Calcaneal fractures:

- More than 50% are associated with other extremity or spinal fractures

Midfoot Fractures:

- Navicular
- Cuboid
- Lisfranc



Navicular fractures:

-Most common midfoot fracture but still rare

-treatment=

non-displaced=short-leg walking cast x6 wks

displaced : surgery

Cuboid Fractures:

- Treat as per navicular fractures
- r/o Lisfranc injury

Lisfranc Joint:

- Formed by the articulations of metatarsals 1-3 with the cuneiforms and metatarsals 4 & 5 with the cuboid
- The metatarsal bases of digits 2-5 are joined by strong ligaments

- Normally, medial aspect of metatarsals 1-3 should align with medial borders of cuneiforms
- Metatarsals should be aligned dorsally with tarsals on lateral view
- Medial 4th metatarsal should align with medial cuboid
- Any fracture or dislocation of the navicular or cuneiforms or widening between metatarsals 1-3
- Proximal 2nd metatarsal # is pathogpneumonic

Normal Lisfranc joint

Treatment:

- May try closed reduction with traction but post reduction displacement of >2mm or tarso-metatarsal angle> 15 degrees requires surgery

Forefoot fractures:

- Metatarsal
- Phalangeal

Treatment:

- Nondisplaced or min displaced fractures of metatarsal 2-4 →stiff shoe, casting, or fracture brace.
- Non displaced 1st metatarsal → NWB BK walking cast
- Displaced 1st or 5th metatarsal
- Attempt closed reduction if >3mm displacement or 10 degrees angulation

Treatment cont.

- Metatarsal base # → rule outo LF injury
- Jones Fracture=5th metatarsal base fracture.
  - Tx=non displaced → NWB BK cast x6-8 wks
  - = displaced → surgery

Jones