Episode 29 - Calcaneus Fxs w/Dr. Dowd- Show Notes

**History/Physical**

- Assess the soft tissue envelope for swelling
  a. skin blisters
  b. compartment syndrome
  c. skin necrosis
  d. open fractures

**Associated injuries**
L spine fractures
Tibial plateau fxs,
Tibial pilon
Talar neck
Imaging

AP/ Lateral Radiograph

- Can assess **Angle of Bohler** on lateral view
  - a line drawn from the highest point of the anterior process of the calcaneus to the highest point of the posterior facet and a line drawn tangential to the superior edge of the tuberosity
  - Normal is 20-40 degrees
  - Decrease indicates weight bearing posterior facet of the calc has collapsed

- **Critical angle of Gissane**
  - Formed by two strong cortical struts extending laterally
    - One along lateral margin of posterior facet and other from anterior to beak of calc
    - Can see it directly below the lateral process of the talus
    - A decrease bohlers and increase in gissane is only seen if the entire facet is separated from the sustentaculum and depressed
Harris heel view

- Allows visualization of the joint
- Loss of height
- Increase in width
- Angulation of the tuberosity fragment

Broden’s view
- Foot in neutral flexion, and leg internally rotated 30-40 degrees. Beam centered over lateral mal
- Xrays at 10-40 degrees towards head of patient. 10 degree view shows posterior portion of
  facet, 40 degrees shows anterior portion of facet
- A mortise ankle view will reproduce

Ankle series

Consider CT imaging if intra-articular component to fracture

Anatomy/Mechanism
- Typically high energy trauma, such as a fall from a height or a MVA
- Essex-Lopresti
  a. Primarily fracture line produced by lateral talus impacting the crucial angle of Gissane, dividing
     the lateral wall and body of the calc. Fracture line exit at anterior process or calcaneocuboid joint
  b. Secondary fracture line -
     - If force directed posterior = fracture continues posterior into posterior facet = joint depression type
     - If force was directed axially, a tongue type fracture is produced
Classification

- Via xray (Essex Lopresti)
  - Tongue Type
  - Joint depression type

- Via CT (Sanders)
  - Based on coronal images
  - Posterior facet divided into 3 fragments- Lateral, Central, Medial (A,B,C)
    - Type 1-4 (Non displaced > 4 part articular fragments)
  - Tongue type typically IIC, IIB if extends intra-articular

Fragment Terminology

- Anterolateral fragment- encompasses lateral wall of anterior process
- Anterior main fragment- large fragment anterior to primary fx line
- Superomedial fragment (sustentacular or constant fragment)- almost always remains attached to talus through deltoid ligament complex- and is stable
- Superolateral fragment (semilunar fragment)- lateral portion of posterior facet - sheared from remaining posterior facet in joint-depression fx
- Tongue fragment- the super-lateral fragment that remains attached to portion of posterior tuberosity including the achilles tendon insertion
- Posterior main fragment- posterior tuberosity
- Fracture dislocations

**Treatment**

*Nonoperative*

A. *Indications*

- Nondisplaced extra-articular/ intra-articular fractures
- Anterior process w/ less than 25% involvement of the Calcaneocuboid joint
- Severe PVD or diabetes
- Minimally ambulatory elderly patients

Splinting, bulky jones
Conversion to fracture boot after swelling improves
Early ROM and NWB 10-12 weeks
Operative

A. Indications

- Displaced intra-articular fractures involving the posterior facet
- Anterior process calc fx w/ >25% involvement
- Displaced calcaneus fx of the calcaneal tuberosity
- Fracture/Dislocations
- Open fractures

Medial Ex Fix
- Can be useful w/ soft tissue injury

Percutaneous + minimally invasive

- Pre-op planning
- Sanders 2C tongue type where entire posterior facet is attached to tongue fragment; Displaced calc tuberosity or beak fx
- Patterns w/ relative contraindications to open surgery (heavy smokers, pmts on chronic anticoagulants).
  - Definitive fixation w/ large 6.5-8.0mm cannulated lag screws.
  - Medial/Lateral pins through superior calc
Lateral Extensile
- Pre-op planning
- No touch technique (wire in fibula, talar neck, cuboid, talar body)
- Technique:
  - Fragment mobilization (posterior tuberosity disimpacted from sustentaculum- restores height and calc length)
  - Articular reduction (type 3- assemble medial>lateral)
    - Anterior process- assess anterolateral fragment- reduce to A1 portion of articular fragment- restores crucial angle of gissane
  - Definitive fixation (lag screws, plate, +/- grafting)
- Locking plates
- Repair SPR? Peroneals assessment?

Complications:
- Wound dehiscence
- Peroneal tenosynovitis/impingement
- Peroneal tendon dislocation
- Subtalar arthrosis
- CC arthritis
- Cutaneous nerve injury (can do gabapentin, amitriptyline, PT, or shoe inserts)

Nailed It Ortho podcast episode

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References: