Fractures of the Talus
Talus

- Old French for ankle “Talo” from the Latin “Taxillus”. Romans made dice from the heel of a horse.

- Greeks made dice from C2 of a sheep “Astragulus”
Talar Fractures

- Fabricius 1609: 1st account of treated by takedown
- Astley Cooper: 1818 1st description of # disloc.
- James Syme: 1848 RIE 13 cases open # only 2 survived Recc BKA
- Anderson: 1919 Aviators Astragalus
- Coltart: 1952 106 #’s WWII injuries
Talar fractures

- Rare injuries
- 0.14-0.32% of all fractures
- Because they are rare experience is usually limited.

- Often present requiring emergency treatment.
Mechanism of injury

- Falls from height
- Crush injuries
- Dorsiflexion:
  - Aviators astragulus  Anderson 1919
Blood supply

- Three main sources:
  - Dorsal
  - Medial
  - Sinus tarsi
Blood supply
Classification

- **Peripheral:** rare less than 100 reported cases

- **Central:**
  - Neck
  - Body
  - Dome
Classification

- Neck:

- Hawkins 1970
  - Discussed 57 talar neck fractures
  - 55 Dorsiflexion injury
  - 15 associated Med mal #
  - 64% other #'s
  - 21% open injuries
Classification

• Hawkins 1970:
  – Group 1: Vertical fracture of the talar neck
    Undisplaced
    One source of blood disturbed, dorsal
    No AVN
    All healed
Classification

- Hawkins 1970:
  - Group II: Vertical fracture of neck displaced, subluxed or dislocated subtalar joint.
  - 2 sources of blood disturbed
  - All united
  - 42% AVN
Classification

- Hawkins 1970:
  - Group III: Body of talus displaced from both the subtalar joint and the ankle joint.
    - All 3 sources of blood gone
    - 3 non unions
    - 90% AVN
Hawkins sign:
- Subchondral talar atrophy, disuse secondary to NWB.
- Excludes diagnosis of AVN
- Time to AVN 6-8 weeks
Hawkins I
Hawkins III
Classification

- Canale Kelly JBJS 1978:
  - Type IV: Vertical # talar neck associated with disruption of the TNJ
Classification

Body #’s

• Sneppen 1977 Acta Orthop Scand

• Compression #’s

• Coronal, saggital or shearing #’s

• Posterior process #’s

• Lateral process #’s (Snow boarder’s #)

• Crush #’s
Lateral process #
Type II
Management:

- Considerable challenge usually as an emergency

- **AO principles:**
  - Anatomical reduction
  - Stable internal fixation
  - Preservation of blood supply
  - Early ROM
Management

- Early efforts based on removal of all or part of the talus and fusion
- McKeever advocated early subtalar fusion to open up vascular channels to the talus
- Variable results
Management

- Hawkins and Canale

- Began to suggest that early accurate fixation produce the best results.

- Still had very variable post op regime
• He accepted 5mm displacement

• Overall 59% AVN
  – Gr I: 2 cases of AVN but all had good results
  – Very variable post op treatment
  – NWB for 2/7!!

  – Gr II 50% AVN
  – Poor result directly attributable to malalignment
Canale & Kelly 1978

- **Gr III:**
  - 11/23 good to excellent results
  - 84% AVN

- **Gr IV:**
  - All developed AVN 1 poor 2 fair results.
Management

- Vallier JBJS 2004:
  - 102#  
    - 4 Type I
    - 68 Type II
    - 25 Type III
    - 5 Type IV
  
  All fixed, 19 (49%) AVN but 7 of these revascularised
  Overall AVN plus collapse 31%
Management

- Vallier 2004
- Canale x ray useful
- Weight bearing once # healed
- Effect of wt bearing on AVN ??
Management

- Lindvall, Sanders JBJS 2004

- 26 Talar neck and body 
  - All closed neck fracture healed no relation to delay in surgery.
  - No relation to inc of AVN
  - Post op OA more of a problem in body #’s than AVN
Approaches

- Anterior medial
- Anterior lateral
- Posterior

- Vallier 91% of neck #’s in this series required both medial and lateral approaches
Lateral approach
Medial Approach
Posterior approach
Surgical Approaches to the Talus
Lateral Approach
Fixation

- Screws or plates?
  - Charlson: Foot ankle Int 2006
    - Fresh frozen cadaveric talar neck#
    - Simulated comminution
    - Fixed with 2 post to ant 4mm screws or 2mm mini frag. plates
    - Load to failure greater in screws than plates
    - Plates better controlling axial alignment.
Talar Body ORIF
Hawkins II
Hawkins III ORIF
Lateral process #
Conclusions

• Rare fractures
  – Difficult to manage, often presenting to the non specialist as emergency
    – No one has vast experience but emergency reduction vital
    – Delayed fixation will not alter the outcome
  – Warn patients that it may be poor