Background

“Aviator’s Astragalus”, Anderson 1919 (pilots bracing against rudder controls)

Forced dorsiflexion of foot
- Fall from height
- MVC

Talus: 0.1%-0.85% of all fractures
- 50% are talar neck fractures

Santavirta et al., JOT 1984, 986-989

Vascular Supply

Talus supplied by 3 main arterial branches
- Dorsalis Pedis
- Arteries of tarsal sinus and canal
- Deltoid artery

Mulfinger et al., JBJS Am, 1970, 160-167

Imaging

- AP, lat, obliques of foot and ankle
- Canale view
- CT scan

Canale and Kelly, JBJS Am; 1978, 143-156

Hawkins Classification

Group I
- Nondisplaced vertical fracture of the talar neck

Group II
- Displaced fracture of the talar neck with subluxation or dislocation of the subtalar joint

Group III
- Displaced fracture of the talar neck with dislocation of the body of the talus from both the subtalar and tibiotalar joints
Canale's Modification

Type IV
- Hawkins III with subluxation or dislocation of talar head

Hawkins I

Hawkins II

Hawkins III

Type IV

Biomechanics

Cadaveric study
- 2mm displacement altered contact characteristics of subtalar joint
- Dorsal and varus displacement caused the greatest change

Sangeorzan et al., JOR, 1992, 544-551
**Treatment**

Type I: Cast immobilization
- Cast immobilization 6-8 weeks
- Surgery?

Type II-IV: ORIF
- Anterolateral and medial incisions

**Timing**

How urgent are these?
2 studies
- No increase in AVN with delayed fixation
- Urgent to reduce dislocation
  - Talus needs to be under plafond

*Lindvall et al. JBJS 2004 86-A(10); 2229-2234
Vallier et al. JBJS 2004 86-A(8); 1616-1624*

**Medial Approach**

Easy access to talar neck
Avoid stripping dorsal neck vessels and deltoid (medial malleolus osteotomy)
Less extensile than anterolateral approach
Single incision may result in shortening and varus malunion

**Anterolateral Approach**

Exposure
- lateral neck
- subtalar joint

2 incisions is gold standard

*Murphy, Campbell’s; 1998, ed 9, 1924-1971*

**Posterolateral Approach**

Usually used in conjunction with medial or anterolateral approach
Superior mechanical strength
Disadvantages include subtalar or lateral trochlea violation, FHL insult, and impingement

*Trillat et al. Rev Chir Orthop Reparatrice Appar Mot; 1970, 529-536*

**Böhler Incision**

Extensile anterolateral approach
Alternative to 2-incision technique

*Herscovici et al., JOT 14(6), 2000, 429-432*
Screw Fixation
Solid-core stainless steel
Cannulated
Titanium
  - Allows MRI to assess for AVN
Bioabsorbable
Countersunk or headless lag

Post-op Care
Early ROM
If comminuted or unstable, consider immobilization
NWB until evidence of fracture healing?
Fortin & Balazsy. JAAOS; 2001, 114-127

Results
Canale reported 59% good or excellent in 71 fractures
  - >50% Hawkins II were treated closed
  - Many healed in varus malunion
Low: 18 of 22 good to excellent displaced talar neck fx’s treated with ORIF
Canale, JBJS Am; 1978, 143-156
Low et al, Ann Acad Med Singapore; 1998, 763-766

Hawkins Sign
Seen at 6-8 weeks
Patchy subchondral osteopenia on AP & mortise views
Presence is reliable indicator no AVN
  - Absence is not reliable indicator of AVN
Compare to contralateral side
Hawkins, JBJS Am, 1970, 991-1002

Complications
Fortin & Balazsy. JAAOS; 2001, 114-127

Osteonecrosis
MRI is also helpful but implant must be non-ferromagnetic
MRI not helpful before 3 weeks
MRI is not 100% sensitive
Progress WB status based on fracture healing, not AVN
May take 3 years for revascularization
Thordarson et al, Foot & Ankle Int.; 1996, 742-747
Henderson, RC. JOT; 1991, 96-99
Malunion

Incidence as high as 32%
  - Most common in Hawkins II treated closed
Varus malunion most common
  - 2-incision approach if any medial comminution exists
  - Correction is difficult
Dorsal malunion
  - Leads to impingement
  - Resection of prominence

Hawkins, JBJS Am, 1970, 991-1002

Summary

Non-operative for only non-displaced fractures

ORIF with 2-incision technique if medial comminution exists

Don’t wait for Hawkin’s sign to advance WB status, use fracture healing as a guide

CASES

32 YO M S/P MVC W/ R ANKLE PAIN

Physical Exam

Obvious R ankle deformity
Weakly palpable DP and PT
NL sensation
Motor limited by pain
Case 2 - 27 yo male with ankle injury

- What tests are needed?
- Treatment options?

Case 2 - 27 yo male with ankle injury

- What tests are needed?
- Treatment options?
- If surgery, what approaches are used?
- How do you reduce this injury?
- What fixation?
Case 3 - 52 yo male s/p fall from ladder

- What tests are needed?
- What approaches are used?
- How do you reduce this injury?
- What fixation?

Case 4 – 26 yo in MVC

- How do you classify this fracture?
- What tests are needed?
- What approaches are used?
- How do you reduce this injury?
- What fixation?
Case 5 – 42 yo male with MCA

22 yo MVA

To OR to reduce Joint

Case 5 – 42 yo male with MCA