Seth R. Yarboro, MD
Assistant Professor
University of Virginia

**Posterior malleolus fracture: is there a critical size?**

**Background**
- Isolated posterior malleolus fractures rare
- Important for normal contact forces
- Contributes to stability of ankle

Fracture pattern may be highly variable

**Posterior malleolus**
- Posterior malleolus is attached to PITFL
- May result in functional disruption of syndesmosis

**Fix it versus syndesmotic screw?**
- 70% original stiffness restored with ORIF posterior malleolus vs 40% with syndesmotic screw
- Superior stability after fixing posterior mal (PITFL) compared to screw fixation (Miller CORR 2010, Gardner CORR 2006)

**Biomechanical data**
- 25% rule? (Macko JBJS 1991)

Remaining contact area in various ankle positions was decreased compared to intact for all sizes

University of Virginia Orthopaedic Surgery
**Biomechanical data**

- 200N posterior force did not translate talus up to 40% fracture if fibula and AITFL were intact. (Raasch JBJS 1992)
- 30% did result in translation if fibula and AITFL incompetent.

**Other ideas on size of fragment**

- 5-10% has been suggested as a cutoff for fixation (Jaskulka J. Trauma 1989)
- Joint incongruity for fragments >10% predicted ankle osteoarthritis in a series of 57 ankles (Langenhuijsen J. Trauma 2002)

**What do surgeons actually do?**

- 97% of surgeons would fix a 50% posterior mal fracture (Gardner FAI 2011)
- 9% would fix a 10% fracture
- 44% would fix a 20% fracture

No consensus for moderate fracture size

**Are plain XR adequate?**

- Plain radiographs are inadequate for determining posterior mal size. (Ferries JOT 1994)
- External rotation views (50 degree) may better visualize fracture (Ebraheim FAI 1999)

**Limitation of XR**

- Variable morphology is difficult to identify
- Useful classification?
**Classification**

- Haraguchi (JBJS 2006)
  - I 67%
  - II 19%
  - III 14%

**How to fix?**

"A to P" Screw Versus Posterolateral Plate for Posterior Malleolus Fixation in Trimalleolar Ankle Fractures

- 27 patients
  - 16 plate
  - 11 screw
- Patients treated with plate had superior clinical outcomes

**Open reduction options**

- Posterolateral approach
  - Centered between Achilles and fibula
  - Interval: FHL and peroneals
- Posteromedial approach
  - Follows PTT
  - Exposure between PTT and FDL or posterior to FDL
- Positioning?
  - Supine with bump
  - Prone

**Outcomes**

- Fragments smaller than 25% treated non op have worse outcomes than surgically repaired group. (Evers Injury 2015)
- Worse radiographic arthritis with medium and large size fragments and stepoff >1mm. Clinical outcomes did not correlate with size. (Drijfhout van Hooff FAI 2015)

**Isolated posterior mal fracture**

Good clinical and radiographic outcomes at 20 yrs with closed treatment. (Donken JBJS Br 2011)
• The historic standard of 25% is just a starting point
• Consider (more) routine use of CT scan for surgical planning.

Summary

• More important than size, we should consider:
  – Morphology of fracture
  – Posterior translation of talus
  – Loose bodies
  – Implications for syndesmosis
  – Associated injuries

References

- Black EM. Role of preoperative computed tomography scans in operative planning for malleolar ankle fractures. FAI 2013 May;34(5):697-704.
- Donken CC. The outcome at 20 years of conservatively managed isolated posterior malleolar fractures of the ankle: a case series. JBJS Br 2011;93-B:1621–5.