Open Reduction and Internal Fixation of Posterior Malleolus Fractures via a Posteromedial Approach

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Disclosure

• Robert Zbeda, MD has no financial conflicts or disclosures
• Stephen Friedel, MD has no financial conflicts or disclosures
• Stuart Katchis, MD is a paid presenter for Zimmer/Biomet stockholder and is stockholder in Nextremity Solutions
• Lon Weiner, MD receives royalties from Zimmer/Biomet and is a stockholder in Nextremity Solutions

We have no potential conflicts with this presentation
Background

• Posterior malleolus fractures occur in 7 to 44% of ankle fractures

• Internal fixation is indicated in posterior malleolus fractures > 25%-30% of the joint

• Most commonly used surgical methods
  – Indirect reduction via fibular fixation + percutaneous anterior approach
  – Direct reduction and visualization via a posterolateral approach

• For large posterior malleolus fractures with medial extension, direct reduction via a posteromedial approach is a reasonable alternative

Irwin TA. JAAOS 2013
Background

• Purpose: to report on a large series of posterior malleolus fractures treated via posteromedial approach.

• Hypothesis: fixation of large posterior malleolus fractures with medial extension via a posteromedial approach leads to anatomic reduction and stable plate fixation.
Methods

• 2008 to 2016, 23 of 244 (9.4%) consecutive operative ankle fractures were identified

• Patient charts were retrospectively reviewed

• All patients had pre-operative CT scans

• Post-operative radiographs reviewed to ensure anatomic reduction/stable fixation maintained

• Descriptive statistical analysis
Methods/Surgical Technique

• Direct lateral incision made and fibula was reduced and brought out to length

• Posteromedial incision was made ~6cm above joint, curving around the posterior aspect of medial mall

• Saphenous vein isolated/retracted anteriorly and posterior tib retracted posteriorly

• Posterior malleolus was reduced under direct visualization and fixated with a 5-hole 1/3 tubular plate

• Medial mall was fixed with K-wire/tension band construct
## Results

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<td>Removal of Hardware</td>
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<td>Post-Operative Complication</td>
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Results

• Average age at time of surgery=54.6 years (range, 26-86 years)

• Average follow-up time was 11.0 months (range, 0.3 to 41.4 months)

• Post-operative complication rate=13% (3/23)
  – 1 superficial infection (cellulitis)
  – 1 deep infection localized to the fibula (osteomyelitis)
  – 1 symptomatic heterotopic ossification

• All complications resolved following appropriate management
Figure 1. 39 year old female status post-slip and fall. Injury radiographs (anteroposterior and lateral views) of the right ankle depicting trimalleolar ankle fracture and ankle subluxation.

Figure 2. Pre-operative computed tomography (CT) scan (sagittal view) showing large posterior malleolus fracture.

Figure 3. Pre-operative CT scan (axial view) showing large posterior malleolus fracture with medial extension.

Figure 4. Pre-operative CT scan with three-dimensional reconstruction showing large posterior malleolus fracture along with medial and lateral malleolus fractures.

Figure 5. Right ankle radiographs (anteroposterior and lateral views) taken at approximately 4 months post-operatively demonstrating anatomic reduction and stable plate fixation after open reduction internal fixation via a posteromedial approach. There is a 1/3 tubular plate on the posteromedial aspect of the tibial plafond with 2 bicortical screws going posterior-anterior.
Discussion

• Novel approach, posterior tib retracted posteriorly
• direct visualization + anatomic reduction
• fixation of the posteromedial tibial plafond is important, because PITFL does not indirectly reduce posteromedial fragment via ligamentotaxis
• supine patient positioning allows for excellent visualization of both ankle joint + anterior portion of the medial malleolus.
Summary

• All patients with posterior malleolus fractures treated with ORIF via a posteromedial achieved anatomic reduction and stable plate fixation

• Posteromedial approach is a reasonable alternative to other more commonly used methods