Suture Button Fixation of Posterior Malleolus Fractures

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Disclaimers

Michael R. Anderson, DO:
• None

Christopher N. Zingas, MD:
• Paid consultant: Paragon28
Background

Despite the increasing awareness and literature addressing fractures of the posterior malleolus (PM), no consensus surgical indications or techniques have been established. A posterolateral or posteromedial approach allows fixation to be placed in a compressive mode as opposed to the more traditional anterior to poster placed screws which relies upon static screw placement. We designed a technique that utilizes a suture button device for fixation. This technique allows for compression across the fracture site while avoiding cumbersome patient positioning and extensive posterior dissection. We hypothesized that our technique would safely and reliably lead to satisfactory surgical and clinical outcomes for operatively treated PM fractures.

Seven patients underwent treatment of a PM fracture using our technique. All cases achieved an anatomic reduction of the PM based on available imaging. Final follow up averaged 9.5 months. Four of the seven patients underwent additional surgical procedures. Final ROM was available for 5 patients. Of the five, 4 achieved satisfactory final motion. No patients experienced loss of fixation of the posterior malleolus, nor were any complications attributed to our technique.

Our technique of using a suture button as fixation for PM fractures has several advantages over other available techniques of PM fixation and is able to achieve a radiographically anatomic reduction. We believe that our technique is a viable option in those injuries that benefit from surgical treatment of the PM component.
Description of technique

1. Address the medial and lateral malleoli in a standard fashion prior to fixation of the posterior malleolus. It helps to place the lateral incision slightly posterior.
2. Following fixation of the lateral malleolus bluntly dissect posterior to the fibula to gain access to the PM fragment. Reduction via ligamentotaxis should be palpably confirmed.
3. Position a PCL retroguide squarely on the PM fragment and note where the trochar is positioned on the anterior aspect of the tibia.
4. Incision the skin over the anterior aspect of the tibia and bluntly dissect to bone. Advance the trochar to the anterior cortex.
5. When the guide is properly positioned on both the anterior and posterior cortices advance a 2.4 mm cannulated drill through the trochar.
6. Release the guide and remove the center sleeve from the drill bit. This leaves the hollow tube of the drill remaining in a bicortical fashion.
7. A suture lasso is then passed through the cannulated drill from anterior to posterior and retrieved through the lateral incision with a hemostat.
8. The cannulated drill is removed leaving just the suture lasso passed through bone.
9. The PCL suture button device is then guided through the distal tibia via the suture lasso. Proper placement of the button on the PM is confirmed radiographically.
10. The anterior limbs of the suture button device are then secured through a second, knotless, suture button on the anterior cortex.
11. Compression across the fracture is achieved by pulling straight back on both limbs anterior button. The anterior button is knotless to prevent suture burden from irritating the soft tissues. Once maximal compression is achieved the excess tail material is cut with attention directed towards not cutting the cinch bundle overlying the button.
Trochar for cannulated drill

PCL guide positioned on PM and anterior cortex of distal tibia
Methods

A retrospective review of all ankle fractures treated by the senior surgeon was reviewed with institutional review board approval. Medical records were reviewed for demographic as well as clinical data with range of motion, complications, quality of reduction and secondary surgery as our primary outcome measures.
Results

- Mean age: 55.9
  - 3 males
  - 4 females
- Mean motion (5 pts)
  - 5 deg dorsiflexion
  - 34.5 deg plantar flexion
- Complications
  - One loss of fixation of medial malleolus
  - None related to PM fixation

Anatomic reduction of PM achieved and maintained on all patients
### Additional surgical procedures

<table>
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<th>Procedure</th>
<th>Timing</th>
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<td>Removal of hardware, ankle arthroscopy with lysis of adhesions and chondroplasty of 1.5x1 cm medial talar dome osteochondral lesion</td>
<td>6 months</td>
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<tr>
<td>Removal of hardware, ankle arthroscopy with lysis of adhesions, open excision of anterior exostosis and tarsal tunnel release</td>
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<td>Removal of hardware, ankle arthroscopy with lysis of adhesions, chondroplasty of medial talar dome osteochondral lesion and open toneless of posterior tibial tendon</td>
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<tr>
<td>Removal of hardware, ankle arthroscopy with lysis of adhesions and chondroplasty of talar dome lesion. Open posterior capsular release.</td>
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<td>Revision medial malleolus ORIF, deltoid repair and syndesomotic screw fixation</td>
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Case example
Case example
Conclusion

We were able to achieve an anatomic reduction of the posterior malleolus in 7 consecutive patients who underwent fixation of the PM fragment with a suture button device. None of our patients experienced any complications related to the fixation of the PM fragment. Five of our 7 patients underwent additional surgical procedures; most commonly for removal of hardware with ankle arthroscopy and debridement of osteochondral lesions that likely resulted from the initial injury. Our technique avoids cumbersome prone positioning required for a posterolateral approach. Perhaps more importantly, our technique minimizes the amount of posterior dissection which may lead to excessive scar formation and decreased range of motion. While our cohort is small and lacking a control group, we believe that our technique is a safe and viable method of fixation of posterior malleolus fractures when indicated.
References


