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Ankle Plating System 3

Providing Stability to the Syndesmosis by Plating the Posterior Malleolus

Case Study

Jeffrey D. Seybold, MD

A 69-year-old female who sustained an ankle dislocation with associated distal fibula, posterior pilon, and deltoid avulsion fractures was treated successfully with the Acumed Ankle Plating System 3.

Post-op X-ray showing Ankle Plating 3 plates

Acumed® is a global leader of innovative orthopaedic and medical solutions.

We are dedicated to developing products, service methods, and approaches that improve patient care.

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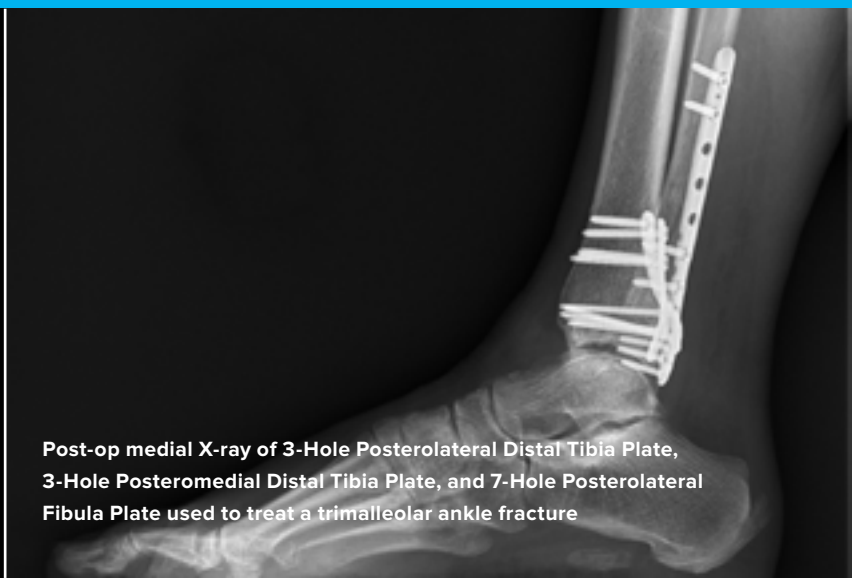
Pre-op A/P X-ray of long oblique distal fibula fracture, posterolateral tibia fracture, and posterolateral tibia fracture



Post-op medial X-ray of 3-Hole Posterolateral Distal Tibia Plate, 3-Hole Posteromedial Distal Tibia Plate, and 7-Hole Posterolateral Fibula Plate used to treat a trimalleolar ankle fracture

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Patient History

The patient is a 69-year-old female with an unremarkable medical history who sustained a mechanical fall at home, slipping and falling down the last few steps of a staircase. The patient was brought to the emergency department where an ankle fracture-dislocation was noted. The patient underwent a successful closed reduction of the ankle in the emergency department and was placed into a short-leg splint. The patient was initially admitted to the hospital for pain control and discharged the following day after formal orthopaedics consultation. Eight days later, after adequate improvement in soft tissue swelling, the patient was brought to the operating room for definitive fracture fixation.

Treatment

The patient was positioned prone on the operating table. A standard posterolateral approach was utilized and the FHL muscle belly and tendon were reflected medially to expose the posterior distal tibia. The peroneal muscle bellies and tendons were mobilized laterally to allow adequate exposure of the posterior fibula. A long, oblique distal fibula fracture was noted. Anatomic reduction and stabilization of the distal fibula fracture was achieved first using two Kirschner wires. The wires were used initially to maintain adequate fibular length and fracture reduction while allowing the surgeon to visualize the posterior malleolus on a lateral fluoroscopic image. (Plating the fibula first will block the view of the posterior malleolus and is not recommended.)

The posterolateral fracture fragment was carefully elevated to allow for reduction of the marginal impaction at the articular surface. A pointed reduction forceps was used to reduce the posteromedial and posterolateral distal tibia fracture fragments, creating essentially a single posterior malleolar fragment. The small impacted fragments were then stabilized by reducing the posterolateral malleolar fragment with a Kirschner wire. The Acumed 3-Hole Posterolateral Distal Tibia Plate was used first to stabilize the posterolateral fragment. Locking screws were secured distally and nonlocking screws were used proximally to secure the plate to bone. The Acumed 3-Hole Posteromedial Distal Tibia Plate was then used to secure the posteromedial fragment, taking care to avoid prominence of the plate around the posterior tibial tendon, which was carefully elevated over the distal tapered end of the plate. Locking screws were used distally to avoid prominence of the screw heads around the posterior tibial tendon, and nonlocking screws were used proximally to secure the plate to bone. After confirming anatomic reduction of the posterior malleolus, the fibula was formally fixed with an Acumed 7-Hole Posterolateral Fibula Plate.

There was no evidence of extension of the posteromedial fracture into the anterior colliculus of the medial malleolus, therefore there was no need for additional fixation of the medial malleolus. Excision of the deltoid fragments and primary deltoid repair was performed to limit impingement of the small deltoid avulsion fragments and to improve medial stability of the ankle mortise. After layered closure of the posterior wound, the knee was flexed and a longitudinal incision was made over the anterior border of the medial malleolus. A complete deltoid disruption was noted, with small avulsion fragments from the medial malleolus interposed within the medial gutter. Debridement of the fragments and medial gutter was performed, followed by primary suture repair of the deltoid ligament. Final fluoroscopic images demonstrated anatomic reduction of the fractures and a stable ankle mortise without residual talar subluxation or syndesmotic instability. Layered closure of the medial ankle incision was performed and the patient was placed in a short leg splint.

Postoperative Care

The patient was kept non-weight-bearing for a total of 6 weeks postoperatively, and weight-bearing was then advanced in a cast boot over the subsequent weeks. The patient was able to progress activity in a regular shoe by approximately 10 weeks postoperatively and returned to normal daily activity by three months. Final evaluation demonstrated healed fractures without progressive post-traumatic degenerative changes. The patient did not report any hardware irritation. Ankle range of motion was pain-free from approximately 20 degrees of dorsiflexion to 30 degrees of plantarflexion. The patient denied sural or saphenous nerve paresthesias.

Discussion

Ankle fractures present with many variations, and the surgical plan may change in the operating room based on the fracture pattern encountered, bone fragility, and soft tissue envelope. The Acumed Ankle Plating System 3 provides the surgeon with multiple tools to address complex ankle fracture patterns, and includes standard cannulated screws and one-third tubular plates, as well as posterior malleolus locking plates and medial malleolar hook plates. Fixation of the posterior malleolus has gained significant traction in recent years, even for smaller fractures, due to concerns for stability of the syndesmosis and limiting posterior subluxation of the talus leading to deformity and post-traumatic arthritis. A posterolateral approach allows for excellent visualization of the posterior malleolus and distal fibula and the Acumed Ankle Plating System 3 provides multiple plate and screw options to accommodate fixation of fractures with this approach.

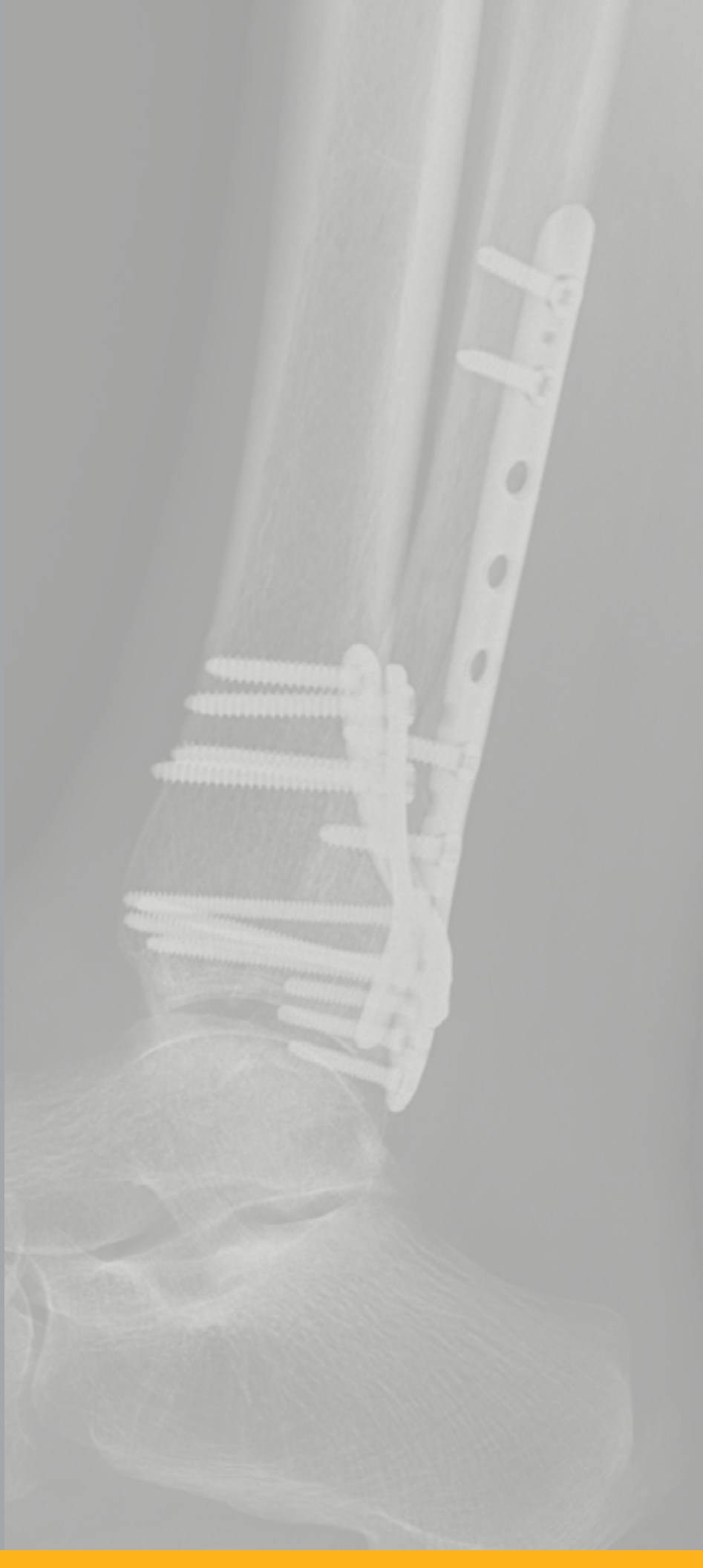
This patient presented with a posterior pilon fracture variant, with fractures of both the posteromedial and posterolateral tibial plafond. Fixation of both fragments was warranted in this situation to limit posterior instability of the talar dome, allow for adequate fracture healing, and limit risk of post-traumatic arthritis. Fixation of the posterolateral fragment, and consequently the attachment of the posterior inferior tibiofibular ligament, stabilized the posterior syndesmosis. No further syndesmosis fixation was required, as the anterior syndesmosis remained reduced without evidence of anterior inferior tibiofibular ligament injury as noted on the preoperative CT scan. Preoperative CT imaging of the ankle in these cases is critical to identify the extent of the posterior malleolar fracture pattern and assess both anterior and posterior syndesmosis stability.

Dr. Seybold is a paid consultant for Acumed.

Pre-op CT scan shows an oblique fibula fracture with posterolateral and posteromedial tibia fractures

Pre-op lateral X-ray of ankle dislocation with associated distal fibula, posterior pilon, and deltoid avulsion fractures

Post-op A/P X-ray of 3-Hole Posterolateral Distal Tibia Plate, 3-Hole Posteromedial Distal Tibia Plate, and 7-Hole Posterolateral Fibula Plate



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