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Ankle 3 Plating System

Dual Plating for Posterior Pilon Fractures

Case Study

Jeffrey D. Seybold, MD

A 38-year-old female who sustained a left ankle fracture with significant posterior malleolar fracture fragments 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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A slip and fall leads to an ankle fracture with significant posterior malleolar fracture fragments

An Acumed 3-Hole Posterolateral Distal Tibia Plate, 3-Hole Posteromedial Distal Tibia Plate, and two 3.5 mm hexalobe screws were used to treat a trimalleolar ankle fracture

Dual Plating for Posterior Pilon Fractures

Patient History

The patient is a 38-year-old female with a history of hypothyroidism and limited daily nicotine use who slipped on a patch of ice and fell, twisting her left ankle. The patient was brought to an orthopaedic urgent care where radiographs demonstrated minimally displaced posterior pilon and distal fibula fractures. The patient was placed into a short-leg splint and a CT scan was ordered. She presented to clinic for definitive evaluation and treatment 4 days following her injury, where examination demonstrated moderate soft tissue edema around the ankle, but no fracture blisters or significant deformity. A CT scan confirmed the presence of a posterior pilon fracture with mild displacement of the posterolateral fragment, a mildly displaced distal fibula fracture without anterior syndesmosis gapping, and extension of the posteromedial fracture line to the medial malleolus without a separate medial malleolus fracture. Operative intervention was recommended and the patient proceeded to undergo ORIF of the posterior pilon and distal fibula fractures a few days following her clinic visit.

Treatment

The patient was positioned prone on the operating table. A standard posterolateral approach was used 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 mildly displaced oblique fracture of the distal fibula was encountered. The fibula fracture was reduced manually and secured with two 3.5 mm cortical lag screws. Given the patient's excellent bone quality and minimal displacement of the fracture, additional plate fixation of the fibula was not deemed necessary.

The posterolateral fracture fragment was carefully manipulated and secured in a reduced position with a Kirschner wire. The Acumed 3-Hole Posterolateral Distal Tibia Plate was secured proximal to the posterolateral fragment, buttressing and maintaining anatomic reduction of the fracture. The plate was secured distally with a nonlocking screw to sink the plate down to bone and two distal 2.7 mm locking screws to secure the posterolateral fracture fragment. The Acumed 3-Hole Posteromedial Distal Tibia Plate was then used to secure the posteromedial fragment. Care was taken to ensure the posterior tibial tendon was able to glide freely over the plate and was not incarcerated underneath the distal edge of the plate. 2.7 mm 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. Fluoroscopic images confirmed anatomic reduction of the posterior malleolus and fibula fractures, with appropriate alignment of the hardware.

Because there was no evidence of extension of the posteromedial fracture into the anterior colliculus of the medial malleolus, there was no need for additional medial malleolus fixation. The medial clear space reduced indirectly after fixation of the fractures and limited the need for formal deltoid exploration or repair. The anterior syndesmosis remained reduced without evidence of anterior inferior tibiofibular ligament injury, as noted on the preoperative CT scan, so no further syndesmosis fixation was required. The posterior syndesmosis was stabilized with fixation of the posterolateral tibial plafond fragment. Layered closure of the posterolateral incision was performed and the patient was placed in a short leg splint.

Postoperative Care

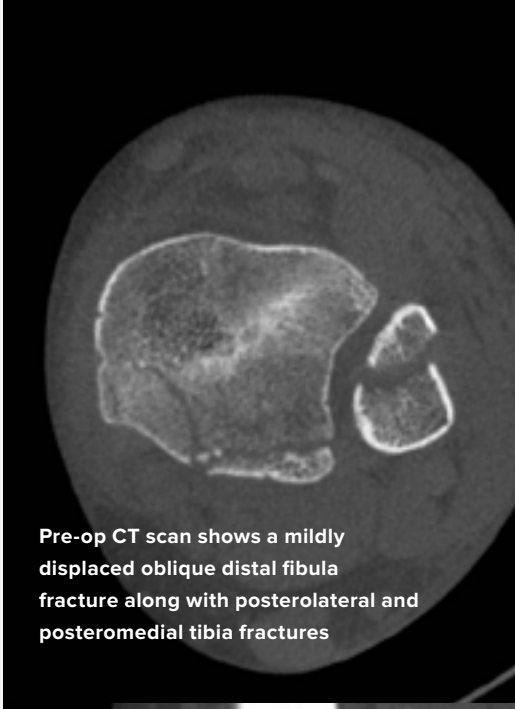
The patient was kept non-weight-bearing for a total of 6 weeks postoperatively, and weight bearing was then advanced in a cast boot over the subsequent weeks. The patient was able to progress activity in a regular shoe by approximately 8 weeks postoperatively and returned to normal daily activity by 10 weeks. Final evaluation demonstrated healed fractures without post-traumatic degenerative changes. The patient did not report any hardware irritation. Ankle range of motion was pain-free with only 5-10 degrees of limited dorsiflexion compared to the contralateral ankle, and normal plantarflexion. The patient denied any sural nerve paresthesias.

Discussion

Ankle fractures present with many variations, and the surgical plan may change in the operating room based upon the fracture pattern encountered, bone fragility, and soft tissue envelope. The Acumed Ankle Plating System 3 provides the surgeon with multiple tools to address the most complex ankle fracture patterns, including 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 is 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. 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. In this case, multiple lag screw fixation of the fibula was sufficient to achieve excellent stability at the fracture site due to the patient's bone quality, but neutralization or locking plate fixation is frequently required.

Dr. Seybold is a paid consultant for Acumed.



Pre-op CT scan shows a mildly displaced oblique distal fibula fracture along with posterolateral and posteromedial tibia fractures

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