

Calcaneal Fracture Solutions - Case Study

Treated with the Acumed® MINI-Calc™ Plate



Case Study: Calcaneal Fracture Solutions

INDICATION: Nondisplaced Calcaneus Fracture

PRODUCTS: Calcaneal Plating System

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PATIENT HISTORY

54-year-old man presents to the orthopaedic office several days after falling off a ladder from a height of approximately four and a half feet. He was immediately seen in the emergency room where he was splinted and told to ice and elevate the foot and ankle. X-rays of his lumbar spine revealed no injury to the vertebrae. Upon his initial visit to the office he was found to have significant swelling and discoloration to the hindfoot. He had appropriate pain and was neurovascularly intact in the foot.

His X-rays revealed a comminuted but essentially nondisplaced calcaneus fracture. A CT scan revealed a comminuted calcaneus fracture with minimal subtalar displacement, but with an obvious small subtalar loose fracture fragment. Given the swelling and ecchymosis, we determined that the patient would return in 7 to 10 days for reevaluation.

His past medical history is fairly insignificant except for smoking about one pack of cigarettes per day. He was advised that this may impede healing as smoking can lead to nonunion after a fracture. He underwent the appropriate preoperative clearance and we determined to perform the operation on day 17, post-injury. He was otherwise compliant with initial fracture management and returned for follow-up examination a week later.

TREATMENT

Per the Acumed® surgical technique, we made a curvilinear incision below the tip of the fibula and extended distally. The incision measured about five to six centimeters. We carefully retracted minor neurovascular structures and proceeded anterior to the peroneal tendons. Great care was taken to minimize disturbance of the tendon's sheath. We identified the posterior facet of the subtalar joint and the anterior process of the distal calcaneus. We used a lamina spreader to open and explore the joint. We removed the offending loose body and reduced an obvious step-off. At this point, we held the reduced fracture with several wires at the same time holding an appropriately sized newly designed Acumed® MINI-Calc™ plate to the lateral calcaneus.

The contour of the plate exactly matched the contour of the lateral calcaneus at the junction of the subtalar joint and the anterior process of the calcaneus (also known as the Angle of Gissane). We confirmed anatomic restoration of the joint and perfect placement of the hardware with C-arm fluoroscopy in the lateral and Harris views.

FIGURE 1: Preoperative CT-Scan



FIGURE 2: Preoperative X-ray



FIGURE 3: Intraoperative Photograph



POSTOPERATIVE RESULTS

The patient's postoperative course was fairly uneventful. His stitches were removed on post-op day 13 and was placed in a cast for a few weeks in order to let the fracture consolidate. After the cast was removed, he underwent physical therapy where special attention was paid to reacquiring adequate subtalar motion. Within two months of his calcaneus fixation, he was doing his own physical therapy at home and was essentially walking with minimal gait abnormality.

DISCUSSION

Calcaneus fractures usually result from high energy impacts to the feet and can be accompanied by lumbar spine fractures. They are frequently intra-articular, involving the posterior facet of the subtalar joint. X-rays in multiple views, including a lateral and Harris view are often necessary. CT scans of the calcaneus is universally necessary. Patients are frequently left with a flatter, wider heel even if the fracture is fixed.

Most currently used classification systems are based on the fracture pattern, amount of comminution, and posterior facet involvement. If there is no significant displacement calcaneus fractures can be treated nonoperatively, even if there is significant comminution. However, even with a small amount of subtalar displacement, results can be devastating. This is why special attention has been focused on creating fixation devices that can assist in subtalar reduction and fixation.

Historically, large 'hockey stick' incisions with lateral approach have been used for this type of injury. This incision proceeds proximally down the lateral border

of the Achilles tendon towards its insertion. It then curves 90° in a distal direction where the pad of the heel meets the lateral ankle skin, and continues distally and slightly anterior to where the peroneus brevis inserts. The exposure reveals the entire lateral wall of the calcaneus proximally to the subtalar joint and distally to the anterior process. Also, the peroneal tendons are identified and retracted anteriorly. Sometimes a Steinmann pin is inserted into the posterior calcaneus to assist with reduction, called a Lopresti technique. Ultimately the subtalar joint is exposed, reduced and fixed with a large multi-pronged plate placed on the lateral wall of the calcaneus. Aside from the sheer size of the exposure and fear of infection there is always much trepidation with skin healing as this extensile exposure is fraught with wound complications.

Recently there have been advances in the exposure and fixation devices used for certain calcaneus fractures. Now we can make a small curvilinear incision just below the distal fibula, which easily exposes the subtalar joint. The visualization through this incision is excellent. The plates are fabricated for easy insertion through this new exposure and have some variability in design to capture certain fracture fragments if present. The Lopresti technique can still be used but there is less concern with its proximity to the incision.

FIGURE 1: Postoperative X-ray



FIGURE 2: Postoperative X-ray



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