

# OPEN LATERAL SUBTALAR JOINT DISLOCATION WITH RUPTURE OF THE POSTERIOR TIBIAL ARTERY AND AVASCULAR NECROSIS OF THE CALCANEUS

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## INTRODUCTION

Subtalar joint dislocations are rare injuries. They represent approximately 1-2% of all types of dislocations. Subtalar joint dislocation are described as an injury with simultaneous dislocation of the subtalar joint and the talar-navicular joint, excluding a fracture of the talar neck. Dislocations are described according to the placement of the distal aspect of the involved foot.

The most common of the subtalar joint dislocations are medial, which account for 80% of the reported cases. Medial subtalar joint dislocations are usually the result of an inversion injury. The medial type of dislocation has been called an acquired clubfoot or basketball foot. Lateral subtalar joint dislocations account for 17% of injuries and are usually the result of eversion of the foot. The lateral subtalar joint dislocation is often referred to as an acquired flatfoot. Posterior subtalar joint dislocation account for 2.5% of subtalar joint dislocations and anterior subtalar joint dislocations account for ~1% of subtalar dislocations. A subtalar joint dislocation is most common in people age 20-40 years. Subtalar joint dislocations are 6 times more common in men than women.

We present a case of open lateral subtalar joint dislocation with rupture of the posterior tibial artery. Often lateral subtalar joint dislocations have a worse prognosis than medial dislocations due to the extensive soft tissue injury that occurs.

## CASE REPORT

A 45-year-old man was seen in the emergency department after sustaining a 20 foot fall from a ladder and landing on uneven pavement. It was noted that the right talus was fully dislocated from all of its articulating surfaces and protruding through the skin (Figure 1). The patient had an unremarkable past medical history, non-contributory surgical history, but smokes 40 cigarettes per day for the past 20 years, and drinks socially.

The patient received tetanus prophylaxis and copious irrigation consisting of 80 ml of normal saline. The radiographs showed a lateral mechanism subtalar joint dislocation with a small fracture of the lateral process of the talus (Figures 2, 3, and 4). The cervical and lumbar spine radiographs showed no fracture. An arterial doppler study showed an intact dorsalis pedis artery and an absent posterior tibial artery.

The patient was then taken to the operating room where under general anesthesia open reduction of the subtalar joint was performed. The ankle joint capsule was intact. A Steinmann pin was driven across the calcaneus from medial to lateral to aid in distraction of the calcaneus and relocation of the talus. The talus extruded dorsal to the tibialis posterior tendon and the contents of the tarsal tunnel were located posterior to the exposed talus. The artery was stretched and torn, the nerves and tendons were stretched and intact. The talocalcaneal joint was reduced



Figure 1. Open lateral mechanism subtalar joint dislocation.



Figure 2. AP ankle radiograph.



Figure 3. AP radiograph of the foot.



Figure 4. Lateral radiograph of the foot.



Figure 5. Repair of the posterior tibial artery.

first with posterior pressure on the talus and inversion of the calcaneus. The talonavicular was then reduced with pressure on the medial talar head and adduction of the navicular. Reduction was confirmed under fluoroscopy. A vascular surgeon performed the repair of the posterior tibial artery with 10-0 prolene sutures and ligation of surrounding venous vessels (Figure 5). An intraoperative angiogram was performed to confirm the repair of the posterior tibial artery (Figure 6).

After closure, a posterior splint was applied and the patient was nonweight bearing for 4 weeks (Figure 7). Staples were removed 3 weeks postoperatively. The patient was in a walking boot for 4 weeks partial weight bearing, and underwent physical therapy for 3 weeks. At 8 weeks postoperative, a T1- and T2-weighted magnetic resonance

image showed vascular changes in the calcaneus suggesting avascular necrosis (Figures 8 and 9). There was no evidence of avascular necrosis of the talus. The patient continued the full weight bearing activity with no pain and no restrictions. There was no collapse of the calcaneus. At the 2-year follow up, the patient was essentially pain free (Figure 10).

## DISCUSSION

Osteonecrosis of the talus is associated with severe open dislocations. The head of the talus receives its blood supply from branches of the perforating peroneal, tarsal sinus, branches of the dorsalis pedis arteries, and small branches from the deltoid branch of the posterior tibial arteries. The

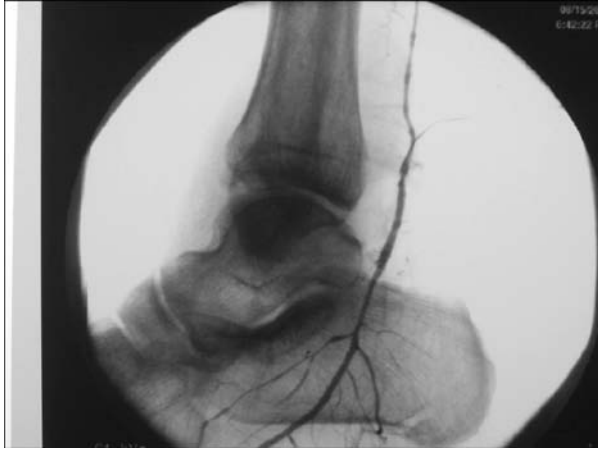


Figure 6. Intraoperative angiogram of the posterior tibial artery.



Figure 7. View at 5 days postoperative.



Figure 8. T1-weighted MRI 2 months postoperatively.



Figure 9. T2-weighted MRI 2 months postoperative showing vascular changes in the calcaneus.

neck of the talus receives its blood supply from tarsal sinus branches of the perforating peroneal artery and branches of the dorsalis pedis artery. Most of the blood supply comes from the artery of the tarsal canal, the posterior tibial artery. Basic knowledge of the vascular supply is mandatory to understand the risk of avascular necrosis caused by talar trauma.

Approximately 10% of the blood supply of the calcaneus is from the sinus tarsi artery and the remainder is divided equally between the lateral and plantar arteries. The medial and lateral calcaneal vascular supply are from the posterior tibial and peroneal arteries. In this case, rupture of posterior tibial artery caused transient vascular compromise of the calcaneus.

Complications associated with lateral subtalar joint dislocations with rupture of the posterior tibial artery are avascular necrosis of the talus, avascular necrosis of the calcaneus, infection, loss of range of motion at the subtalar and ankle joint, arthritis, darkly pigmented scarring and wound dehiscence. The subtalar joint becomes arthritic after subtalar joint dislocations most of the time. A total of 60-80% of patients develop restricted movement or motion to the subtalar joint following subtalar joint dislocations. As a result of prolonged immobilization, osteoporosis also becomes a concern. Open lateral subtalar joint dislocations are challenging injuries with various complications that may require long-term treatment.



Figure 10. Appearance 2 years post injury.

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