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Posterior Tibial Tendon Entrapment Within an Intact Ankle Mortise: A Case Report

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ABSTRACT

The present case report demonstrates a rare finding associated with irreducible ankle fracture dislocations. To our knowledge, posterior tibial tendon entrapment with an intact ankle mortise has not yet been documented in published studies. In the case of our patient, a high-energy, 12-ft fall resulted in a comminuted intra-articular fracture of the medial malleolus, confirmed by the initial radiographs. Preoperative magnetic resonance imaging showed the Achilles tendon to be ruptured and the posterior tibial tendon to be both displaced and entrapped between the medial malleolar fracture fragments, preventing initial closed reduction. At operative repair for the ruptured Achilles tendon and the medial malleolus fracture, the posterior tibial tendon was removed from the fracture site and was found to be intact with no evidence of laceration or rupture. The tendon was returned back to its anatomic position, and the tendon sheath was reapproximated. Although uncommon, it is important that entrapment of the posterior tibial tendon be considered in cases of irreducible ankle fracture. This injury type can be addressed during open reduction internal fixation to achieve reduction.

Ankle fractures are seen in approximately 187 fractures per 100,000 people every year, with 60% unimalleolar (1). In 1943, Lee and Horan (2) first described severe ankle fracture dislocations in which soft tissue structures had become trapped within the ankle mortise, preventing closed reduction. More than 1 decade later, Coonrad and Bugg (3) presented 2 case studies that specifically involved posterior tibial tendon entrapment within the disrupted ankle mortise. Thus, this unique obstacle to closed ankle reduction has received more recognition (3). However, very few reports detailing this rare condition have been published. The few published reports have identified high-energy impact trauma (i.e., motor vehicle accidents) as the preceding event to entrapment (2–7).

In 1959, Parrish (4) reported on a patient who had experienced a high-energy 4-ft. fall from a moving steam roller, resulting in open fracture dislocation of the ankle, with subsequent entrapment of the posterior tibial tendon. Similarly, we have described a case involving a closed isolated medial malleolus fracture. However, our case uniquely represents a scenario in which the posterior tibial tendon is interposed within the fracture, with an intact ankle mortise. We believe the present case to be the first reported case of a closed ankle fracture involving posterior tibial tendon entrapment with an intact ankle mortise.

Case Report

A healthy 56-year-old male presented to the emergency department after sustaining an injury to his left ankle by a 12-ft. fall from a tanker at work. On initial clinical examination, a visible 6-cm oblique laceration was observed. The laceration originated 2 cm superior to the lateral malleolus and terminated at the posterior aspect of the leg. No other gross deformities were noted on examination. Bedside washout and exploration of the laceration showed the deep tissue and fascia to still be intact with no exposed bone. During irrigation, a palpable void to the posterior aspect of his leg was noted, suggesting potential Achilles tendon rupture. The initial radiographs demonstrated a comminuted intra-articular fracture of the medial malleolus. Closed reduction of the site was not possible; thus, a Jones compression dressing and a posterior splint were applied to the left ankle as a method for initial stabilization. From the gross evaluation and clinical assessment, magnetic resonance imaging (MRI) was performed before the patient was permitted to leave the emergency department in preparation for surgical intervention.

The preoperative review of the MRI scan confirmed a complete 1.8-cm Achilles tendon rupture involving the mid aspect of the tendon, approximately 7 cm superior to the calcaneal tuberosity (Fig. 1). A mildly comminuted intra-articular fracture of the medial

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Fig. 1. Magnetic resonance imaging scan of the left ankle fracture showing rupture of the Achilles tendon, fracture of the medial malleolar fracture, and entrapment of the posterior tibial tendon.

malleolus was found to involve both a vertical fracture, extending through the base of the medial malleolus, and a transverse fracture, through the distal aspect of the medial malleolus. The MRI study also showed the posterior tibial tendon to be both displaced and entrapped between the medial malleolar fracture fragments (Fig. 2). The posterior tibial tendon, flexor digitorum longus tendon, and flexor hallucis longus tendon were all shown to be otherwise intact. The imaging findings indicated a complete tear of the anterior talofibular ligament (ATFL) and also suggested a moderate- to high-grade injury of the proximal component of the calcaneofibular ligament.

The intra-articular nature of the medial malleolus fracture, combined with the mild displacement and entrapment features of the posterior tibial tendon, provided a unique clinical experience that has not been previously documented. The MRI findings and the inadequate closed reduction meant the patient needed to be scheduled for open reduction internal fixation for the management of the malleolar fracture, release of the entrapped posterior tibial tendon, and repair of the ruptured Achilles tendon.

In the operating room, an incision was made at the medial malleolus, and care was taken to avoid inadvertent compromise of vital neurovascular and tendinous structures. The vertical fracture of the medial malleolus was shown to be displaced from the posterior aspect. The apex of the vertical fracture faced anteriorly, with interposition of the periosteum. In addition, the posterior tibial tendon was intact, although trapped tightly within the fracture site as it coursed from posteriorly to anteriorly, through the fracture, ultimately exiting in an inferior and anterior direction. With careful manipulation of the posterior tibial tendon, periosteum, and fracture fragments, the tendon was removed from the fracture site. Inspection showed no laceration or rupture. After careful assessment, the tendon was returned back to anatomic position, with the tendon sheath reapproximated. The fracture site was curetted and irrigated, followed by reduction of the medial malleolus fracture fragment and fixation with 3 cannulated screws (Fig. 3). Our attention then turned to the high-grade ATFL/calcaneofibular ligament injury as indicated by the MRI findings. On clinical examination with the patient under anesthesia, however, a patent calcaneofibular ligament was discovered, with a negative talar tilt sign visualized under live fluoroscopy, along with only a slightly positive anterior drawer sign. These findings were indicative of an isolated ATFL injury. Therefore, given both the complexity of the case and the isolated injury, the decision was made to forego repair