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Posterior Tibial Tendon Tears in Young Competitive Athletes: Two Case Reports

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ABSTRACT

Unlike the Achilles tendon, the posterior tibial tendon does not typically undergo acute rupture. We report two cases **of posterior tibial tendon tears occurring in young,** athletic **individuals (<30** years **old) that required operative** intervention before the patients **could return to competitive** sports. We believe **that these are the first two reports of posterior tibial tendon tears occurring in this population without the patient having** a **prior history of** steroid injections in the tendon. The tears we observed and described at surgical exploration were chronic and **degenerative in nature. We also comment on our approach to treatment of posterior tibial tendon injuries in the athletic** population.

INTRODUCTION

In the general population, posterior tibial tendon insufficiency and tearing are common. This ailment has received considerable attention, although controversy still dominates its classification and ultimate treatment, especially in the chronic setting.[4,5,9] However, posterior tibial tendon tearing rarely occurs in the competitive athlete.[2] There is only one report in the literature involving a competitive runner; this athlete had **a** prior history of local steroid injection into the tendon.[12] In the athletic population, posterior tibial tendon pathologic condition has almost exclusively been noted to be tenosynovitis.[1,7,8]

We report two cases of posterior tibial tendon tears occurring in young, athletic individuals (age <30 years old), both of which required operative intervention before the patient could return to competitive sports.

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CASE REPORTS

Case 1

A 22-year-old Division 1 competitive basketball player presented with a history of medial ankle pain and mild swelling after an unspecified "ankle sprain" that had occurred 4 months earlier. He was initially treated for a medial ankle sprain with taping, Achilles tendon stretching, and a regimen of range-of-motion and strengthening exercises. He received no local injections. At 3 months after injury, a 2- to 3-week period of reduced activities, taping immobilization, and an ankle brace were prescribed; this course of treatment also failed to alleviate symptoms. At 4 months after the index injury, the patient became unable to play competitive basketball because of pain. Activities of daily living were unaffected.

Physical examination at 4 months revealed an athletic African American male with no general health problems. The patient's feet demonstrated mild bilateral and equal pes planus. There was otherwise no deformity or unilateral hyperpronation. The hindfoot alignment was 5° to 7° valgus and flexible, and there was a negative too-many-toes sign. The patient was able to perform a good single leg heel raise but complained of pain behind the medial malleolus. He demonstrated good inversion strength with the foot in maximal eversion but again complained of pain in the medial ankle. There was local tenderness behind the medial malleolus and along the posterior tibial tendon from the medial malleolus to the navicular. Mild swelling accompanied the course of the posterior tibial tendon.

Standard weightbearing radiographs of the foot and ankle revealed norma! alignment of the talonavicular and talocalcaneal joints. There was no evidence of an accessory navicular or navicular stress fracture. Alignment of the ankle mortise was normal. Because of the athlete's persistent pain and because a tendon injury was suspected, a magnetic resonance imaging scan without contrast was performed. The scan revealed a

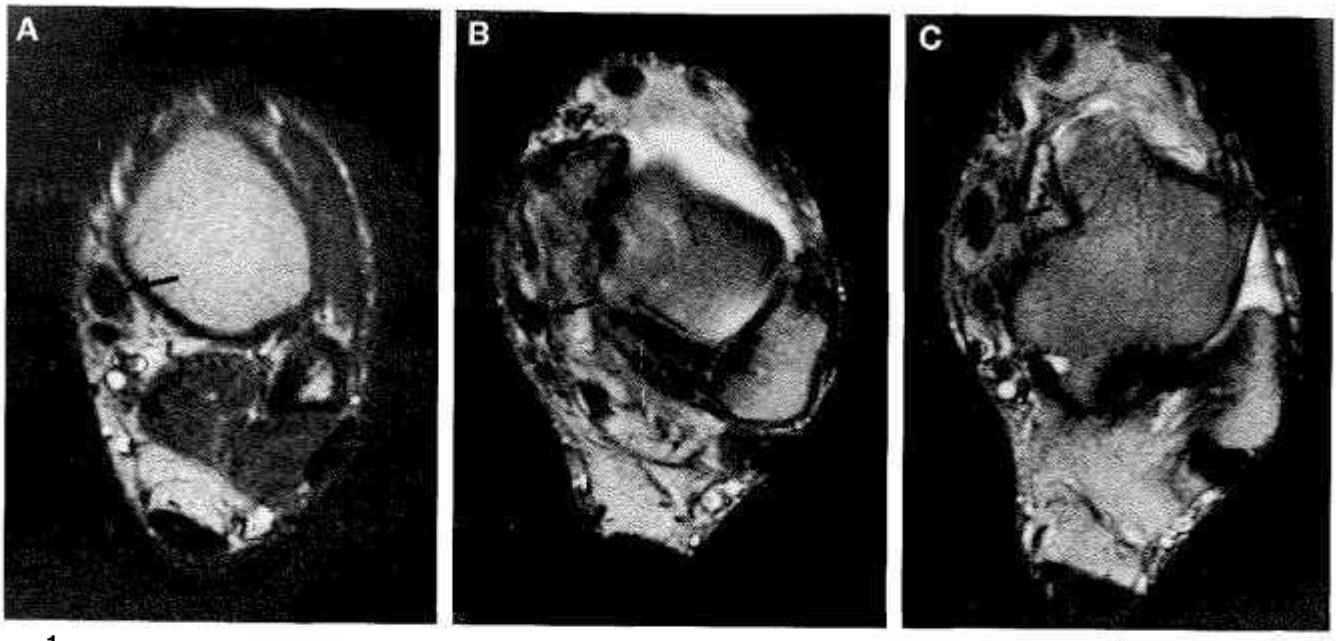

Fig. 1. Magnetic resonance image (axial views) of the left ankle in a 22-year-old male competitive athlete with medial ankle pain. *A,* Proximal-most axial cut above the medial malleolus demonstrating a posterior tibial tendon of normal size (arrow). *B,* Axial cut at the level of the ankle joint demonstrating a narrowing of the posterior tibial tendon with surrounding fluid (arrow). C, Distal-most axial cut demonstrating a longitudinal tear in the posterior tibial tendon just proximal to navicular insertion.

significant narrowing of the posterior tibial tendon at the level of the medial malleolus with interstitial changes in the tendon distal to the malleolus (Fig. 1 A-C). Also noted were edema in the deltoid ligament and a longitudinal tear of unknown severity in the posterior tibial tendon just above the medial malleolus (Fig. 1 A-C).

Because of the recalcitrant nature of the injury and the athlete's desire to return to Division I basketball, surgery was recommended. At exploration, there was a 30% tear in the posterior tibial tendon at the level of the medial malleolus (Fig. 2). A longitudinal tear approximately 1.5 to 2.0 cm in length was also noted extending proximally from the medial malleolus. The tendon distal to the medial malleolus to the level of the navicular was intact with an intact insertion but showed mild, diffuse mucinous changes, consistent with a chronic injury (Fig. 2). A small tear was also noted in the deltoid ligament, with some mild redundancy to the ligament.

Surgical treatment consisted of debridement of the 30% tear, repair of the longitudinal posterior tibial tendon tear and the deltoid ligament with absorbable suture, and transfer of the flexor digitorum longus (FDL) tendon into the navicular with tenodeses of the posterior tibial tendon into the transfer (Fig. 3).

The athlete was initially placed in a short leg fiberglass cast with a molded arch for 5 weeks. The patient was nonweightbearing on crutches for 3 weeks. After use of the cast was discontinued at 5 weeks, the patient was placed in a removable walking boot for an additional 3 weeks for a total of 8 weeks of immobilization. Range-of-motion was initiated at 5 weeks. Running and jumping were permitted at 3 months after surgery, with resumption of competitive full court basketball occurring 4 months postoperatively. The athlete was able to return to playing competitive basketball and was free of symptoms.

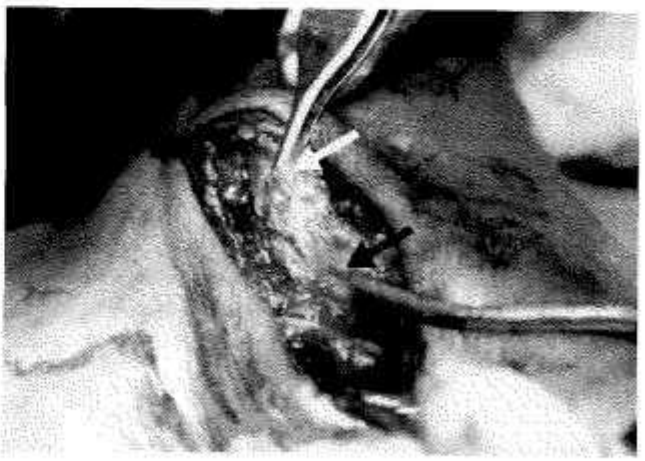

Fig. 2. Posterior tibial tendon in the left foot of a 22-year-old male competitive athlete with medial ankle pain. Mucoid degenerative changes (black arrow) in the distal posterior tibial tendon insertion, with a longitudinal tear. Area of thinning (white arrow) in the posterior tibial tendon, with an approximately 30% tear in the tendon.

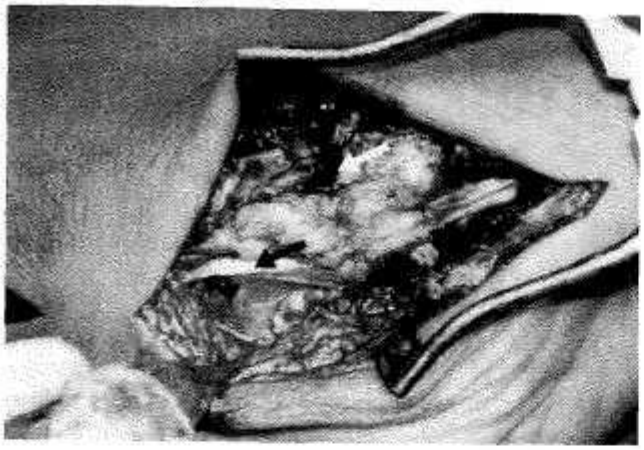

Fig. 3. FDL transfer in a 22-year-old male competitive athlete. FDL (black arrow) transferred into the navicular through a drill hole and posterior tibial tendon tenodeses into transfer. Suture (white arrow) placed in the anterior deltoid for repair of a 1- to 2-cm rent in ligament.

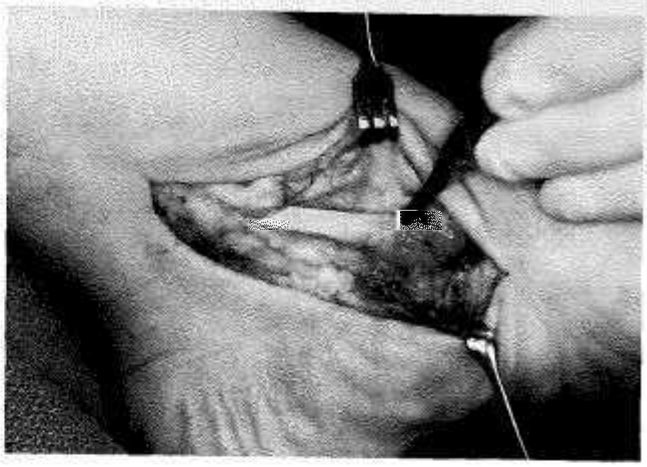

Fig. 4. Posterior tibial tendon in the left foot of a 17-year-old female competitive athlete demonstrating distal chronic mucinous changes. Clinically at surgery, the tendon was noted to be elongated, with fibrinous repair into the navicular.

Case 2

A 17-year-old female two-time All State high school basketball player initially presented with a 2- to 3-week history of media! foot pain after two to three episodes of twisting her foot while playing basketball. The patient said her foot was always flat, but she noted progressive deformity after the pain began. She was able to continue playing basketball but experienced pain in doing so. At examination, her foot was very tender over the insertion of the posterior tibial tendon and she reported pain at resisted inversion. The involved foot demonstrated a unilateral planovalgus deformity with a positive too-many-toes sign and a poor single leg heel raise accompanied by pain.

Radiographic evaluation revealed divergence of the talonavicular joint but no degenerative changes. Although operative repair and reconstruction of the posterior tibial tendon were recommended, the athlete and her family requested cast immobilization. A walking cast was used for 4 weeks, followed by 4 weeks in a removable walking boot. The patient was allowed to gradually return to sports at 3 months in a custom-made orthosis and a stiff-soled shoe.

The patient received an athletic scholarship at a Division 1 school for basketball and played infrequently during her freshman season. She returned 16 months after her initial visit with a new complaint. She noted a 2-week history of pain behind her medial malleolus after experiencing a sharp pain in the same area while running on the basketball court. Examination at this time revealed pain along the posterior tibial tendon down to the insertion site of the tendon, with the continued unilateral planovalgus deformity. The hindfoot was flexible to examination and could be passively placed slightly past neutral into mild varus. However, the athlete was unable to perform a single leg heel raise. Results of radiographic examination were unchanged; there was no evidence of degenerative arthritis, but continued divergence of the talonavicular joint and mild uncovering of the talus were noted. The patient and her family opted for surgical intervention at this time.

At surgery, degenerative changes were seen within the posterior tibial tendon at its insertion to the navicular with thickening and fibrosis of the tendon proper (Fig. 4), and the posterior tibial tendon was elongated. Therefore, the tendon was released from its insertion on the navicular and advanced to restore its more normal length and tension. Next, an FDL transfer was performed and the FDL was inserted into the navicular through a drill hole. The foot was placed in a short leg fiberglass cast with a molded arch that was worn for 8 weeks. Weightbearing in the cast was begun at 3 weeks. At 8 weeks the foot was placed in a removal walking boot with a custom-made semirigid orthosis. The patient removed the boot four times daily to perform range-of-motion exercises. At 3 months, use of the walking boot was discontinued and the patient was started on low resistance biking and pool therapy. She was then allowed to wear a stiff-soled athletic shoe with her custom-made orthosis, and a stirrup ankle brace was prescribed to use as needed for support. She was allowed to resume playing basketball at 6 months. At final follow-up, the patient was preparing for her first full season of competitive sports after surgery and was asymptomatic.

DISCUSSION

These two cases demonstrate that posterior tibial tendon tears can and do occur in the competitive athlete. Early recognition and intervention is important to the recovery of the patient. We believe that definitive treatment before development of deformity should be the goal. Proper function of the posterior tibial tendon allows locking of the subtalar joint, which produces a rigid lever arm for the triceps surae during push-off and jumping. A stretched out or insufficient tendon will result in poor push-off and compromise the level of play for the competitive athlete. Therefore, restoration of norma! length and tension in the tendon with maintenance of the anatomic arch are paramount to participation at the upper levels of sport. Unlike the Achilles tendon, the posterior tibial tendon does not typically undergo acute rupture. The tears we observed and described at surgical exploration were chronic and degenerative in nature (Figs. 2 and 4). The athlete in case 1 did recall a specific injury, but the nature of the pathologic condition at surgery would suggest a partial tear that became chronic in nature and developed degenerative changes over time. The athlete in case 2 noted several instances of "twisting her foot" during a 2- to 3-week period with a progressive deformity but noted no single injury.

A review of the literature reveals only four cases of posterior tibia! tendon rupture in patients younger than 30 years of age.[3,6,11,12] One patient was a 20-year-old female runner who had had local steroid injections before her partial rupture.[12] The only complete rupture among the four cases was in a 26-year-old nonathlete who experienced sudden medial ankle pain after stepping onto a bus.[6] Woods and Leach[12] did report complete or partial ruptures in three other athletes, but all were middle-aged athletes (range, 30-50 years).

The posterior tibial tendon pathologic condition in the competitive athlete typically involves only tenosynovitis. We treat these athletes with a course of antiinflammatory medication, protected mobilization, and strengthening exercises with an elastic band. Some athletes benefit from a full length insert that is purchased either off-the-shelf or that is custom-made to fit the foot of the athlete. If the athlete's symptoms are not alleviated, a short !eg walking cast or walking boot is recommended for 4 to 6 weeks. If the problem persists after 3 to 6 months of consistent nonoperative treatment, then surgery is recommended. Our approach to treatment for the competitive athlete with posterior tibial tendon pathology that requires surgery involves exploring the tendon and sheath first. If there is only synovitis and the tendon appears normal on all surfaces from the insertion on the navicular tuberosity to behind the medial malleolus, then a synovectomy is performed. If, as in these two cases, there are tears in the tendon, then we debride the tears, repair the tears as we are able, and then transfer the FDL into a drill hole in the navicular.[9] We are aggressive about using the transfer for treating the highly competitive athlete to give the patient the best chance to return to full, unlimited competition. Athletic competition is usually possible 4 to 6 months after this approach is initiated. It is also important to examine the anterior deltoid ligament to note any tears or redundancy and repair or imbricate the ligament as needed. Furthermore, if there is deformity such as increased hindfoot valgus, then careful assessment of the flexibility of the hindfoot and forefoot must be made. For the athlete with a valgus hindfoot not correctable to neutral preoperatively, a medial sliding calcaneal osteotomy may need to be added at the time of surgery (Roger Mann, M.D., San Leandro, California, personal communication, 1996).[10] Furthermore, it should be noted that if the athlete has developed a rigid deformity, a transfer should not be expected to correct this deformity.

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