The etiology of tibialis anterior tendon tear, first described in 1905 by Brüning, may be traumatic or nontraumatic. A traumatic lesion is usually the result of a laceration or blunt trauma. Nontraumatic or degenerative tendon tears are usually seen in the avascular zone of the tendon. Treatment can be conservative or surgical. Conservative treatment is adequate for low-demand older patients. For active patients, surgical treatment can be challenging for the surgeon because after debridement of degenerative tissue, a gap may be formed that can make side-to-side suture impossible. The authors present allograft Achilles tendon insertion for reconstruction of chronic degenerative tears. Using Achilles tendon allograft has the advantage of bone-to-bone fixation, allowing rapid incorporation and earlier full weight bearing.

Abstract: Tibialis anterior tendon tear is an uncommon injury. Nontraumatic or degenerative tears are usually seen in the avascular zone of the tendon. Treatment can be conservative or surgical. Conservative treatment is adequate for low-demand older patients. For active patients, surgical treatment can be challenging for the surgeon because after debridement of degenerative tissue, a gap may be formed that can make side-to-side suture impossible. The authors present allograft Achilles tendon insertion for reconstruction of chronic degenerative tears. Using Achilles tendon allograft has the advantage of bone-to-bone fixation, allowing rapid incorporation and earlier full weight bearing.

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Chronic Tibialis Anterior Tendon Tear Treated With an Achilles Tendon Allograft Technique

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Case Report
A 64-year-old man presented with a soft tissue mass in the anterior aspect of the ankle. The patient reported decreased ankle dorsiflexion strength and difficulty performing activities of daily living. On physical examination, the tibialis anterior tendon could not be palpated, and relative weakness of ankle dorsiflexion was noted. Degenerative tibialis anterior tendon was diagnosed clinically and confirmed by ultrasound.

After 3 months of physiotherapy treatment without improvement, surgical treatment was recommended. The patient’s American Orthopaedic Foot and Ankle Society (AOFAS) score was 23 and his Foot and Ankle Disability Index (FADI) score was 34.6 preoperatively.

With the patient under general anesthesia, a direct anterior approach to the ankle was performed, and a degenerative, retracted tibialis anterior tendon was discovered (Figure 1). Debridement was performed for the proximal and distal parts of the tendon, which resulted in a 5-cm gap. End-to-end suture was impossible (Figure 2). It was decided to use a fresh-frozen Achilles tendon allograft for the reconstruction of degenerative tears of the tibialis anterior tendon.

The current authors describe a surgical technique using fresh-frozen Achilles tendon allograft for the reconstruction of degenerative tears of the tibialis anterior tendon.
navicular tunnel and secured to the distal part of the tibialis anterior tendon with absorbable Vicryl (Somerville, New Jersey) suture. Once the bony attachment was performed, the tendons were sutured to each other with Vicryl using the side-to-side technique (Figure 5). The wound was closed, and a nonweight-bearing cast was applied.

After 6 weeks, protected full weight bearing was allowed. Intensive physiotherapy to recover ankle movement and tibialis anterior tendon strength was prescribed.

At 1-year follow-up, the patient reported no disability, and full recreational activities were resumed. His AFOAS score was 90 and his FADI score was 89.4. Full ankle movement was noted.

Discussion

Tibialis anterior tendon tear can be caused by traumatic or nontraumatic events. Nontraumatic or degenerative tears have been related to several predisposing illnesses.9,11-14,16-20

An avascular zone 5 to 30 mm from the insertion was described by Petersen et al.10 Its location correlates well with the most frequent site of spontaneous tibialis anterior tendon ruptures.1

The clinical presentation is described as a triad of pseudotumor at the anteromedial aspect of the ankle, loss of the contour of the tibialis anterior tendon over the ankle, and the use of the extensor hallucis longus and the extensor digitorum communis tendons to achieve dorsiflexion of the ankle.6,24

Pain is mild, but decreased coordination in walking with a steppage or foot-slapping gait and a tendency for toe dragging may be evident.3

In many cases, the diagnosis of tibialis anterior tendon rupture can be established by physical examination alone. Magnetic resonance imaging of the ankle is the diagnostic method of choice when clinical history or physical examination are unclear.25

Because tibialis anterior tendon ruptures are uncommon, no clear guidelines exist for their treatment.6,8 Others have advocated repair or reconstruction of the tendon to restore ankle dorsiflexion and inversion of the ankle to approximate a normal gait pattern and theoretically to avoid later development of foot deformity.6,17,26,27

Ouzounian and Anderson27 reviewed their clinical experience with 12 patients who had tibialis anterior tendon ruptures. Two types of ruptures were identified on the basis of clinical presentation: (1) nontraumatic ruptures that occurred in low-demand older patients who presented late with minimal dysfunction and (2) traumatic ruptures that occurred in high-demand younger patients who presented earlier with increased disability. The authors concluded that patients with traumatic ruptures, regardless of the time of presentation, demonstrate better function after op-
operative intervention and that patients with nontraumatic ruptures who present early should be managed surgically whereas those with delayed presentation can be managed with bracing. Dooley et al recommended nonsurgical treatment for patients with a delay in diagnosis of more than 3 months.

Sammarco et al recommended that tendon repair should be performed in all cases, regardless of age, when the patient is symptomatic with an unsteady or slapping gait or weakness and fatigability due to lack of dorsiflexion strength.

If technically possible, reinsertion of the tendon directly into bone or direct tendon repair is preferred. After delayed diagnosis, a secondary reconstruction through tendon transfer or transplantation is often necessary.

In defects up to 4 cm, an augmented tenolasty (longitudinal tendon preparation that will be turned down to cover the defect) is recommended. Semitendinosus autograft was recommended to bridge a gap longer than 4 cm, with suture and drill holes into the cuneiform. Substitutions of the extensor hallucis longus, the extensor of the fifth toe, the peroneus brevis or tertius, and the posterior tibial tendon have been reported.

In orthopedic surgery, allograft Achilles tendon is used to restore the tendon length when reconstructing a ruptured patellar tendon following total knee arthroplasty. Fehm et al reported the use of fresh Achilles tendon allograft to reconstruct adductor mechanism insufficiency after total hip arthroplasty. Medial collateral ligament reconstruction was described using Achilles allograft for combined knee ligament injury.

To the current authors’ knowledge, the technique described herein has not been used before. It permits full strength recovery and provides a secure bony distal insertion, giving the tibialis anterior muscle an excellent bony anchor. This is advantageous because the long, strong tendon and the bony attachment allow the tendon to be rapidly incorporated, with the possibility of accelerating full weight bearing. The use of allograft may result in decreased postoperative morbidity at the donor site.

**Conclusion**

A degenerative tear of the tibialis anterior tendon causes disability in active patients. Operative treatment after unsuccessful conservative treatment is an option. Chronic degenerative changes in both ends of the tendon result in a large defect in its length after debridement. This must be considered preoperative. Using frozen Achilles tendon allograft to reconstruct the degenerative tear of the tibialis anterior tendon gives the surgeon an excellent anchor for the tibialis anterior muscle.

**References**


