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Use of an All-Suture Anchor for Re-Creation of the Anterior Talofibular Ligament: A Case Report

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ABSTRACT

The lateral ankle ligament complex is typically injured during athletic activity caused by an inversion force on a plantar flexed foot. Numerous open surgical procedures to reconstruct the lateral ankle complex have been described. In contrast, we present a case report in which an all-suture anchor was used arthroscopically to re-create the anterior talofibular ligament in conjunction with ankle arthroscopy. A retrospective analysis of a 55-year-old male with a work-related inversion ankle sprain was performed with 14 months of follow-up. Objective and subjective assessments were obtained using range of motion measures, a strength assessment, and the Foot Function Index. An all-suture anchor was deployed through the anterolateral portal and secured in both the fibula and talus, re-creating the anterior talofibular ligament at its origin and insertion. Active range of motion physical therapy began at 2 weeks postoperatively. The patient started a neuromuscular re-education program at 5 weeks with minimal pain or discomfort. A return to full duty was achieved at 3 months postoperatively. To our knowledge, the use of an all-suture anchor has not been previously reported for lateral ankle complex re-creation. It is hoped that this approach to anterior talofibular ligament repair will decrease the incidence of complications and improve outcomes.

Injury of the lateral ankle complex continues to remain one of the most common injuries of the lower extremity. A number of surgical procedures have been described to repair the damaged ligaments of the lateral ankle, but few have used arthroscopic re-creation with an all-suture anchor. The aim of the present case report was to describe the use of an all-suture anchor in the re-creation of the anterior talofibular ligament (ATFL).

The ATFL and the calcaneofibular ligament (CFL) are the 2 most commonly injured ligaments in lateral ankle sprains (1). Approximately 80% of acute sprains can be managed with rehabilitation (2). The other 20%, which result in chronic lateral ankle instability, could need surgical intervention to be successfully treated (2).

Two of the most frequent methods of surgical intervention have been anatomic repair with imbrication of the lateral ligaments and ankle ligament reconstruction (3). Reconstructive tenodesis is a nonanatomic approach that uses tendon grafts to tighten the lateral ankle but generally fails to follow the orientation of the normal ligaments (3). The Chrisman and Snook (4) procedure most closely approximates the ATFL and CFL anatomically (3). Modified subtalar motion and the dynamic function of the muscle is preserved (3). Autograft tendon reconstruction, using synthetic carbon fiber or allograft tendon, has often been less apt to conform anatomically (5).

The Broström procedure is an open anatomic surgical approach in which the remnants of the ruptured ATFL are reapproximated in an overlapping fashion (6,7). Preservation of the subtalar and talocrural motion can be maintained, with few complications (3). However, the Broström procedure might not always have an effective outcome because of poor ATFL or CFL quality and/or weakness in these ligaments, preventing shortening imbrications (5). When the integrity of the lateral ligaments is in question, a bioabsorbable suture anchor has been used with the Broström-Gould procedure, allowing for early ankle rehabilitation with minor complications (8,9). Although this technique provides an increase in lateral ankle complex stability, it is an open procedure, carrying

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Fig. 1. All-suture anchor deployed in talus.

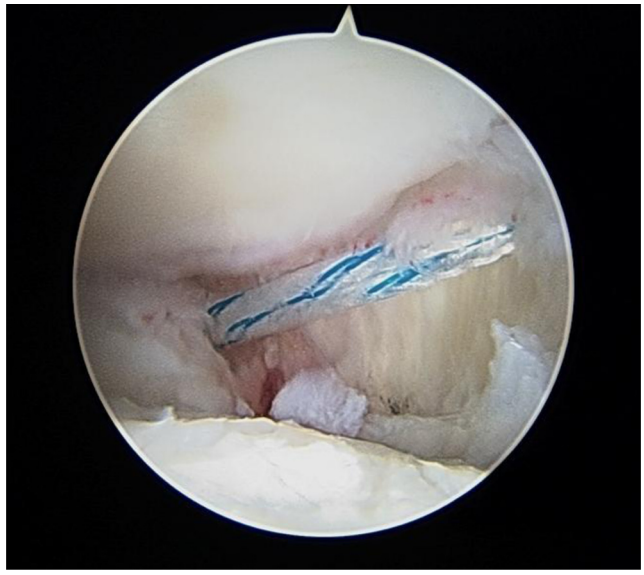

Fig. 3. All-suture anchor located in distal fibula.

greater risks than an arthroscopic procedure, such as was described in the present report (8,9).

Originally indicated for use in the shoulder, the all-suture anchor used in the present case has been approved for use in the foot and ankle. As an entirely suture-based system, it consists of many features that could categorize it as superior to other procedural alternatives. The suture used in the device leaves a lower knot profile, and the smaller instrument size results in less bone removal and less destruction of surrounding tissue, and allows for multiple anchor placements, resulting in a stronger construct and less trauma to the area (10,11).

The success of the procedure was examined using the Foot Function Index, a device developed to "measure the impact of foot pathology on function in terms of pain, disability, and activity restriction. The Foot Function Index is a self-administered index consisting of 23 items divided into 3 subscales" (12,13).

Case Report

The patient was a 55-year-old male who had sustained an occupation-related injury of his left ankle 6 years before his initial presentation. His occupation required him to perform physical activity, which had become strenuous on his symptomatic left ankle. His medical history was significant for diabetes mellitus, hypertension, hyperlipidemia, and asthma. On a visual analog scale, he had rated his pain as 8 of 10 on presentation. In addition to pain, the patient reported weakness, limited ankle range of motion secondary to pain, persistent edema, and instability. He underwent a magnetic resonance imaging (MRI) study, which revealed mild interstitial tearing of the deltoid ligament consistent with a recent injury and partial tears of the ATFL and CFL that were chronic. The MRI scan also showed mild degenerative changes to the tibiotalar joint.

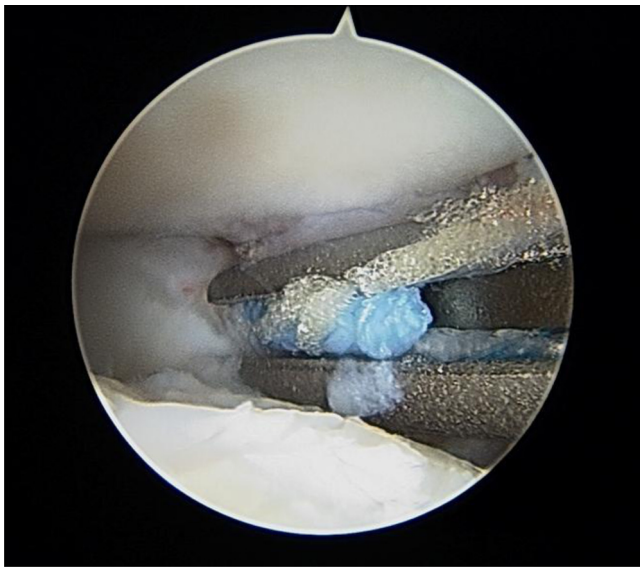

Fig. 2. All-suture anchor being secured into the fibula with a mallet.

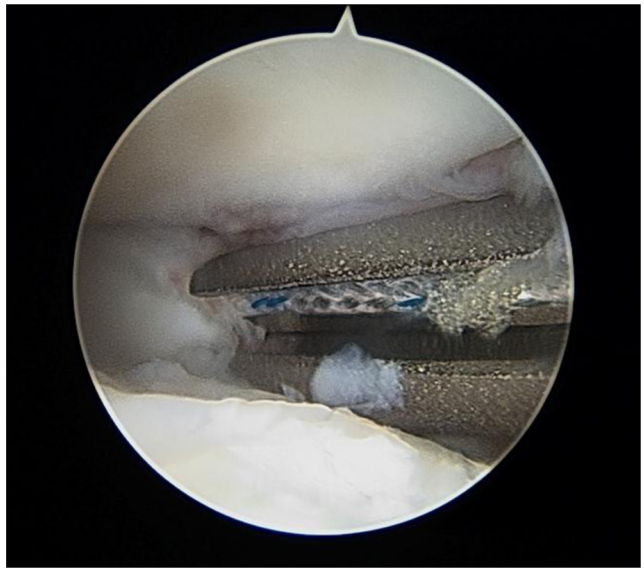

Fig. 4. Cannula being removed.

Fig. 5. Both sutures deployed—1 in fibula and 1 in talus.

Preoperatively, the patient underwent several forms of conservative therapy, including anti-inflammatory medication, bracing, injection therapy, and physical therapy. All forms of conservative therapy were unsuccessful, leading him to desire surgical intervention.

Because of the degenerative changes to the tibiotalar joint that were identified on MRI, this patient also underwent ankle arthroscopy, performed in the usual fashion. After completion of the 21-point inspection, including visualization of the ATFL, all debridement was completed within the joint to remove any synovitis and meniscoid bodies. Attention was then directed to the anterolateral ankle joint portal. Using the scope for visualization, the all-suture anchor guide was positioned to the desired location on the talus according to the anatomic insertion of the ligament. The drill was then inserted into the drill guide and advanced until contact was made with the guide. The drill was removed, maintaining the guide position against the talus. The all-suture anchor was then inserted into the guide and pilot hole and was fully seated into the talus using a mallet (Fig 1). The laser etch marks were aligned, indicating the anchor had been inserted to an appropriate depth. Once seated, the anchor was deployed and the suture released. A second all-suture anchor was then placed in the same fashion in the appropriate anatomic location on the fibula (Figs. 2 to 5). The polyethylene suture material attached to the anchors was tied using a 2-hand tie technique with the foot held in a corrected, slightly everted position (Fig. 6). Once complete, the ligament augmentation was inspected arthroscopically by way of the anteromedial portal. The patient was placed through the range of motion before closure, and a decrease in the previous laxity of the joint was found. The joint was lavaged, the instrumentation was removed, and portals were closed using 4-0 Monocryl® (Ethicon, Endo-Surgery, Cincinnati, OH) and 4-0 nylon suture.

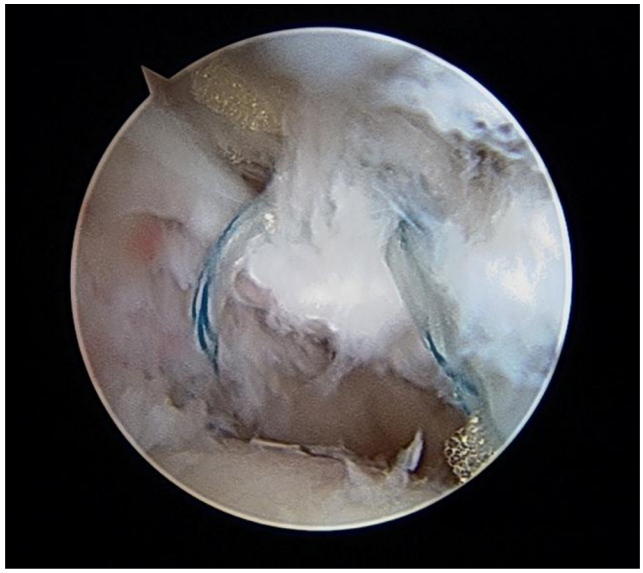

Fig. 6. Both sutures tied down to re-create anterior talofibular ligament.

Table
Results of the Foot Function Index at 4, 12, and 16 weeks and 14 months after repair

Variable	Before Physical Therapy	Interval After Repair and Physical Therapy			
		4 wk	12 wk	16 wk	14 mo
Pain	44	43	20	10	21
Disability	78	77	41	13	26
Use of assistive device	8	5	0	1	5
Total (%)	76	74	36	14	31

The patient had regained much of his normal function at 16 weeks; however, moderate regression was noted at 14 months postoperatively.

The sites were dressed, and the left lower extremity was placed in an everted position in a below-the-knee cast. The patient was instructed to remain non-weightbearing using crutches until his first follow-up appointment 4 days later. He was given prescriptions for cephalexin and oxycodone/acetaminophen.

The patient began a physical therapy regimen at 2 weeks postoperatively. At that point, the patient was transitioned to a controlled ankle motion walker, followed by gradual transition to an ankle stabilizing orthosis. The protocol was designed and implemented by Temple University's Foot and Ankle Institute director of physical therapy and the surgeon. Physical therapy consisted of 2 to 3 sessions per week that incorporated modalities for pain, therapeutic exercise, strengthening, balance, gait, and proprioception training. The patient was discharged from physical therapy at 3 months postoperatively.

After 4 months, the participant's Foot Function Index had improved from 76% to 14%. The results of a 14-month telephone-administered Foot Function Index are listed in the Table. The patient stated that he was experiencing far less pain than before the surgery and that he had been able to work without interruption, which was not possible previously. At 3 years postoperatively, the patient reinjured the ankle in a motor vehicle accident; however, the MRI findings were negative for pathologic features at that time, and the patient was sent for physical therapy.

Discussion

The classic approach to surgical intervention of lateral ankle instability was based on the anatomy of the ATFL and CFL. Anatomic repair and ankle ligament reconstruction, which uses tenodesis, are 2 broadly cited techniques performed in ankle instability surgery. The ubiquitous goal of ankle ligament reconstruction is to re-establish mechanical ankle stability with a decreased incidence of complications. Although the open Broström procedure modified by Gould appears to be the reference standard for ATFL repair (5,10), an arthroscopic repair technique with an all-suture anchor can provide similar results (8).

It is hoped the all-suture anchor approach to ATFL repair will decrease the incidence of complications and improve outcomes not

evidenced by nonarthroscopic lateral ankle complex repair, owing to its ease of use, decreased requirement for exposure, minimal bone excision, and the ability to fixate in multiple layers (10,11). The presented case shows promise in that the patient experienced a substantial reduction in pain levels and a rapid progression to weightbearing. However, no definitive conclusions can be made until additional studies are conducted to more accurately assess the long-term efficacy of an all-suture anchor in the re-creation of the ATFL.

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