CHAPTER **3**

AUGMENTATION OF TENDON REPAIR IN FOOT AND ANKLE SURGERY

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INTRODUCTION

Management of tendon ruptures in the foot and ankle present a challenge even for the experienced surgeon. Frequently the rupture leaves a significant defect or at the very least an area of noteable attenuation at the time if debridement and repair. In the past, options available for managing these defects included slide lengthening to gain needed length, thus creating a new area of weakness away from the repair, or borrowing other local autogenous tissue for the repair. In the case of Achilles rupture, the literature contains multiple descriptions of these type procedures such as augmentation with plantaris tendon, gastroc recession and limited descriptions of use of commercial products such as GoreTex or Marlex mesh.

More recently however, other products have become available to supplement the area of attenuation following reapproximation of ruptured tendons. We will review the commercially available materials for supplementation and highlight distinct differences that might aid the surgeon in choosing the product that is most appropriate for their repair supplementation needs.

AVAILABLE PRODUCTS

Commercial products for supplementation include Allograft tendon, the Depuy Restore Patch, and Wright Medical's Graft Jacket. Allograft tendon is typically supplied frozen and returns to its normal properties following thawing, minus any weakening that results from the sterilization and processing/freezing. The Depuy Restore Patch is a section of split-thickness intimal submucosa of porcine origin. This product is fairly thin, maliable and rapidly resorbs with complete degradation and replacement with normal host tissue within 3 months.

Wright Medical's Graft Jacket is available in several forms. The type of interest for augmentation of tendon repair is the standard graft jacket. Graft jacket is an acellular dermal collagen allograft matirix. Graft jacket, with its intact vascular channels, allows for ingrowth and substitution by host tissue. The Graft jacket implant is approximately 1 mm in thickness and is the strongest of the materials in tensile strength in its packaged state.

Allograft tendon is available for augmentation. This is typically fresh frozen and therefore does carry a definite increased risk of disease transmission compared with the other commercially available products.

CASE REVIEWS

The primary author treated 3 different tibilais anterior tendon ruptures over the last year. These included a neglected traumatic rupture, a rupture following debridement of nodules from the TA tendon, and a rupture that occurred approximately 2 months following Lapidus fusion for correction of severe HAV deformity with medial plate application

The first case was that of a 58-year-old male. He presented with a neglected rupture of the tibialis anterior tendon, approximately 2 months post injury. Clinical examination showed significant weakness with manual muscle testing. MRI evaluation showed complete rupture of the tibialis anterior tendon with gapping of approximately 7 cm.

Intraoperatively there was scar interposed at the site of previous rupture as shown in Figure 1. After debridement of the rupture/scar area the tendon was reapproximated utitlizing nonabsorbable suture. Severe attenuation was noted after reapproximation at the rupture

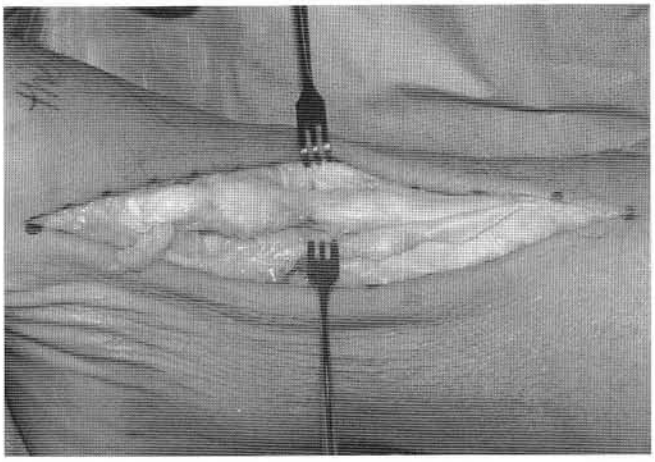

Figure 1. Intraoperative view showing rupture site with scarring from the anterior ankle to the navicular.

site (Figure 2). This was reinforced utilizing allograft gracillus tendon as shown in Figure 3. Reinforcement was performed along the posterior medial and posterior lateral margins

Postoperatively, the patient was maintained non-weightbearing in a short-leg cast for 4 weeks. The patient was then advanced to progressive weightbearing in a fracture boot for 4 weeks and progressed through physical therapy for strengthening and returned to full activities as a security officer at 12 weeks

The second case was that of a 65-year-old female who had previously been evaluated for palpable nodules in the tibialis anterior tendon at the proximal edge of the extensor retinaculum. The patient underwent debridement and suturing of the tibialis anterior tendon. Approximately 10 weeks post surgically the patient experienced a popping sensation at the front of the ankle. Clinical exam showed palpable rupture of the tendon which was confirmed on MRI The patient was returned to the operating room where repair was undertaken. This was reinforced using the Graft Jacket accellular tissue matrix. Figure 5 shows MRI of the repair several months after repair

The final case was of a patient who had undergone Lapidus fusion for severe hallux valgus deformity. The patient was noncompliant with nonweightbearing status. Approximately 10 weeks post surgically the patient experienced a popping sensation at the front of the ankle. Clinical exam showed palpable rupture of the tendon which was confirmed on MRI. A Restore patch split-thickness porcine graft was used to repair the tibialis anterior tendon (Figure 4).

There are several options available, including allograft and xenograft materials, for reinforcement of tendon repair without the increased risk of autogenous tissue harvest.

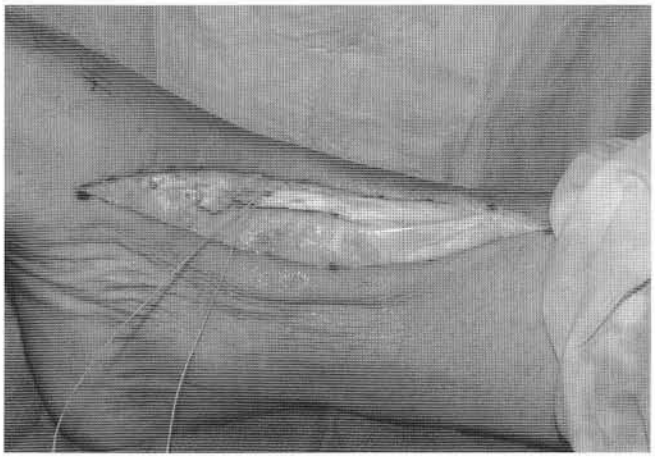

Figure 2. Intraoperative view showing repair of the tendon utilizing modified Bunnell stitch. Note the attenuation distal to the knot.

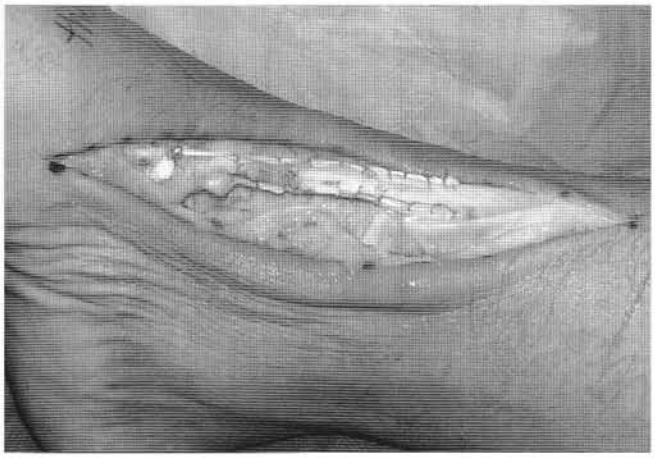

Figure 3. Repair reinforced with allograft tendon sutured in place ready for deep closure.

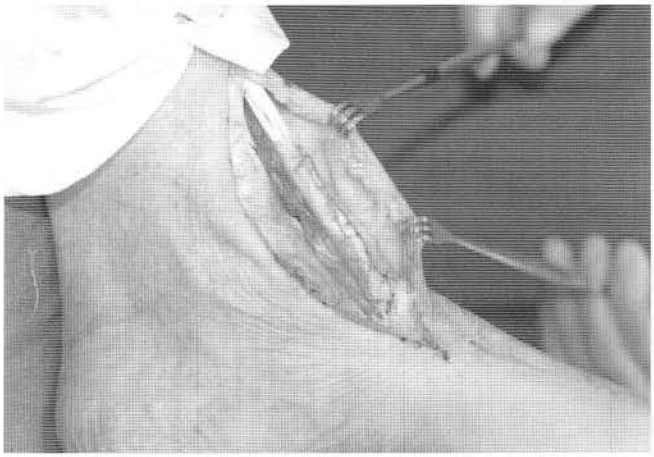

Figure 4. Intraoperative view showing the primary repair of the tibialis anterior tendon wrapped circumferentially with the Restore patch split thickness porcine intimal submucosa prior to reapproximation of the extensor retinaculum.

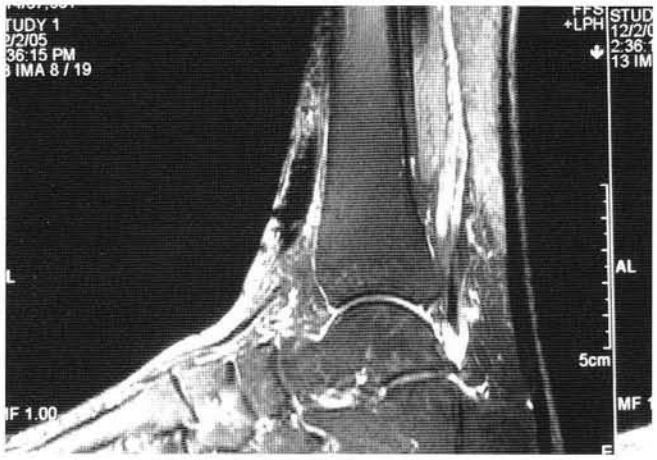

Figure 5A. Sagital section showing repair of the tibialis anterior tendon with reinforcement with Graft jacket at approximately 3.5 months postoperative.

Figure 5B. Transverse section of repair showing increased fluid content and continued remodeling/incorporation at 3.5 months postoperatively.