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Tips, Quips, and Pearls

"*Tips, Quips, and Pearls*" is a special section in The Journal of Foot & Ankle Surgery®, which is devoted to the sharing of ideas to make the practice of foot and ankle surgery easier. We invite our readers to share ideas with us in the form of special tips regarding diagnostic or surgical procedures, new devices or modifications of devices for making a surgical procedure a little bit easier, or virtually any other "pearl" that the reader believes will assist the foot and ankle surgeon in providing better care.

Surgical Considerations for the Neglected or Chronic Achilles Tendon Rupture: A Combined Technique for Reconstruction



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ABSTRACT

The Achilles tendon is among the most commonly injured tendons in the human body. The most common reason for delayed treatment is a missed diagnosis or a deficiency in presentation. The neglected or chronically ruptured Achilles tendon presents a unique treatment challenge. The surgical approach varies greatly depending on the extent of degeneration and the resultant gap between the opposing tendon ends. Most surgeons have recommended the use of a tendon transfer or augmentation to strengthen the Achilles tendon repair. The following technique uses a flexor hallucis longus tendon transfer with gastrocnemius aponeurosis turndown flap augmentation. This technique has been commonly performed by us with success.

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The most commonly ruptured tendon in the human body is the Achilles tendon (1). Acute Achilles tendon ruptures are typically encountered in 30- to 50-year-old males who participate in recreational athletics (2). After the age of 50 years, chronic tendinosis, tendon attenuation, or insertional calcification are frequently seen in women. Acute ruptures of the Achilles tendon will often be accompanied by a snapping sensation felt in the posterior ankle. The patient might then experience difficulty with weightbearing on the affected extremity, an inability to run, and difficulty climbing stairs (2,3). On the clinical examination, the posterior ankle will often be acutely edematous and painful. A palpable gap, or delve, between the ruptured tendon ends will frequently be identified. Increased dorsiflexion compared with the contralateral ankle and a weak or absent heel rise could also be noted on the physical examination.

Rupture of the Achilles tendon often occurs 2 to 6 cm proximal to the tendon insertion into the calcaneus. The average rupture site is 4.78 cm proximal to the insertion of the tendon (3,4). Lagergren and

Lindholm (5) described this zone of rupture as having reduced vascularity, also known as a "watershed" region. Although the diagnosis is straightforward for foot and ankle specialists, acute Achilles tendon ruptures can be missed in up to 20% to 25% of cases (6,7). This delay in diagnosis can significantly change the management.

The definition of a chronic, or neglected, rupture has most commonly been described as a delay of 4 to 6 weeks after the injury (2,3,8). In untreated ruptures, the paratenon becomes thickened and adherent to the tendon ends (9). An absence of tendinous tissue is often found inside the paratenon at the site of the defect. Thick scar tissue will bridge the defect between the conical-shaped proximal tendon stump and the bulbous distal stump (10,11). The proximal tendon stump is often found adhering to the posterior fascia of the flexor hallucis longus (FHL) (11). Den Hartog (8) noted 2 unique considerations when evaluating and treating neglected ruptures of the Achilles tendon. Skin contracture overlying the Achilles defect can cause difficulties with wound closure, and an irreducible gap greater than 2 cm cannot be closed without excessive plantar flexion of the ankle (8).

The indications for surgical management of neglected Achilles tendon ruptures include weakness of the triceps surae complex, functional lengthening of the gastrocnemius–soleus complex, and an propulsive gait. Nonoperative treatment, including bracing, can be an acceptable alternative to surgical reconstruction in a patient with

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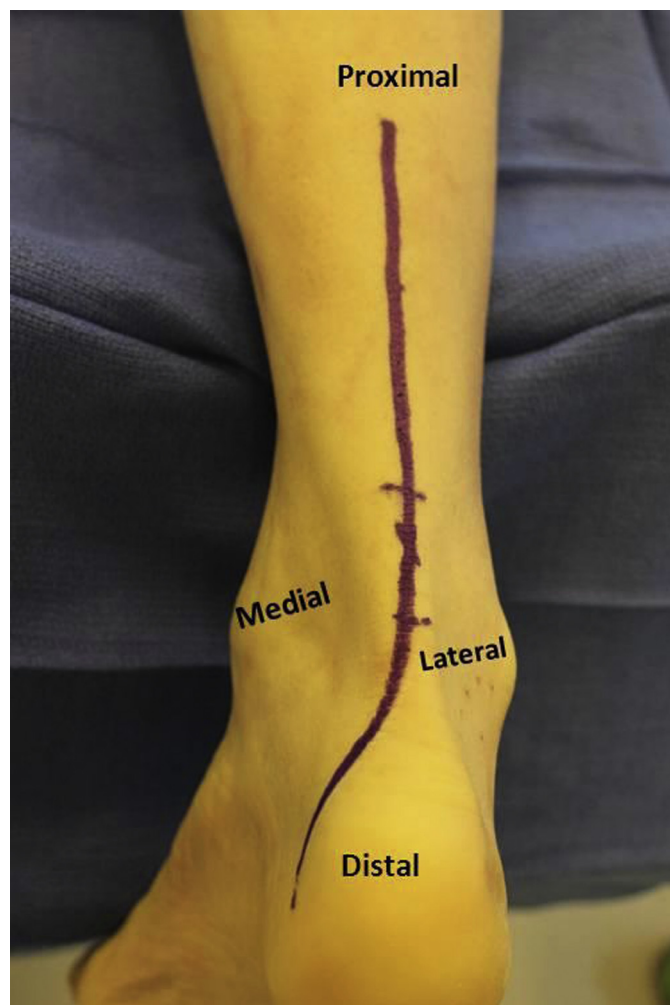


Fig. 1. Incision placement when transferring flexor hallucis longus tendon to medial or superior calcaneus.

lower extremity arterial disease or poor skin quality of the posterior leg. The goals of surgery are to restore the function and push off strength through reconstructing the normal length–tension relationship to the Achilles tendon complex. This can be accomplished through a combination of treatment options, including primary repair, augmentation with tendon transfer, fascial advancement procedures, and the use of synthetic or allograft materials. The following technique involves tendon debridement with local tendon transfer (FHL), gastrocnemius fascial turndown flap, and, on occasion, biologic augmentation to address neglected Achilles tendon ruptures. We have used this technique with high patient satisfaction.

Surgical Technique

A popliteal block is administered with the patient under sedation. The patient is then given general anesthesia to allow monitoring of the airway. A thigh tourniquet is applied, and the patient is placed in a prone position with the foot hanging just over the end of the operating room table. The incision is made in the posterior aspect of the lower leg, with the extent and design determining the technique planned for the FHL transfer. A straight posterior incision or slightly medial approach is adequate for harvesting the FHL tendon from its sheath and anchoring the tendon in the superior or medial calcaneus (Fig. 1). However, if an FHL transfer is planned through the body of the calcaneus, the tendon will be released from the plantar aspect of the

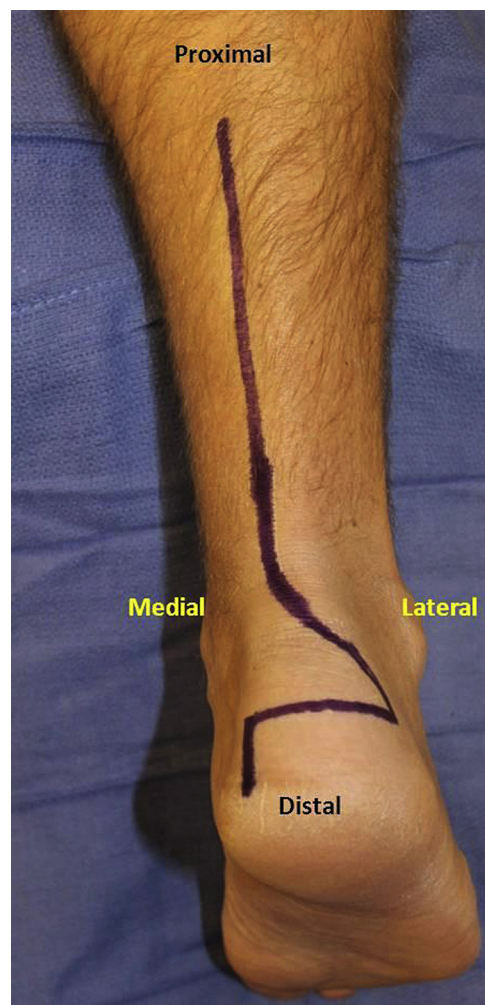


Fig. 2. Incision placement when harvesting flexor hallucis longus tendon for transfer through calcaneal body, medially to laterally.

medial longitudinal arch to provide more length. This necessitates a more expansive approach to provide exposure to the distal medial and lateral aspects of the calcaneus (Fig. 2).

Dissection is then continued through the fascia and tendon sheath to expose the area of tendon disease or injury. The flap can have a central or medial and lateral straps harvested from the proximal Achilles and myotendinous junction. The lesser saphenous vein and sural nerve should be protected. These structures will cross over the central posterior calf approximately 12 cm from the tip of the fibula (Fig. 3). The flap size can be determined by measuring the deficit and/or nonviable Achilles tendon that requires excision (Fig. 4). The incision is then lengthened to allow adequate exposure for harvest of the flaps. We recommend harvesting approximately 4 additional cm of tendinous flap material than is actually measured to allow adequate crossover, stability, and suturing (Fig. 5).

Next, the medial or lateral straps are marked out on the posterior Achilles tendon to the level of the myotendinous junction (Fig. 6). These tendon straps should be made wide enough to allow adequate coverage distally while leaving the central zone and a portion of medial and lateral tendon intact. Distally, the tendon straps should be cut back slightly from the central area to allow ease in the rotation because these flaps will be transposed distally (Fig. 6). The flaps are then dissected and teased away from the underlying muscle belly before rotation and suturing (Fig. 7). The flaps are then rotated toward each other and distally by 180° to maintain the gliding surface

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