CHAPTER **10**

ACHILLES TENDON LENGTHENINGS

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Multiple techniques of Achilles tendon lengthenings have been described. The two open techniques, the gastrocnemius recession and z-plasty lengthening are the most commonly utilized. Both procedures are time consuming to perform and require a degree of surgical sophistication and practice.

To perform the above procedures the patient is generally turned prone, which can dramatically increase operating room time and increase the anesthesia risk. The surgery is perfomed through a longitudinal incision at least 7cm in length. The subcutaneous tissue must be carefully dissected to reduce risk of injury to the sural nerve. The deep fascia and paratenon must be carefully separated and then anatomically re-approximated. If the tendon is lengthened by open z-plasty all post-operative strength comes from sutures. Failure to perform any of these steps will result in delayed healing with possible rupture, adhesions, nerve entrapment and unsightly scarring with or without contracture.

Multiple percutaneous methods have been described to avoid many of the difficulties of the open procedures. White was the first to describe a percutaneous technique. He based the procedure on the apparent rotation of the Achilles tendon. White stated the tendon rotated laterally approximately 90 degrees. He therefore recommended the anterior 2/3 of the tendon be severed distally, about 2.5cm proximal to the insertion into the calcaneus (Figures 1, 2). A second incision is placed 6cm proximal to the first and the medial 2/3 of the tendon. With the knee held in extension, the foot is forcible dorsiflexed on the ankle until lengthening is accomplished. Although the procedure can be performed percutaneously, I find it somewhat difficult and prefer a semi-open method when the patient is in the prone position. I make a transverse skin incision over the tendon about 2-3cm proximal to the insertion. I isolate the tendon by passing a hemostat beneath it. Utilizing an #11 surgical blade, the anterior one-half to two-thirds of the tendon is transected (Figure 3). The skin is then closed with a few simple Vicryl sutures. Another transverse

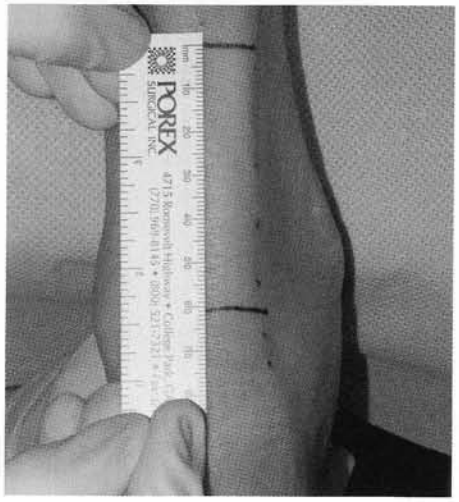

Figure 1. Skin incisions for the White TAL. The incisions are placed approximately 6cm apart.

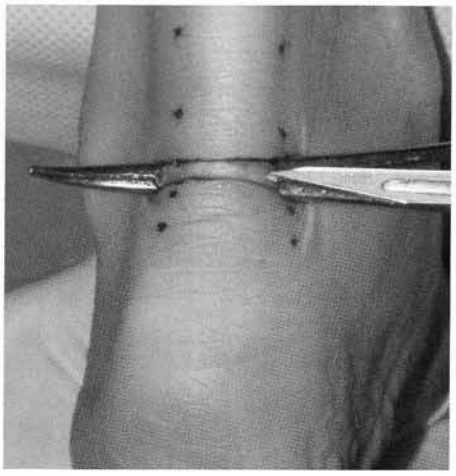

Figure 2. The incision is deepened through the subcutaneous layer only. The tendon is isolated distally with a hemostat.

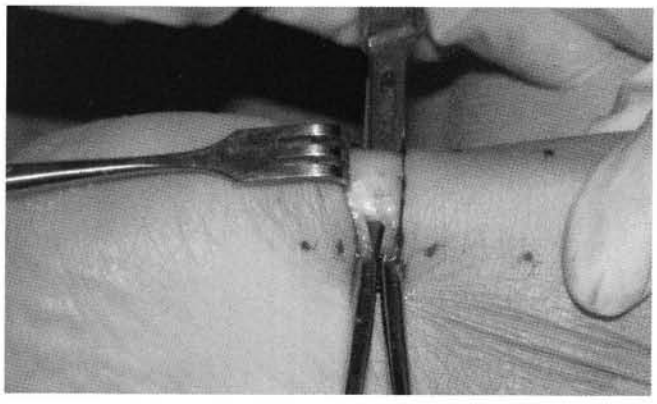

Figure 3. A #11 blade is passed through the tendon and the anterior half is cut.

incision is placed approximately 6cm proximal. This is centered over the medial half of the tendon. Remember, the bulk of the tendon is somewhat more medial, in the proximal leg. The incision is deepened to the deep fascia. The sural nerve should not be encountered (Figures 4, 5). With the foot held in dorsiflexion, I stab through the fasica/paratenon layer and cut the medial half to two-thirds of the tendon (Figure 6). Again, I close the skin only.

This procedure is occasionally difficult to perform due to variation in the amount of rotation of the Achilles tendon. Mercado, based upon personal observations, felt the rotation of the tendon is a myth. He was shown to be mistaken in an anatomic study by van Gils, Steed and Page, published in *Journal of Foot and Ankle Surgery* in 1996. The authors perfomed 17 cadavaric dissections. They noted the tendon rotated laterally in all cases anywhere from 11° to 65° with an average lateral rotation of 37°. Although the mean length of the tendon was 16.8cm, the twist in the tendon began on average 10.6cm proximal to the insertion. Although these variations exists, I have always been able to lengthen the tendon using this method. However, due to the significant dorsiflexory forces that will occasionally be applied to the foot it is possible to over lengthen the tendon.

My preference for Achilles tendon lengthening is a triple stab technique, attributed to Hoke (Figure 7). The procedure is performed with the patient supine. The leg is elevated by the surgeon or the assistant. With the foot held in dorsiflexion, the first incision is placed about 2cm proximal to the insertion into the heel. A #15 blade is used to pierce through the skin and the middle of the tendon. The blade is inserted parallel with the tendon fibers. Once through, the knife is turned medially 90° and the tendon fibers are severed. The next incision is made about 3cm proximal. The tendon is again stabbed centrally, this time the lateral half of the tendon is severed. At this level the sural nerve should not be encountered. A third and final incision is placed another 3cm proximal to the central stab. (Figure 8) Here the medial half of the tendon is transected. With the knee held in extension the foot is dorsiflexed on the ankle and the tendon will slide lengthen. I apply a gauze dressing. Occasionally I will close the skin with a single suture of Vicryl. The patient is placed in a non-weight bearing cast. The cast is removed in a month and the patient is allowed to bathe and sleep without the cast, and active range of motion exercises are begun. I allow the patient to bear weight in a removable walker. After two more weeks the patient is allowed full, unprotected weight bearing.

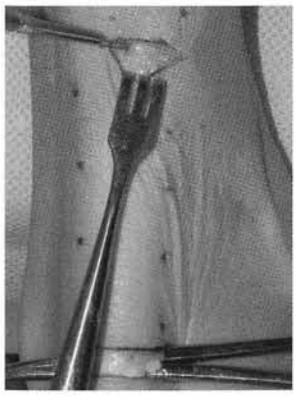

Figure 4. The proximal incision is located somewhat central-medial and deepened to the fascia.

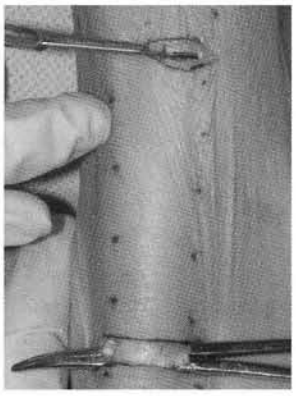

Figure 5. With the foot in dorsiflexion the medial half of the tendon fascia/paratenon is incised.

Figure 6. The foot is forcibly dorsiflexed with the knee extended.

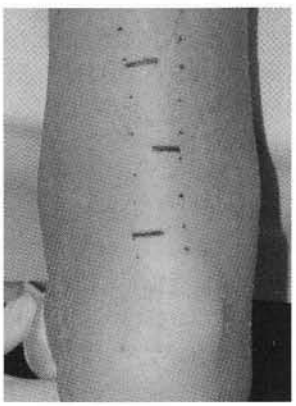

Figure 7. The skin incisions for the Hoke TAL. Each cut is 3cm apart.

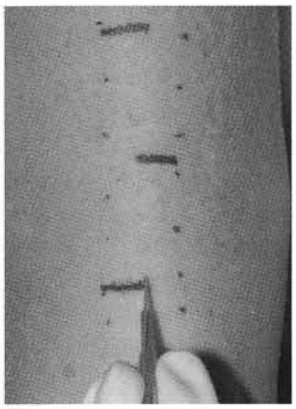

Figure 8.