EDITORIAL

Achilles Insertional Tendinopathy- Is There a Gold Standard?

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Achilles insertional tendinopathy (AIT) is inflammation and painful thickening of the Achilles tendon at its insertion on the posterior calcaneus. This most commonly occurs in middle-aged and elderly patients due to repetitive microtrauma leading to inflammation and bony metaplasia, ultimately resulting in the formation of a bone spur at the posterior calcaneus. Over time, the bone spur may continue to enlarge and irritate the Achilles tendon causing degeneration and necrosis. Intratendinous calcifications also develop which can worsen clinical symptoms. Patients typically present with progressive posterior heel pain, swelling, burning, and stiffness. Physical exam often reveals pain with palpation along the tendon and weakness with push-off. Magnetic resonance imaging (MRI) can be used to determine the extent of tendon involvement, however it is not required for diagnosis.

Non-operative management is most often successful and aims to eliminate pressure and alleviate inflammation to the surrounding area (1). Options include nonsteroidal anti-inflammatory agents, activity modifications, support sleeves, braces, and shoe wear modifications (1, 2). Physical therapy modalities including heel cord stretching and eccentric training, as well as ultrasound modalities using dexamethasone iontophoresis can also be attempted.

After a failed six month trial of non-operative management, the patient may elect to undergo operative management. This includes tendon debridement, retrocalcaneal bursa resection, and calcaneal exostectomy, followed by a repair of the Achilles tendon and possibly a deep tendon transfer. Most commonly the flexor hallucis longus (FHL) tendon is recruited because of its close proximity to the Achilles tendon, large size, strong vascular supply, function as a secondary plantar flexor, and it is in-phase with the gastrocnemius-soleus muscle to provide a synergistic effect to the Achilles tendon [Figure 1]. This ability to augment push-off strength is especially useful in older patients with more severe disease and those with a

Figure 1. The FHL tendon is identified through the same midline posterior incision and confirmed with gentle passive dorsi and plantarflexion of the hallux.

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high body mass index (BMI) (2-4).

A variety of surgical techniques have been reported, however, there is no current literature to support one technique as being superior to another. One of the most common differences noted in the literature is how to adequately access the calcaneal exostosis and how much tendon can be debrided safely in order to ensure adequate removal of disease without causing push-off weakness or an increased risk of post-operative rupture. The literature has described complete detachment of the tendon at its insertion, partial detachment, as well as tendon sparing techniques, such as splitting of the tendon (2, 3, 5- 10). Most studies show good to excellent results using these different techniques, however there are flaws with each.

The major benefit of complete or partial detachment of the Achilles tendon from the calcaneal insertion is ease of access to the posterior calcaneus and anterior tendon in order to treat all associated pathology. In theory, this should ensure a complete debridement and reduce the recurrence of disease. In fact, Wagner *et al* described that over time, they transitioned from partial to complete detachment of the tendon insertion in order to adequately visualize the calcaneus and tendon appropriately (6). The disadvantage is that it requires retensioning and reattachment of the Achilles insertion with bone tunnels or suture anchors, which adds time and cost to the surgical procedure (2, 7, 8). Additionally, any disruption of the Achilles tendon insertion through either iatrogenic detachment, or an aggressive debridement can increase risk of post-operative tendon avulsion or rupture (18). In general, studies support that insertional strength can be maintained with very little risk of post-operative rupture if less than 30-50% of the central tendon is detached (2, 5-10, 13).

Tendon sparing techniques, such as central tendon splitting, have also been described. Benefits of this approach include adequate exposure, direct access to the zone of injury, preservation of the tendon, blood supply preservation, and not needing to perform bone-tendon fixation techniques as long as greater than 50% of the insertion is preserved. On the contrary, it is argued that adequate visualization is not achieved with this approach and consequently, patients return with persistent pain and recurrence of disease due to inadequate debridement (6, 11). For example, Schepsis *et al* reported that the most common reason for failure after operative treatment was due to inadequate debridement and/or exostectomy (11). Additionally, even when the tendon splitting approach is utilized, the insertion is often partially elevated from the calcaneus in order to better visualize the calcaneus exostosis, somewhat defeating the purpose of a tendon sparing technique (8, 10).

Minimally invasive surgery (MIS) utilizing tendoscopy or endoscopy-assisted techniques have been reported for non-insertional Achilles tendinopathy. In particular, this has been described for tendon repair, proximal tendon debridement, and calcaneal exostectomy (14, 15). However, a limited number and quality of evidence exists for the management of insertional tendinopathy with MIS techniques (16, 17). A retrospective review of 12 patients by Vega et al was one of the first to report on this and noted improved patient satisfaction and functional scores, without major complications, after endoscopic exostectomy, tendon debridement, and tendon repair with suture anchors (16).

In contrast to MIS techniques, there have been reports of complete excisional debridements for the treatment of AIT. One technique in particular includes a complete excision of the distal 4-6cm of the Achilles insertion with a concomitant FHL tendon transfer (5). Utilizing this technique, Martin et al reported a patient satisfaction of 86%, with 95% reporting less or no pain after surgery (5). They did note reduced range of motion and strength in plantar flexion, however it did not appear to be functionally relevant on SF-36 scores (5).

Lastly, the addition of an FHL tendon transfer is often performed to augment the final tendon construct by providing mechanical strength and improved vascularity (1). Not only is this beneficial for when a debridement of greater than 50% is required, but it has also been shown to improve outcomes in patients greater than 50 years old. For example, McGarvey et al found that those greater than 50-55 years old had worse Achilles tendon disease, required a more extensive debridement, and had worse post-operative outcomes (9). They recommend a tendon repair or tendon transfer be performed in this age group. Although Hunt *et al* found no clinically significant difference with or without an FHL tendon transfer for chronic AIT, they did report that when an FHL transfer was concomitantly performed plantarflexion strength was improved, with no loss of hallux plantarflexion strength due to reliable anastomoses from the FDL tendon (3).

Overall, a review of the literature demonstrates that the many techniques utilized to treat AIT result in similar outcomes, including high satisfaction rates, improved function, and pain relief (3-5, 8, 10, 12). With there being no gold standard, management is most commonly based on individual surgeon preference. With over 30 years of experience, the senior author has felt that many of the reported techniques offer a variety of advantages and disadvantages with none being all encompassing. He uses a single incision technique performing an excisional debridement in which the most diseased central one third portion of the Achilles tendon insertion is resected in an apex-superior triangle fashion, followed by a calcaneal exostectomy performed through the created Achilles tendon window [Figure 2-4]. The FHL tendon transfer is performed, followed by a side to side repair of the Achilles tendon [Figure 5].

The author believes this technique combines many of the best features of the wide variety of techniques that currently exist, while still minimizing complications. For example, through the central tendon resection there is enhanced visibility of the posterior superior calcaneus for exostectomy and any further debridement of the tendon required. In addition, this technique does not involve detachment of the Achilles insertion, and therefore does not require retensioning and reattachment to the calcaneus. The lead author finds this to be both cost effective and time saving in the operating room. Lastly,

Figure 2. The excisional debridement of the distal one-third of the Achilles tendon insertion is outlined in purple.

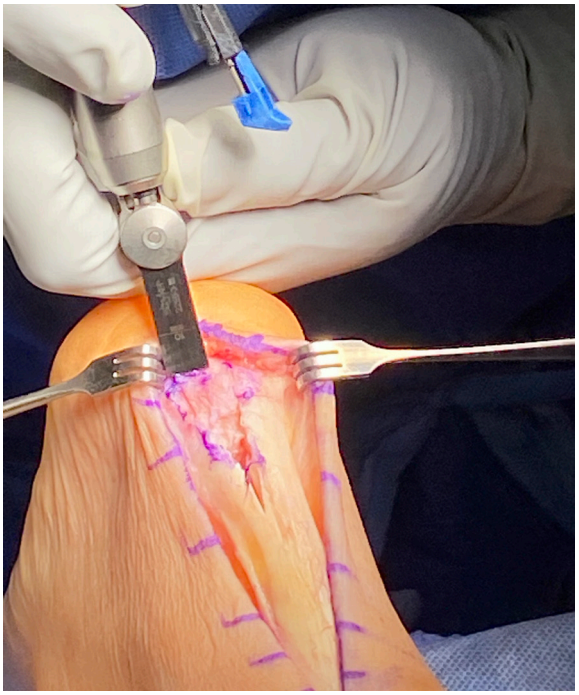

Figure 3. The calcaneal exostectomy is performed through the tendon resection zone.

Figure 4. A postoperative radiograph demonstrating appropriate resection of the posterior calcaneal exostosis.

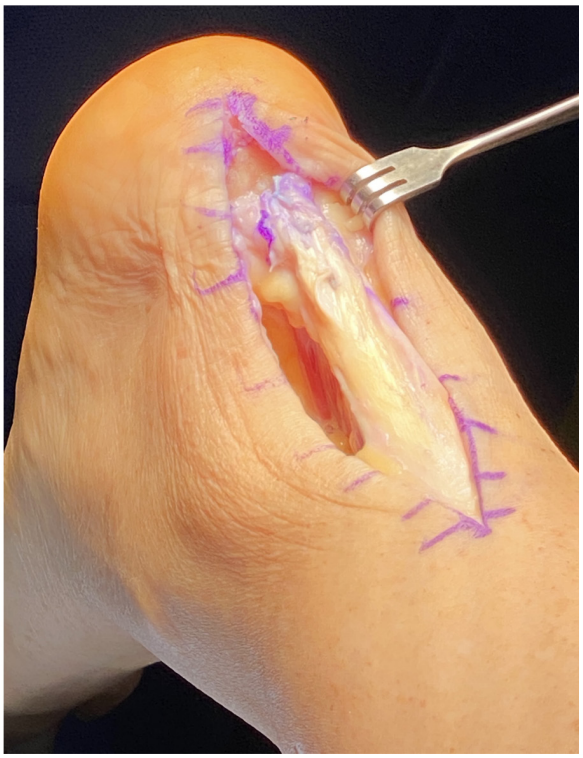

Figure 5. The final construct after debridement and FHL tendon transfer. A side to side suture closure of the Achilles tendon is performed.

the FHL tendon transfer provides mechanical push-off strength to augment the Achilles tendon without significant morbidity to the patient. This technique is pending publication and has proven to be uniformly reproducible, with no complications and excellent patient satisfaction.

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