Insertional Achilles tendinosis (IAT), a clinical syndrome that presents as posterior heel pain, is a degenerative process that may include intratendinous calcifications, posterior calcaneal osteophyte formation, and retrocalcaneal bursitis. The retrocalcaneal bursa lies between the anterior aspect of the distal Achilles tendon and the posterior–superior aspect of the tuberosity of the calcaneus. Inflammation of this bursa may occur in systemic inflammatory diseases such as rheumatoid arthritis, but more commonly is caused by mechanical irritation or impingement between the calcaneal tuberosity and the Achilles tendon, especially in dorsiflexion. This posterior–superior portion of the calcaneus tuberosity may be referred to as Haglund’s deformity if misshapen or abnormally large. Most patients will have a gastrocnemius contracture on examination. Conservative treatment of IAT, including rest, immobilization, Achilles stretching, physical therapy, heel lifts, and non-steroidal anti-inflammatory drugs (NSAIDs), is often successful. Surgical treatment may be indicated if symptoms persist after at least six months of conservative treatment.

Surgical procedures recommended for recalcitrant IAT have included excision of the posterior calcaneal osteophyte, excision of the Haglund’s exostosis, limited Achilles debridement, complete debridement of the tendon insertion with bone anchor re-attachment, and isolated gastrocnemius fascia release without direct treatment of the posterior heel. Several incisions have been advocated for treatment of IAT, including posterior mid-line, medial and/or lateral, \( J \)-shaped, and transverse incisions. Gould described an extensive procedure for IAT that included a proximal \( V-Y \) lengthening of the gastrocnemius, complete detachment of the Achilles insertion, removal of the abnormal distal portion of the tendon, and re-attachment of the insertion with anchors. The purpose of this study is to determine the effectiveness of a simple surgical procedure for the treatment of IAT that we believe addresses all of the pathology while avoiding the time, cost, and prominence of suture anchors.

**Materials and Methods**

**Surgical Technique**

The patient is placed in the prone position with utilization of a thigh tourniquet. The first portion of the procedure is to perform a gastrocnemius fascia release through a 4cm posterior mid-line incision at the level of the musculotendinous junction (see Figure 1). Care is taken to identify and avoid injury to the sural nerve, which is a mid-line structure at this level. After the nerve is retracted, the fascia of the superficial posterior compartment of the leg is opened longitudinally and a chevron-shaped incision, with the apex proximal, is made through the gastrocnemius fascia, avoiding incision into the muscle (see Figure 2A). With the knee extended the ankle is dorsiflexed, and the fascial incision can be seen to open about 2cm (see Figure 2B). The foot should dorsiflex at least 10º above neutral following the gastrocnemius fascia release.

A second posterior mid-line incision is then made, beginning 3cm above the top of the calcaneal tuberosity and extending distally to the thickened skin at the upper edge of the posterior aspect of the heel pad (see Figure 1). Care is taken not to elevate the skin flaps off the Achilles tendon. The scalpel is placed directly through the mid-line of the Achilles tendon, at the proximal end of the incision, and the scalpel is then brought straight distally. When the scalpel comes to the superior edge of the tuberosity, the incision through the mid-line of the tendon is continued distally, past the distal end of the tendon insertion. Sharp dissection is then used from the mid-line to elevate the Achilles insertion off the calcaneus, leaving a small amount of intact tendon insertion on both the medial and lateral aspects of the tuberosity. With the tendon insertion elevated off the tuberosity, osteotomes and rongeurs are used to remove any posterior osteophyte from the calcaneus. The Achilles tendon is then everted and any degenerative or calcified areas of tendon are sharply excised (see Figures 3A and 3B). The abnormal tendon is almost always limited to the anterior aspect of the tendon, and therefore the length of tendon is preserved by leaving the posterior portion of the tendon intact.

After debridement of the abnormal tendon, the tendon halves are again retracted with the overlying skin flaps, and the retrocalcaneal bursa is removed. We believe that impingement by the posterior–superior prominence of the calcaneus on the anterior aspect of the tendon always contributes to IAT, and therefore, in all cases, an osteotome is utilized to remove the posterior–superior portion of the tuberosity (Haglund’s deformity). This is easily accomplished through the mid-line incision in the tendon. A lateral radiograph is obtained to make certain that the Haglund’s deformity, posterior insertional osteophytes, and all tendon calcifications have been adequately removed (see Figures 4A and 4B). If the ankle can be plantarflexed by pulling on each Achilles tendon half proximally with an Allis clamp, there is enough insertion remaining intact that anchor fixation is not necessary. The mid-line incision through the Achilles tendon is repaired with 2–0 Vicryl suture, with the knots buried on the deep aspect of the tendon (see Figure 5). The skin is closed with nylon or absorbable subcuticular suture.

Sterile dressings are applied and the ankle is splinted in neutral. One week post-operatively a short leg cast is applied for an additional three weeks, with continued non-weight-bearing. At four weeks post-operatively, the patient is placed in a hinged boot that is adjusted to
allow full plantarflexion but no dorsiflexion. The boot is removed for bathing, sleeping, and range of motion exercises, but weight-bearing is not allowed until eight weeks post-surgery. At eight weeks post-operatively, progressive weight-bearing as tolerated is allowed in the boot. At 12 weeks after surgery, the boot is discontinued, and progressive strengthening and shoe-wear are allowed. Full return to impact-loading sports activity or heavy lifting is not allowed until six months following surgery.

Outcome Measures
The patients were evaluated at follow-up by comparing pre-operative and post-operative pain ratings on a scale of 0–10 and by completing the American Academy of Orthopaedic Surgeons (AAOS) Foot and Ankle questionnaire. Patients were also evaluated by a physical therapist for range of motion (ROM) and the ability to perform single-leg heel raises on both operative and non-operative extremities. Patient satisfaction level was assessed as very satisfied, somewhat satisfied, neutral, somewhat dissatisfied, or very dissatisfied with the surgery. Furthermore, the patients were asked whether they would repeat the procedure and whether they would recommend the procedure to family or friends.

Results
Between May 2002 and October 2005, 25 patients (26 feet) underwent surgical treatment of IAT using the procedure described. Three patients were lost to follow-up and one patient declined participation. The study
Results of Surgical Treatment of Insertional Achilles Tendinosis

consisted of 21 patients (22 feet). There were 18 females and three males, with a mean age of 57 years. The patients were evaluated at a mean follow-up of 21.8 months (range 12–43). There were no complications in these patients. Specifically, there were no wound problems, painful scars, or Achilles insertion avulsions. In the entire series, a bone anchor was used in only one half of one tendon insertion.

The mean pre-operative pain rating of 8.95 improved to 1.50 post-operatively (p<0.001). However, this slight weakness on the operative side was completely unrecognized by all but one patient. The mean difference in active ankle ROM between the operative and non-operative extremities was 4.07º (p=0.36). Of the 21 patients, 13 were very satisfied with their current foot and ankle symptoms, five were somewhat satisfied, two were neutral, and one was very dissatisfied due to residual pain. All of the patients stated that they would repeat the procedure and would recommend it to family or friends.

Discussion

Although IAT and retrocalcaneal bursitis may occur individually, it is our belief that both processes contribute to posterior heel pain in most patients. We also feel that it is difficult to differentiate the contribution of IAT versus retrocalcaneal bursitis as a cause of pain in most patients, and that both should be addressed in any surgical treatment of posterior heel pain.

Routine radiographs will often show soft-tissue calcification in the Achilles tendon above its insertion, and/or a posterior osteophyte arising from the posterior calcaneus at the site of tendon insertion. When present, this posterior osteophyte may result in a large bony prominence that makes shoe-wear difficult. The tendon-splitting approach allows excision of the calcified tendon and complete removal of the posterior osteophyte.

Magnetic resonance imaging (MRI) will often show increased signal in the distal 1–2cm of the Achilles tendon, but is rarely needed because the diagnosis is usually made clinically. The abnormal signal in the Achilles tendon is usually more pronounced in the anterior aspect of the tendon, most likely due to the impingement by the posterior–superior portion of the calcaneal tuberosity. Radiological guidelines have been suggested to determine when the posterior–superior portion of the calcaneal tuberosity is abnormal, but we believe that it always impinges on the tendon in dorsiflexion, and therefore always needs to be removed as part of any surgical treatment for posterior heel pain. The tendon-splitting approach easily allows removal of this Haglund’s prominence.
Patients with posterior heel pain usually present with a gastrocnemius contracture, although it is not known whether the contracture leads to or is the result of the chronic heel pain. It seems likely that the compression of the anterior portion of the Achilles tendon by the posterior–superior portion of the calcaneal tuberosity will be greater if the gastrocnemius contracture prevents dorsiflexion during gait, and we therefore believe that release of the gastrocnemius contracture, if present, should also be included in any surgical procedure for posterior heel pain. The abnormal tendon requiring debridement is almost always limited to the anterior aspect of the tendon and therefore the length of the tendon is preserved by leaving the posterior portion of the tendon intact. An additional goal of our surgical technique is to avoid the need for anchor fixation, which decreases the cost and time of surgery, but also, and more importantly, decreases the ‘bulk’ of the suture knots over the posterior heel. In addition to decreasing the impingement on the anterior aspect of the Achilles tendon, as described above, we believe that releasing the gastrocnemius contracture will also decrease the tension at the insertion of the tendon, which might help reduce insertional pain. Furthermore, the increased dorsiflexion makes avulsion of the insertion less likely, which has allowed us to avoid use of anchors in almost all cases, with no occurrence of post-operative Achilles avulsion.

Conclusion

Our findings suggest that surgical treatment consisting of limited Achilles debridement through a tendon-splitting approach, excision of the calcaneal posterior insertional exostosis, removal of the Haglund’s prominence, and gastrocnemius fascia release is safe and effective in relieving the pain of chronic IAT. The gastrocnemius fascia release decreases the tension on the tendon, thereby protecting the Achilles tendon insertion in the early post-operative period, obviating the need for suture anchors, and may contribute to relieving the pain associated with a tight Achilles tendon.

Editor’s Recommendations

Insertional Achilles Tendinosis—Surgical Treatment Through a Central Tendon-splitting Approach

McGarvet W et al.


Twenty-two heels in 21 patients treated surgically for a primary diagnosis of insertional Achilles tendinosis were reviewed on the basis of pre- and post-operative examinations, office records, and a comprehensive questionnaire administered to each subject. Each patient underwent surgical treatment using a mid-line–posterior skin incision combined with a central tendon-splitting approach for debridement, retrocalcaneal bursectomy, and removal of the calcaneal bursal projection as necessary. The findings at surgery revealed involvement of the middle third of the insertion in 21 of 22 cases, with only one patient manifesting isolated lateral involvement. Thirteen of 22 had an associated prominent calcaneal bursal projection and four of 22 a superficially inflamed bursa. Three patients required re-insertion of the Achilles tendon via drill holes and one underwent augmentation with a plantaris tendon. Operative findings and complications were reported. Eight male and 13 female patients underwent 22 procedures (one case bilaterally) with an average follow-up of 33 months. Pre-operative symptoms included presence of symptoms over a range of three months to two years and pain associated with activities of daily living (17 of 22), limitation of regular activities (six of 22), and pain present at rest (six of 22). Post-operatively, 20 of 22 patients were able to return to work or routine activities by three months; only 13 of 22 were completely pain-free. Only 13 of 22 also claimed that they were able to return to unlimited activities. Overall, there was an 82% (18 of 22) satisfaction rate with surgery, and 77% (17 of 22) stated they would have the surgery again.

Surgical Treatment of Insertional Achilles Tendinosis

Calder J, Saxby T


Most patients with insertional Achilles tendinosis can be managed non-operatively, but those who do not respond may require excision of the diseased tendon. Currently, there are no clinical studies indicating how much of the tendon may be excised without predisposing the patient to Achilles tendon rupture. This chart review reports on 52 heels treated surgically for this condition and followed for a minimum of six months post-operatively. When less than 50% of the tendon was excised (49 heels) patients were immediately mobilized free of a cast. There were two failures using this regimen: one patient with psoriatic arthropathy and another who underwent bilateral simultaneous procedures. We suggest that in selected patients it is safe to proceed with early active mobilization immediately post-operatively when less than 50% of the tendon is resected.

References