AMIT AMIN
FOOT & ANKLE SURGEON

Achilles Tendon Rupture

Achilles tendon rupture is a common and principally sports-related injury. It is more common in males typically between 29–40 years of age.

Ruptures occur as a result of sudden contraction of the calf muscle with dorsiflexion (pointing up) of the foot. Other mechanisms include direct sharp and blunt trauma. Pre-existing tendinopathy (thickening) creates an inherent zone of weakness that can pre-dispose to rupture, however only 10% of patients with a rupture describe pre-existing symptoms. Nevertheless most patients will have some degree of pre-existing degeneration as the principal risk factor.

Steroids, vascular disease, rheumatological conditions and certain antibiotics can also increase the risk of Achilles tendon rupture, usually with less forceful mechanisms such as an ankle twisting injury.

Treatment/decision-making

The initial presentation is typically to an A+E department and the diagnosis will be made clinically usually without the need for further tests like Ultrasound or MRI. A cast will be applied with the foot pointing downwards and the cast limits upward movement.

Achilles ruptures can be treated with or without surgery, and there has been an abundance of literature published on this topic over the last 10 years. What is clear from the recent literature is that conservative treatment of Achilles tendon ruptures can be very successful in the majority of cases. Conservative treatment means – pointing the foot down as soon as possible after the injury, and immobilising the limb in that position strictly for 2 weeks to begin to allow healing to occur, and then a process of graded rehabilitation in a boot, slowly bringing the foot up to neutral (flat to the ground).

In my practice, I ensure my patients are fully informed about the merits of both treatment methods, and thereafter we make an informed decision. A number of factors need to be considered in the decision-making process.

Why choose non-operative management?

First and foremost, as an orthopaedic surgeon, my principal role is to advise and where possible AVOID surgery. Surgery carries risk, albeit small, and avoiding exposure to that risk where possible is the ideal.

In 2010 Willits et al (see appendix), published a Level 1 study comparing operative and non-operative treatment. Of 144 patients in this study (72 in each group), there was no difference in re-rupture rate, or clinical outcome at 2 years. The complication rate was higher in the operative group. It was the first study that really made us question the absolute need for surgery in Achilles tendon ruptures, which up until then had been the gold standard.

The ultimate goal is for the Achilles to heal at the right tension. This can only be achieved if the tendon ends are in close approximation, and any delay in diagnosis could render non-operative management futile.

A dynamic ultrasound scan (USS) is in some situations helpful for decision-making purposes. This is to assess the 'gap size' - not in the resting position, but with the foot pointing downwards. If the ends are closely approximated this provides reassurance that the Achilles will heal at the right tension. The 'gap size' that is clinically relevant is yet to be formally determined. An alternative option is a MRI in a cast with the foot pointing down.

Like an elastic band, any loss of tension in the Achilles can influence its ability to generate energy, and ultimately rebuild and power the calf. Small discrepancies are well tolerated by most, aside from those that rely on the power in their calf muscles for sport – essentially the elite sport population.

The principal downside of the non-operative approach is that the tendon heals elongated and loses its tension. A typical protocol would be:

a. Decision to treat non-operative
b. Cast or boot with wedges for 2 weeks. Foot to stay pointing down all the time
c. Convert to boot with 4 or 5 heel wedges, and start weight bearing.
d. Remove one wedge every 10 days as an average (a specific plan will be provided for you) – this allows the foot to gradually come up to flat, as the tendon heals. It relies on adequate tendon healing, and this part should not be rushed – as the tendon can elongate and heal long.

If the tendon has now healed long – the foot will lack tension and may feel a little floppy. In the rehabilitation phase (separate document), it becomes difficult to build muscle and there is an inability to graduate to a single leg heel raise for example. In the worst case, climbing and descending stairs and walking up and down hills becomes difficult. As does any impact loading sports including running. The risk of this happening is difficult to specify accurately, but I would estimate 5-10% of cases heal 'long' with no surgery. Of those patients not all will have issues, and some will simply accept the slight loss in power. In a small percentage repeat surgery is required, because of significant dysfunction. The outcome of repeat surgery can be variable.

I use the non-operative approach in the following group of patients –

a. Sedentary non-sporty
b. Active but recreational and not reliant on explosive power for sport
c. Active and perform explosive sports but no gap on USS and patient choice
d. Risk factors such as steroid use, diabetes, and vascular disease
e. High ruptures at the muscle/tendon junction

Patients to consider strongly for surgery

1. Delayed presentation/missed diagnosis.

   If there was more than 24 hours delay between injury and diagnosis/cast application – blood/fat/debris, can block the tendon ends from coming together. Dynamic USS can assess and document the 'gap' in plantar flexion (with the foot pointing down) to aid in decision-making. The relevance of the 'gap size' is yet to be fully understood – in particular what 'gap size' should trigger the need for surgery if at all. The longer the time lag to first presentation/diagnosis, the more likely surgery will be needed

2. Active individual with gap noted on dynamic USS

   If there is a gap noted on USS and the desire is to return to load based sports, like football, tennis and volleyball – then my recommendation is to have surgery to avoid the situation of the tendon healing 'long'. The exact gap size relevance is unclear and requires discussion.

3. Elite Sport

   Surgery is the standard in the Elite Sports population. There are 2 principal reasons. Firstly surgery ensures that the tendon ends are fully opposed together and increases the likelihood of tendon healing occurring at the right tension. Achieving the right tension, allows the calf muscle to be rehabilitated fully, and in this particular population even a slight discrepancy can be devastating for that individual. Some studies (see appendix) report upto 10-18% increase in calf strength in the patients who have surgery when assessed 18 months after the injury. A slight discrepancy would be very well tolerated by a recreational sportsman/woman. Secondly a repaired tendon might allow for earlier controlled range of movement, and allow for a slightly quicker rehabilitation. Ultimately however an elite sportsman/woman will still take around 6 months to return to the football pitch for example. This highlights the seriousness of this injury.

4. Achilles variant injury

   Very occasionally and rarely the Achilles ruptures at the interface with the heel bone, and this always requires surgery to reattach the tendon.

5. Older population with gross tendinopathy, where tendon has low capacity to heal, without surgery and re-inforcement

   This is a borderline group, where the tendon has ruptured because of underlying gross/significant tendinopathy – thickening and disease. This is also the group of patients usually with significant other medical issues that would make surgery less desirable. If the patient is otherwise healthy, and has a rupture in this situation, we sometimes consider surgery to reconstruct and reinforce with a tendon transfer.

Surgery

Surgical reconstruction can be performed ‘open’ which is the traditional approach or ‘minimally invasive’. The principle is to bring the tendon ends together to ensure healing at the correct tension.

This is performed as a day-case procedure under General Anaesthetic. Local anaesthetic is used to ‘numb’ the leg/operative field for post-operative pain relief. The surgery takes 30-45 minutes and a partial cast is applied at the end of the procedure, with the foot pointing down and the cast limits upward movement. It is important to elevate the limb 90% of the time during the first 2 weeks. You will be non-weight bearing and require blood-thinning medication.

At the 2-week point, the cast is taken off, the wound assessed and an aircast boot with 4 or 5 heel wedges applied. At this point I provide you with a plan for wedge removal and advice about weight bearing, and movement/exercises. Physiotherapy can begin at any point from week 2, as it remains important to keep the injured limb strong as the tendon heals, as this will help with the overall recovery.

APPENDIX

J Bone Joint Surg Am. 2010 Dec 1;92(17):2767-75. doi: 10.2106/JBJS.I.01401. Epub 2010 Oct 29.

Operative versus nonoperative treatment of acute Achilles tendon ruptures: a multicenter randomized trial using accelerated functional rehabilitation.

Willits K[1], Amendola A, Bryant D, Mohtadi NG, Giffin JR, Fowler P, Kean CO, Kirkley A.

To date, studies directly comparing the rerupture rate in patients with an Achilles tendon rupture who are treated with surgical repair with the rate in patients treated nonoperatively have been inconclusive but the pooled relative risk of rerupture favored surgical repair. In all but one study, the limb was immobilized for six to eight weeks. Published studies of animals and humans have shown a benefit of early functional stimulus to healing tendons. The purpose of the present study was to compare the outcomes of patients with an acute Achilles tendon rupture treated with operative repair and accelerated functional rehabilitation with the outcomes of similar patients treated with accelerated functional rehabilitation alone.

Methods:

Patients were randomized to operative or nonoperative treatment for acute Achilles tendon rupture. All patients underwent an accelerated rehabilitation protocol that featured early weight-bearing and early range of motion. The primary outcome was the rerupture rate as demonstrated by a positive Thompson squeeze test, the presence of a palpable gap, and loss of plantar flexion strength. Secondary outcomes included isokinetic strength, the Leppilahti score, range of motion, and calf circumference measured at three, six, twelve, and twenty-four months after injury.

Results:

A total of 144 patients (seventy-two treated operatively and seventy-two treated nonoperatively) were randomized. There were 118 males and twenty-six females, and the mean age (and standard deviation) was 40.4 ± 8.8 years. Rerupture occurred in two patients in the operative group and in three patients in the nonoperative group. There was no clinically important difference between groups with regard to strength, range of motion, calf circumference, or Leppilahti score. There were thirteen complications in the operative group and six in the nonoperative group, with the main difference being the greater number of soft-tissue-related complications in the operative group.

Conclusions:

This study supports accelerated functional rehabilitation and nonoperative treatment for acute Achilles tendon ruptures. All measured outcomes of nonoperative treatment were acceptable and were clinically similar to those for operative treatment. In addition, this study suggests that the application of an accelerated-rehabilitation nonoperative protocol avoids serious complications related to surgical management.

Am J Sports Med. 2016 Sep;44(9):2406-14

A Prospective Randomized Trial Comparing Surgical and Nonsurgical Treatments of Acute Achilles Tendon Ruptures.

Lantto I, Heikkinen J, Flinkkila T, Ohtonen P, Siira P, Laine V, Leppilah J

60 patients. Level 1 evidence. Randomised trial

Surgical and nonsurgical treatments of acute Achilles tendon ruptures have similar results in terms of the Achilles tendon performance score
Surgery restores calf muscle strength earlier with a 10% to 18% strength difference favouring surgery at 18 months.