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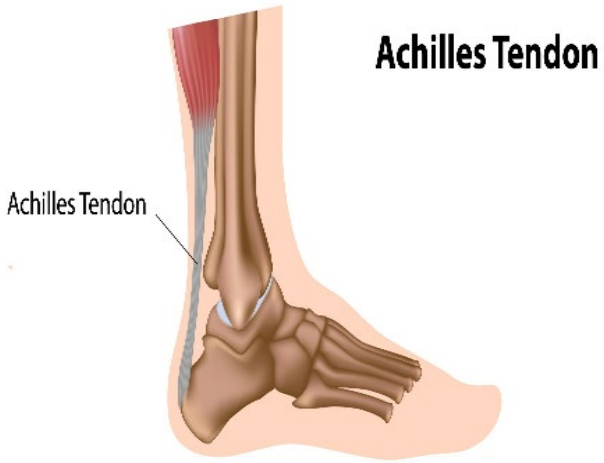
Achilles tendon rupture: management and rehabilitation

This leaflet explains what non-operative (conservative) treatment of a complete rupture of the Achilles tendon involves so you know what to expect if you decide on this treatment option.

About the Achilles tendon

The Achilles tendon (or heel cord) is the largest tendon in the human body. It connects the calf muscles (gastrocnemius and soleus) to the heel (calcaneus). It is made up of many bundles of a strong material called collagen, which is the body's main tissue building block, making it strong and flexible. Its function is to help in bending the foot downwards at the ankle (this movement is called plantarflexion). An example of this is going up on your tiptoes; it also helps to push us forwards when walking or running.



Side on view

Side on view

If the tendon is torn, this is called an Achilles tendon rupture and this leaflet deals with the management of this injury. Occasionally, the tear may be partial and usually occurs where the tendon joins the calf muscle. This injury is managed slightly differently and usually involves resting the ankle in a boot for a few weeks.

What causes an Achilles tendon rupture?

Achilles tendon rupture affects about 1 in 15,000 people at any one time, increasing to 1 in 8,000 in competitive athletes. It can occur at any age but is most common between the ages of 30 and 50. The Achilles tendon usually ruptures without warning.

As with any muscle or tendon in the body, the Achilles tendon can be torn if there is a high force or stress on it. This can happen in activities which involve a forceful push off or lunging type movement e.g. football, tennis, badminton, squash. The push off movement uses a strong contraction of the calf muscles that can stress the Achilles tendon too much. The Achilles tendon can also be damaged by injuries such as falls and slips where the foot is suddenly forced into an upward pointing position (dorsiflexion). Sometimes, the Achilles tendon is weak, making it more prone to rupture. This could be due to specific medical conditions, e.g. rheumatological conditions or medication combinations, such as steroids and certain antibiotics. It can also occur when there has been long-term Achilles tendonitis. This is where the tendon becomes swollen and painful and leads to small tears within the tendon. These tears cause the tendon to become increasingly weak and therefore more susceptible to rupture.

What are the symptoms?

When a rupture of the Achilles tendon occurs, you may experience a sudden pain in your heel or calf. The pain may then settle to a dull ache or it may go completely. This can be associated with a snapping or popping sound. Patients often describe the feeling as if someone has hit them in the back of the leg, only to turn around and find no one is there. After rupture of your Achilles tendon, there may be some swelling and bruising in your calf. It is usually difficult to walk, with only a flat-footed type of walking being possible. It is usually difficult to push off the ground properly on the affected side. You may be unable to stand on tiptoes or climb stairs. A partial tear of the Achilles tendon is rare, so any acute injury to the Achilles tendon should be assumed to be a complete rupture.

How is a rupture diagnosed?

It is usually possible to detect a complete rupture of the Achilles tendon on the symptoms, the history of the injury and a doctor’s examination.

A gap may be able to be felt in the tendon, usually 4-5 cm above the heel bone. This is the normal site of the injury and is called an intra-substance tear. The tear can occur higher up about 10cm above the insertion into the heel, at the site where the muscles join the tendon; this is known as a musculo-tendinous tear.

A special calf squeeze test will be performed. Normally, if the Achilles tendon is intact this causes the foot to point downwards, but if it is ruptured, it causes no movement. To confirm the diagnosis and the exact site of the rupture it may be necessary to perform an ultrasound scan.

What are the treatment options?

There are two treatment options available for Achilles tendon ruptures, which are non-operative (conservative) and operative (surgical). At the Royal Berkshire Hospital, we employ conservative treatment (functional bracing) in the majority of patients, as the evidence suggests similar results to surgery without the associated complications. Occasionally, surgery may be considered, especially in cases of delayed presentation or atypical ruptures.

Conservative treatment (functional bracing)

This is the use of a specialised boot that holds your leg in a set position, to allow healing of the tendon while allowing you to function as normal. With conservative treatment, you will follow a set regime that involves initially being in a below knee plaster cast with the foot held in a fully bent downwards (equinus) position. This usually stays in place for up to two weeks, and is then changed to a specialist boot (Vacoped). This is a boot from the knee down to the toes with Velcro straps.

The plaster cast and boot should be worn at all times, including in bed, to ensure that your tendon is protected throughout the healing process. You may briefly bear weight on your toes while you have the plaster cast on. While wearing the specialist boot (Vacoped), you should fully weight bear on your whole foot.

As you will be less mobile than previously, you will have a risk assessment for venous thromboembolism (VTE), (blood clot in the leg). If you are felt to be at risk, you will be prescribed blood thinning injections (Enoxaparin) for six weeks from the date of your injury.

You will visit Fracture Clinic and the Physio-led Achilles Tendon Clinic for regular skincare appointments and to progress to rehabilitation when ready. During these visits, the boot will be adjusted to allow your foot to come up into a more neutral position.

The total treatment time will be approximately nine weeks. You will be referred for physiotherapy to start towards the end of your boot treatment. It may take several months for your symptoms to completely settle. You will be contacted by email at six months and 12 months after the date of injury to complete appropriate functional outcome scores.

What are the risks of conservative treatment?

- Risk of re-rupture
- Decreased strength
- Risk of clot in leg veins (deep vein thrombosis) / lungs (pulmonary embolus)

What does surgical treatment involve?

Surgery is not usually the preferred treatment option as the risks of complications may outweigh the benefits. However, surgery may be considered for the following:

- Delayed presentation / treatment (more than 2-3 weeks following injury)
- Re-ruptures of Achilles tendon / avulsion injuries / fat within tendon gap
- Elite athletes (some evidence of slightly increased push off strength)

However, patients have to consider potential complications of surgical intervention (risk increase of around 16% (4 out of every 25 cases) compared to conservative treatment).

What are the risks of surgery?

- Risk of re-rupture
- Decreased strength
- Risk of clot in leg veins (deep vein thrombosis): less than 1 in 100
- Risk of clot in lungs (pulmonary emboli): less than 1 in 500
- Risk of infection: 1 in 100
- Risk of delayed wound healing

- Risk of numbness around incision

Patients undergoing surgery will be booked in to have surgery within a week or two following clinic review. On the day of surgery, you will be admitted to the ward. Your surgeon will remind you of the surgical process and possible complications and will ask you to sign a consent form. The anaesthetist will also meet you and discuss any queries. At some point during the morning or afternoon, you will be escorted to theatre.

Once in theatre you will be given a general anaesthetic. The procedure lasts about 45-60 minutes and involves making an incision over the Achilles tendon and repairing the tendon with sutures. After the procedure you will have a below knee back slab (half plaster with the foot pointing down) applied. You will be shown how to use crutches as you should not weight bear on the cast. Most patients should be able to go home the same day after surgery (day case).You should be accompanied home by a responsible adult.

You will be advised of your follow-up appointment date, either on the day or by letter in the post. Your stitches will be removed at two weeks following surgery in outpatients and you will then go through functional bracing (see above) like conservatively managed patients.

What is the general management of Achilles tendon injury?

For patients presenting with symptoms at A&E or the Minor Injury Unit:

- Diagnosis confirmed by palpable gap and positive calf squeeze test (see page 2).
- A full equinus (toes pointing) back slab cast is applied.
- VTE (blood clot) risk assessment is carried out and Enoxaparin (anticoagulant – blood thinner) is prescribed as appropriate.
- Referral to RBH Virtual Fracture Clinic for follow up.

For patients attending Virtual Fracture Clinic:

- Consultant may request an ultrasound scan.
- Scan should be completed within three working days of request.
- Booked into Fracture Clinic for appointment on same day / day after ultrasound scan.

First Fracture Clinic assessment

- Patient and results of ultrasound scan reviewed
- Treatment options discussed with patient: Functional bracing versus surgical repair

Conservative / Functional Bracing Protocol				
Stage	Device	Position	Weight bearing status	Duration
1	Full Cast	Equinus	TTWB	7-13 days
2	Vacoped boot	Locked plantar flexion (30°) Patient to be referred for physiotherapy	FWB	2 weeks
3	Vacoped boot	Dynamic plantar flexion (15 - 30°)	FWB	3 weeks

4	Vacoped boot	Dynamic plantar flexion (0 - 30°) Physiotherapy to start	FWB	2 weeks
5	Supportive footwear	Provide single heel lift	FWB	2 weeks
NB: Boot must be worn at all times TTWB – toe touch weight bearing FWB – full weight bearing				

NB:

If you suffer from any of the following symptoms, **please seek medical advice**:

- Sudden cramp like pain in calf, thigh or groin.
- Pain in chest or shortness of breath (**go to A&E**).
- Sudden increase in swelling, numbness or pins and needles.
- Wound concerns (post-surgery, if applicable).

Physio-led Achilles Tendon Clinic

- All patients will be reviewed in the clinic at the appropriate timeframes as stated above (Stage 2 onwards).
- At these visits, your skin care will be checked.
- A referral will be made for physiotherapy to start immediately at the beginning of Stage 4 (dynamised 0-30°)
- You will be contacted by email at six months and 12 months after the date of injury to complete appropriate functional outcome scores.

Outpatient physiotherapy

This usually starts towards the end of your boot treatment. A physiotherapy referral request should have been made at the beginning of your treatment and you should have been contacted by the relevant Physiotherapy team with an appointment date. This is a basic protocol but may differ according to the individual.

Typical progress / targets:

Phase 1 (Rest phase)

Goals

- Protect tendon, mobilise touch toe weight bearing safely on crutches.
- Minimise pain and swelling.
- Rest and recovery.

Stage 1: Weeks 0-2 (Equinus cast)

- Toe touch weight bearing using crutches.
- Try to keep your hips, knees and toes moving fully to prevent stiffness.
- No physiotherapy or range of movement exercises for ankle.
- You must keep the equinus plaster cast on at all times (day and night).
- Rest and elevate leg as much as possible.
- Pain control.

Stage 2: Week 2-4 (Vacoped boot locked plantarflexion)

Goals

- You can fully weight bear in the Vacoped boot locked in 30 degrees plantarflexion using crutches and as pain allows.
- Vacoped boot to be worn at all times.
- Swelling control.
- Maintain core, upper limb, hip and knee strength.

Physiotherapy

- You can fully weight bear in the Vacoped boot with crutches as discomfort allows.
- Try to keep your hips, knees and toes moving fully to prevent stiffness.
- Rest and elevate leg as much as possible.

Phase 2 (Muscle strength and range of movement)

Stage 3: Week 4-7 (Dynamised Vacoped boot 15-30°):

Goals

- You can fully weight bear in the Vacoped boot, using crutches as required for balance.
- The Vacoped boot should be worn at all times, except for hygiene. You should not put weight on your foot out of the boot at any time. If worried, leave boot on and cover with waterproof cover for showering.
- Protect healing tendon tissue.
- Minimise pain and swelling.
- Maintain core, upper limb, hip and knee strength.

Physiotherapy

- You can fully weight bear in boot with crutches as discomfort allows.
- Try to keep your hips, knees and toes moving fully to prevent stiffness.

Stage 4: Week 7-9 (Dynamised Vacoped boot 0-30°):

Goals

- You can fully weight bear in the Vacoped boot, using crutches as required for balance.
- The Vacoped boot should be worn at all times, except for hygiene. You should not put weight on your foot out of the boot at any time. If worried, leave boot on and cover with waterproof cover for showering.
- Protect healing tendon tissue.
- Start physiotherapy.
- Under the supervision of your physiotherapist, you may start active ankle movements through the available range of plantarflexion (toes pointing down) within the limits of the boot settings.
- Minimise pain and swelling.

Physiotherapy

- Under the supervision of your physiotherapist, gently point your toes within the limits set by the Vacoped boot.
- Try to turn your foot in and out within the limits of the boot.
- Your physiotherapist will teach you some gentle strengthening exercises with light Theraband for pointing your toes down (plantarflexion) and turning your foot in and out (inversion and eversion).
- You can **actively** pull your foot up towards you (dorsiflexion) using your muscles until gentle tension is felt in your Achilles tendon (do not pull your foot up towards you past 90º). **Do not force this movement or use anything to passively pull your foot up towards you past a 90° angle.**
- Your physiotherapist will teach you some proprioception / balance work to be completed in your boot.
- You can start some strengthening work for your hip and knee with the boot on e.g. using a static bike. Push with your heels and not your toes.
- Try to keep your hips, knees and toes moving fully to prevent stiffness.
- Swelling control.

Phase 3 (Strength and Control)

Stage 5: Week 9-11

Goals

- The Physio-led Clinic will remove the Vacoped boot and you will change to a flat shoe with single heel raise for 2-4 weeks. The boot can be worn in vulnerable environments, if necessary. Remember to take a shoe to this clinic appointment.
- You may need to restart walking using crutches initially, until you are able to walk without a limp. Avoid hyperextension of the knee (pushing your knee back excessively) to compensate for lack of ankle movement.

- Wean yourself from your crutches as able. Avoid activities which involve extreme flexion of the ankle combined with active plantarflexion (pointing down of toes) i.e. take care on walking up and down stairs.
- Try to achieve full movement at your ankle.
- You can start gentle ankle strengthening exercises.

Physiotherapy

- Try to walk as normally as possible without a limp.
- You can start a gentle calf stretch in standing but do not push this into a strong stretch. Allow your ability to pull your toes up towards you (dorsiflexion) to match the other side to return naturally.
- Continue to practice ankle movements passively and actively, avoiding excessive stretch.
- Continue active resisted theraband exercises; pointing toes down (plantarflexion) through full range i.e. from a right angle position to pushing toes down fully; pulling toes up (dorsiflexion) to a right angle position. Do not push further.
- Continue to practice resisted movements turning your foot in and out (inversion / eversion) as far as is possible.
- You can use an exercise bike to help keep yourself strong (low resistance).
- You can perform seated heel raises i.e. with your knee bent.
- Aim to climbing stairs normally.
- Progress walking to small up slopes and down slopes.
- Swimming and gentle stretches whilst in the water are beneficial. You may be referred for hydrotherapy if your physiotherapist feels that this is necessary.
- Continue with proprioception / balance exercises – double leg out of boot, single leg in boot initially, progressing to out of boot as balance improves.

NB: Your tendon is still very vulnerable and you need to be diligent with activities of daily living and exercises. Any sudden loading of the Achilles tendon (e.g. trip, step up stairs etc.) may result in a re-rupture.

Stage 6: Weeks 11-16 (Wearing good supportive footwear)

Goals

- Aim to be able to have good balance control when wearing normal good supportive footwear
- Continue to progressively strengthen your leg, foot and ankle.
- Aim for normal dorsiflexion range (pulling toes up towards you), no need to push to extreme.

Physiotherapy

- Your physiotherapy will be tailored and monitored by your physiotherapist, dependent on your needs.

Phase 4 (Sport preparation)
Stage 7: Weeks 16-24
Goals

- Aim for ankle strength to near full strength.
- Aim for restoration of a normal walking pattern.
- Aim to be wearing normal shoes. You may initially need a shoe with small heel.
- Continue to be careful on stairs and uneven, rough ground.
- Aim to be able to have good balance control when wearing normal, good supportive footwear.

Physiotherapy

- You can continue to perform stretches for your calf muscles but do not push this beyond neutral (i.e. not on the edge of a step). There should not be a strong stretch felt in your calf.
- Aim for restoration of a normal walking pattern.
- You may start jogging on a trampette, gradually progressing to jogging on flat ground with guidance from your physiotherapist.
- You may progress jogging to running, including change of direction work / cutting, fast acceleration / deceleration with guidance from your physiotherapist as control and strength allows.
- Start to include sports specific rehabilitation type exercises under guidance from your physiotherapist.

NB: Pain after exercise should subside to a normal level by the following morning and there should be no increase in pain on a week to week basis. If the pain persists exercises should be altered to a level that allows the pain to subside to a normal level by the following morning.

Week 24:
Patient contacted via email to complete ATRS scores.

Phase 5 (Return to full function)
Stage 8: Weeks >24
Goals

- Return to full function.
- Return to sport (dependent on sport) as able.

Physiotherapy

- You can start to stretch and exercise your calf beyond neutral (i.e. on edge of step)
- You can complete sports specific exercises including dynamic drills e.g. hopping, skipping.

NB: There is risk of re-rupture if jumping down from a height.

Week 52:
Patient contacted via email to complete ATRS scores.

NB: It is advised that the strengthening programme you have been taught by your physiotherapist should be completed on a regular basis after discharge from physiotherapy.

Post-injury progress

You will be reviewed at regular intervals in the Physio-led Achilles Tendon Clinic at the Royal Berkshire Hospital, where a physiotherapist will assess your progress. The most important component of your recovery is your regular attendance at physiotherapy, where you will be given strict instructions regarding appropriate exercises and the 'dos and don'ts'.

At certain points in your treatment we will be contacting you by email to complete questionnaires to provide us with information about your functional improvement, not only to make sure you are getting better but also to ensure that your treatment has been successful for our own records.

Long term outlook

Generally, the outlook is good. However, the tendon does take time to heal – two months or more and will take several more months to regain strength and flexibility**.**

Work

If you have an office-based job then it may be possible to return to work after two weeks; however, it is more advisable to return after eight weeks when the boot is removed. If you have a more physical job then it may take 12-16 weeks to return to work.

Driving

You should not drive a manual car for at least nine weeks following your injury. After this time you should start to drive gradually. This will be more difficult if your car pedals are stiff to use. It normally takes a few days to feel confident. If you have an automatic car and it is your left Achilles tendon that is affected, you may be able to drive earlier.

Sport

Time to return to sport is between 4-12 months depending on the sport you wish to return to and dependent on your strength and ability to perform the necessary skills to return to your chosen sport.

What are the complications?

- Whichever treatment option is followed, there is a chance that the tendon will not heal fully and further treatment such as surgery may be necessary.
- The tendon may scar or may become shorter during the healing process.
- There is also a chance that the tendon could become torn again later (re-rupture).

Preventing recurrence

- You have been wearing a Vacoped boot to protect your healing ruptured Achilles tendon. During the first six weeks after removal of the boot, there is a risk that the tendon could rupture again. We advise that you avoid sudden stretching of the tendon during this timeframe.

Protecting the tendon

- You can protect the tendon from further injury by wearing shoes with a heel, no less than 2.5 centimetres and both shoes should be of the same height. A lace up shoe may be beneficial as it can be adjusted to any swelling and does not slip around the ankles
- Do:
  - Take care when walking on rough, soft or uneven ground as the ground could suddenly force your ankle upwards.
  - Do make sure your foot is flat on stairs, steps or kerbs with your heel on the step to prevent it jerking backwards / downwards.
  - Wear your shoes every time you get up to walk.
  - Wear your heel raise if you have been given one in all your shoes.
  - Gradually increase stretching exercises, walking and swimming and take great care when barefoot.

Further information sources

An immense amount of information is available on the internet. If you find something that is of interest or controversial and you wish to discuss it, we will be delighted to do so.

Contacting us

Physio-led Achilles Tendon Clinic	0118 322 7553 (10am-5pm, Monday-Friday)
Clinical Admin Team (CAT 5)	0118 322 7415 or email: rbb-tr.cat5@nhs.net
Physiotherapy Outpatient Department	0118 322 7811
Royal Berkshire Hospital	0118 322 5111 (switchboard)

To find out more about our Trust visit www.royalberkshire.nhs.uk

Please ask if you need this information in another language or format.

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