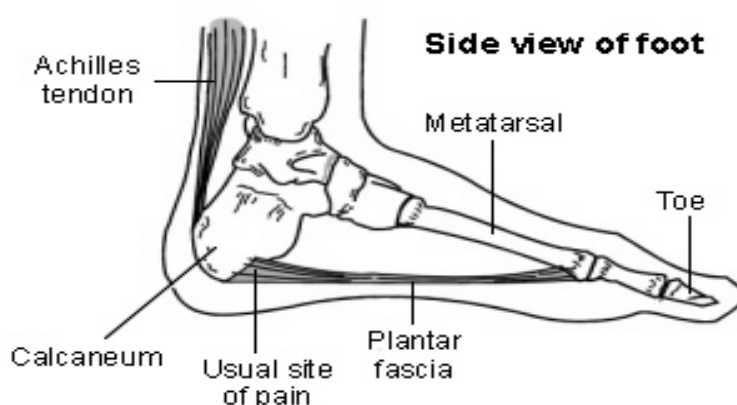


Advice and exercises for patients with plantar fasciitis

Introduction

The plantar fascia is a sheet or broad band of fibrous tissue that runs along the bottom of the foot. This tissue connects the heel to the base of the toes. Under normal circumstances, the plantar fascia supports the arch of the foot and acts as a shock absorbing “bow string” within the arch of the foot. With weight bearing, the foot flattens and the plantar fascia stretches, then springing you forward ready for the next step. While walking, the stresses placed on the foot can be one and a quarter times your body weight (this increases to two and three quarter times your body weight when running). Unsurprisingly then, that heel pain is common. If tension on this “bowstring” becomes too great, irritation or inflammation can occur causing pain.



Plantar fasciitis is a relatively common foot problem affecting up to 10-15% of the population. It can occur at any age. It is sometimes known as “policeman’s heel”. When placed under too much stress due to abnormal loading, the plantar fascia stretches causing micro tearing and degeneration of the tissue. It can lead to pain in the heel, across the sole of the foot and sometimes into the arch area of the foot too. These micro tears repair with scar tissue, which is less flexible than the fascia and can cause the problem to persist for many months. However, approximately 90% of cases are treated successfully with conservative treatment.

What causes plantar fasciitis?

In most people there is no specific cause and it can affect any one. It is most common amongst people over the age of 40 and it can affect both athletic and non athletic people.

Possible causes include:

- Faulty foot mechanics – poor mechanics at the foot, knee and / or hip (e.g. pronated (flat) feet, supinated (high arched) feet or inward pointing knees) causes an abnormal walking pattern and adversely affects the weight distribution on the foot.
- Tight calf muscles and Achilles tendon – does not allow the calcaneus (heel bone) to move freely, putting more stress on the plantar fascia.
- Improper footwear – shoes that are too worn, thin-soled, loose, lack arch support, or lack of shock absorption provide inadequate protection for the foot (eg flip flop type shoes). Frequent use of high-heeled shoes shortens the Achilles tendon which stresses the plantar fascia.
- Physical activity overload – advancing too quickly in your sport or activity can put too much stress on your foot. Occupations that require constantly being on your feet, especially on hard surfaces can also play a part i.e. those that work shifts of eight hours or more.
- Weight – excessive weight, especially sudden weight increases, puts more stress on your foot.
- Other factors – age, family history and conditions such as arthritis and diabetes may play a part.

Symptoms

- Pain usually starts gradually without any injury to the area.
- Pain is often worse on first weight bearing in the morning or after a rest.
- The pain is often a deep, aching sensation but can occasionally feel sharp. This can be anywhere on the underside of the heel and sole. However, commonly, one spot is found as the main source of pain and may be tender to touch. This is often four centimetres forward from the back of your heel.
- It can often ease with activity but can then become more pronounced at the end of the day or after a long period of time spent on your feet.
- The expectation is that the pain will go but may take up to 18 months. In many people it may only last a few weeks. It is impossible to predict how long it will last for each person.

Diagnosis

In the vast majority of people, no investigations are necessary and a diagnosis is made by the doctor talking to you and examining your foot.

Occasionally, if your symptoms have persisted or to rule out other causes of foot pain other tests may be used. These can include X-rays, an ultrasound or MRI scan.

Preventing heel pain

Try to minimise the things that cause the heel pain to start:

- Lose weight.
- Where possible, reduce the amount of time spent on your feet.
- Wear shoes which have some padding or shock absorbing material in the heel. You can buy heel pads in most good chemists and these will reduce the impact of walking.
- Wear shoes that fit well and aren't worn down on the heel or soles.
- Avoid walking bare foot and especially on hard ground. Try to take smaller steps.
- If you are taking part in sports, wear appropriate shoes and warm up (and down) properly before and after exercising.
- If you do regular exercise, try to do low impact activities such as cycling or swimming to allow the tissues to rest.
- If the heel pain is associated with a particular shoe, avoid wearing that pair for a while.

Treatment options

Treatment is aimed at resting the plantar fascia. The problem is you still need to walk and carry out your daily activities. It is worth remembering that plantar fasciitis is a **self-limiting condition**, which means that generally it will resolve on its own. Remember to be patient with some of these treatments as they can take a few weeks before an effect is seen.

Listed below are some of the main treatments for this condition.

- Inflammation and pain management:
 - Anti-inflammatory medications may help. If you are already taking medication prescribed by your doctor for other conditions, please check with a pharmacist prior to taking over the counter medicines (e.g. asthma, stomach ulcers, or if you are taking warfarin).
 - Heat: some people find this beneficial. Heat the sole of your foot first thing in the morning (e.g. rub the sole of your foot or put the plug in the bath whilst you are showering).
 - Cold / ice: some people find cold more helpful. Applying ice wrapped in a damp cloth to your heel for 10-15 minutes once or twice a day and after periods of activity may help to relieve your symptoms. Alternatively, fill a 500l drinks bottle with water and freeze it. Apply the ice by rolling your foot over the bottle with a layer of towel between the bottle and your foot to prevent an ice burn. Do not use if you have any circulatory problems or poor skin sensation.
 - Rolling your foot over a small hard ball e.g. a golf or tennis ball may also help
 - There is some evidence to suggest that acupuncture can be beneficial in the treatment of plantar fasciitis.

- Stretching and strengthening
 - Stretching the Achilles tendon / calf muscles and plantar fascia and strengthening of the intrinsic muscles of the foot can improve foot biomechanics and reduce stress on the foot.
 - At the end of the booklet, we will show you some regular calf and foot stretching exercises and strengthening exercises that should be done regularly every day. In most people this simple regime is enough to help significantly with the pain.

- Taping techniques
 - Certain taping techniques can help the pain experienced on the first few steps of walking. It can be helpful in more short term flare ups.
 - This is something that may be taught to you by a physiotherapist if they feel it would be beneficial.
 - Taping should not be used if you have poor skin sensation or poor skin condition.

- Rest / activity modification:
 - Avoid walking on hard surfaces for long periods of time.
 - Avoid wearing flat, unsupportive shoes.
 - Try and avoid walking bare foot. A shoe or slipper with a small heel will help especially first thing in the morning.

- Support of the arch of the foot
 - Wear comfortable supportive shoes such as trainers and wear insoles.
 - Use insoles and orthotics to correct any foot faults and cushion and cradle the arch of the foot as it heals. AOL or Orthoheel insoles are readily available from various chemists and on line and work well. It is important that you wear these insoles in all your shoes (they are interchangeable between shoes).
 - Your doctor may recommend custom fit orthotics if the cause of your problem is primarily biomechanical.

- Night splints
 - Night splints are an extension of stretching as they both work on the same principles. However, a night splint is worn for longer periods of time, applying a constant stretch to the plantar fascia. These can be bought on the internet.
 - Ideally the splint should be worn all night, but this is often impractical. If they can be worn for periods of 15-30 minutes at a time, several times a day, then this should have similar effect.
 - Night splints can take some getting used to and they do need to be worn for some time before any beneficial benefits are experienced.

In the first instance you should give these first line treatments 6-12 weeks to have an effect. If you are getting improvement, you should continue these treatments until the symptoms have resolved.

If however, these treatments do not give you satisfactory improvement, then other treatment options may be considered:

- Immobilisation

If the pain persists, immobilising the heel might be required. This may be in a plaster cast or a removable boot. This could be for anything up to 6 weeks.

- Steroid injection

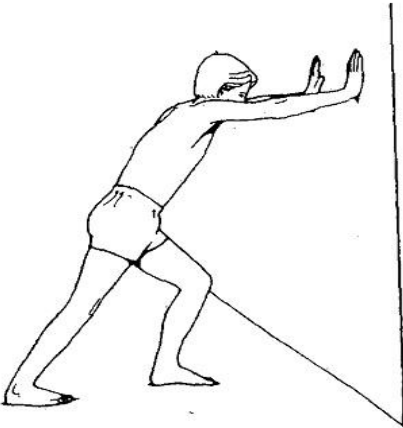
This can bring about dramatic relief to your heel pain. Unfortunately, the benefits can be short lived and there are risks associated with steroid injections. The steroid injection is a powerful anti-inflammatory which reduces the inflammation and can reduce the pain. Numbing the heel before injecting the steroid significantly reduces the pain of injecting the steroid. Side effects include thinning of the fat pad under the heel and rupture/ tear of the fascia which could cause long-lasting effects. For this reason steroid injections are not used as the first line of treatment.

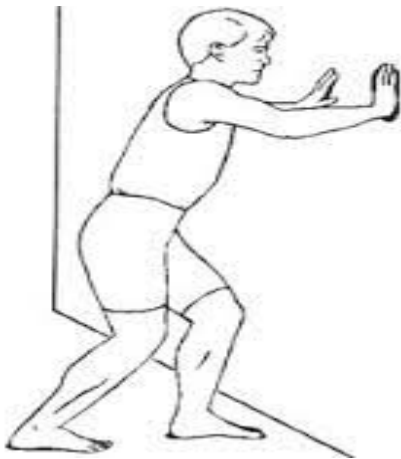
- Surgery

This is rarely needed and the results are not very predictable. There are numerous surgical procedures but the basic aim is to reduce calf muscle tension by partially lengthening the muscle or detaching a portion of the plantar fascia from the heel bone to relieve some of the pressure and pain.

Home exercises

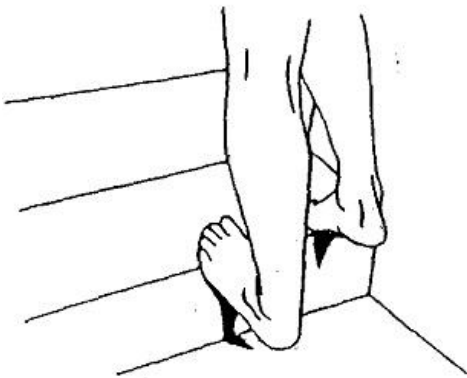
All the stretches and exercises below should be performed 2-3 times a day.

 A line drawing of a person standing with their back to a vertical wall. They are leaning forward with their hands flat against the wall at shoulder height. Their back leg is straight and extended back, with the heel on the ground. The front leg is bent at the knee. This posture stretches the calf muscle of the back leg.	<p><u>Gastrocnemius stretch</u></p> <p>With the affected leg behind you. Stand with both feet facing forwards and heel on the ground. Keep back leg straight and lean into the wall until a stretch is felt in the calf of your back leg. Hold for 30 seconds. Repeat 6 times.</p>
---	--



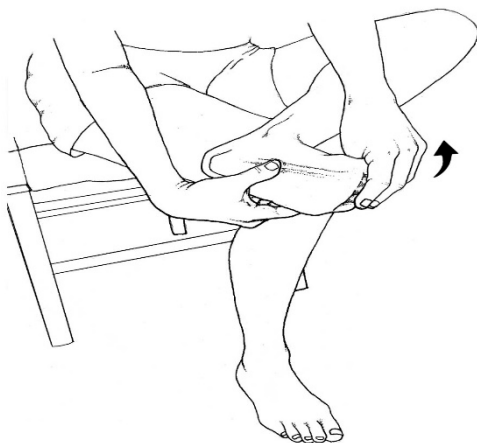
Soleus stretch

With the affected leg behind you.
Stand with both feet facing forwards and heels on the ground.
Bend both knees until you feel a stretch in the lower calf of the back leg.
Hold for 30 seconds.
Repeat 6 times.



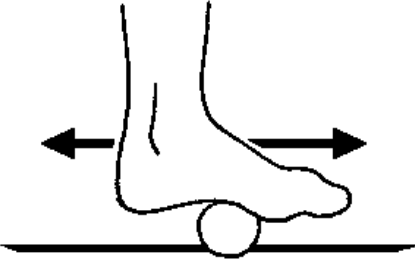

Plantar fascia stretch

Standing with ball of affected foot on edge of step.
Stretch heel down towards floor until a stretch is felt in the calf and arch of the foot.
Hold for 30 seconds.
Repeat 6 times.



Intrinsic muscle stretch

Sitting with affected leg crossed over other leg.
Pull your ankle and toes up towards you until a stretch is felt in the arch of your foot.
Hold for 30 seconds.
Repeat 6 times.
While in this position, you can gently massage along the instep of your foot.

	<p><u>Tennis ball / iced water bottle massage</u></p> <p>While sitting in a chair, roll a small hard ball e.g. a golf ball / tennis ball under your foot for a few minutes.</p> <p><u>Alternatively</u>, fill a 500l drinks bottle with water and freeze it.</p> <p>Place a towel on top of the bottle to prevent an ice burn and gentle roll your bare foot backwards and forwards over the bottle for a few minutes.</p> <p>Use enough force so that you feel a deep massage.</p>
	<p><u>Single toe curl exercise</u></p> <p>With foot resting on a towel, slowly bunch the towel up under your toes.</p> <p>Try to keep your toes flat and make your foot appear shorter.</p> <p>Repeat 10 times.</p>

References

- Cutts, S., Obi, N., Pasapula, C. and Chan, W. (2012) Plantar fasciitis. *Annals of The Royal College of Surgeons of England* **94**(8), 539-542.
- Foye, P.M. (2013) *Physical medicine and rehabilitation for plantar fasciitis*. eMedicineMedscape. www.emedicine.com
- Goff, J.D. and Crawford, R. (2011) Diagnosis and treatment of plantar fasciitis. *American Family Physician* **84**(6), 676-682.
- Thing, J., Maruthappu, M. and Rogers, J. (2012) Diagnosis and management of plantar fasciitis in primary care. *British Journal of General Practice* **62**(601), 443-444.
- Tu, P. and Bytomski, J.R. (2011) Diagnosis of heel pain. *American Family Physician* **84**(8), 909-916.
- Wolgin, M., Cook, C., Graham, C. and Mauldin, D. (1994) Conservative treatment of plantar heel pain: long-term follow-up. *Foot & Ankle International* **15**(3), 97-102.

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.

Further information

Visit the Trust website at www.royalberkshire.nhs.uk

Physiotherapy Outpatient Department
Physiotherapy East
Royal Berkshire NHS Foundation Trust
London Road
Reading, RG1 5AN
T: 0118 322 7811
F: 0118 322 7815
T: 0118 322 5111 (switchboard)

This document can be made available in other languages and formats upon request.

Debbie Burden, Orthopaedic Physiotherapy Specialist
Devendra Mahadevan, Consultant Orthopaedic Foot and Ankle Surgeon
Written: March 2018
Review due: March 2020