

Plantar Fasciitis

Heel and Foot Pain Treatment for Plantar Fasciitis.



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Plantar Fasciitis is a common athletic injury of the foot. While runners are most likely to suffer from Plantar Fasciitis, any athlete whose sport involves intensive use of the feet may be vulnerable. The risk of this injury increases in athletes who have a particularly high arch, or uneven leg length, though improper biomechanics of the athlete's gait and simple overuse tend to be the primary culprits.

What is Plantar Fasciitis?

Plantar fasciitis refers to an inflammation of the plantar fascia, a thick, fibrous band running along the sole of the foot. Such inflammation results from direct injury to the plantar fascia, usually, repeated trauma to the tissue where the fascia attaches to the calcaneus or heel bone. The plantar fascia is critical in maintaining the foot's complex arch system, also playing a role in balance and fine control of certain phases of the athlete's gait.

Injury to the plantar fascia is particularly painful and disabling for runners and can often prove stubbornly resistant to treatment. Rehabilitation is frequently a lengthy and frustrating process. For these reasons, care should be taken where possible to avoid such injury by means of preventative exercises and sensitivity to early warning signs.

Anatomy involved

A non-elastic band of fibrous tissue—the plantar fascia—runs along the bottom or plantar surface of the foot. It attaches to the calcaneus or heel bone, (the largest bone in the foot), fanning out and attaching to the metatarsal bones around the ball of the foot, at the base of the toes. Tension in the plantar fascia acts to maintain the arch of the foot.



Plantar Fasciitis image from [Clinical Guide to Sports Injuries](#)
by Roald Bahr, Sverre Maehlum and Tommy Bolic.

Most commonly, the plantar fascia is injured at its attachment point on the medial tubercle of the calcaneus. During running, the arch of the foot flattens during the pronation phase, allowing the foot to absorb shock as it makes contact with the ground. Repetitive trauma to this tissue can produce micro tears, the signature of plantar fasciitis. Pain usually develops on the calcaneus of the foot.

What causes Plantar Fasciitis?

Plantar fasciitis generally occurs over time, rather than being the result of a single event. Micro trauma from repetitive stress to the tissue often combines with a biomechanical deficiency of the foot to produce the condition. In addition, arthritic and metabolic factors may contribute to the development of this injury, (though they are unlikely to affect young athletes). A variety of training errors commonly lead to plantar fasciitis, particularly a rapid increase in either volume or intensity of athletic activity. Volume refers to the distance or time an athlete performs, while intensity refers to the pace of activity and/or the recovery time allowed following performance.

Training on improper, hard and/or irregular surfaces as well as excessive track work in spiked shoes, or steep hill running, can stress the plantar fascia past its limits of elasticity, leading to injury. Finally, failure in the early season to warm up gradually gives the athlete insufficient time for the structures of the foot to re-acclimate and return to a proper fitness level for intensive exercise. Such unprepared and repeated trauma causes microscopic tearing, which may only be detected once full-blown plantar fasciitis and accompanying pain and debilitation have resulted.

If the level of damage to the plantar fascia is significant, an inflammatory reaction of the heel bone can produce spike-like projections of new bone, known as heel spurs. Indeed, plantar fasciitis has occasionally been referred to as heel spur syndrome, though such spurs are not the cause of the initial pain but are instead a further symptom of the problem. While such spurs are sometimes painless, in other cases they cause pain or disability in the athlete, and surgical intervention to remove them may be required. A dull, intermittent pain in the heel is typical, sometimes progressing to a sharp, sustained discomfort. Commonly, pain is worse in the morning or after sitting, later decreasing as the patient begins walking, though standing or walking for long periods usually brings renewal of the pain.

Certain preconditions favor the development of plantar fasciitis. These include genetic predisposition, excessive rigidity in the feet, overly high arches, (or by contrast, flat feet), and running on the toes or in very soft surfaces such as sand. Finally, improper footwear, particularly with insufficient arch support, is a recipe for injury.

Signs and Symptoms

Plantar fasciitis generally occurs in one foot. Bilateral plantar fasciitis is unusual and tends to be the result of a systemic arthritic condition that is exceptionally rare among athletes. Males suffer from a somewhat greater incidence of plantar fasciitis than females, perhaps as a result of greater weight coupled with greater speed and ground impact, as well as less flexibility in the foot.

Typically, the sufferer of plantar fasciitis experiences pain upon rising after sleep, particularly the first step out of bed. Such pain is tightly localized at the bony landmark on the anterior medial tubercle of the calcaneus. In some cases, pain may prevent the athlete from walking in a normal heel-toe gait, causing an irregular walk as means of compensation. Less common areas of pain include the forefoot, Achilles tendon, or subtalar joint.

After a brief period of walking, the pain usually subsides, but returns again either with vigorous activity or prolonged standing or walking. On the field, an altered gait or abnormal stride pattern, along with pain during running or jumping activities are tell-tale signs of plantar fasciitis and should be given prompt attention. Further indications of the injury include poor dorsiflexion (lifting the forefoot off the ground) due to a shortened gastroc complex, (muscles of the calf). Crouching in a full squat position with the sole of the foot flat on the ground can be used as a test, as pain will preclude it for the athlete suffering from plantar fasciitis, causing an elevation of the heel due to tension in the gastroc complex.

Treatment

Treatment of plantar fasciitis is sometimes a drawn out and frustrating process. A program of rehabilitation should be undertaken with the help of someone qualified and knowledgeable about the affliction. Typically, plantar fasciitis will require at least six weeks and up to six months of conservative care to be fully remedied. Should such efforts not provide relief to the athlete, more aggressive measures including surgery may be considered.

The initial goals of physical therapy should be to increase the passive flexion of the foot and improve flexibility in the foot and ankle, eventually leading to a full return to normal function. Prolonged inactivity in vigorous sports is often the price to be paid for thorough recovery. Half measures can lead to a chronic condition, in some cases severely limiting athletic ability.

As a large amount of time is spent in bed during sleeping hours, it is important to ensure that the sheets at the foot of the bed do not constrict the foot, leading to plantar flexion in which the foot is bent straight out with the toes pointing. This constricts and thereby shortens the gastroc complex, worsening the condition. A heating pad placed under the muscles of the calf for a few minutes prior to rising may help loosen tension, increase circulation in the lower leg and reduce

pain. Also during sleep, a night splint may be used in order to hold the ankle joint in a neutral position. This will aid in the healing of the plantar fascia and ensure that the foot will not become flexed during the night.

Careful attention to footwear is critical. Every effort should be made to wear comfortable shoes with proper arch support, fostering proper foot posture. Should arch supports prove insufficient, an orthotic shoe should be considered. Fortunately, most cases of plantar fasciitis respond well to non-operative treatment.

Recovery times however vary enormously from one athlete to another, depending on age, overall health and physical condition as well as severity of injury. A broad period between 6 weeks and 6 months is usually sufficient for proper healing. Additionally, the mode of treatment must be flexible depending on the details of a particular athlete's injury. Methods that prove successful in one patient, may not improve the injury in another.

Early treatment typically includes the use of anti-inflammatory medication, icing, stretching activities, and heel inserts and splints. Cortisone injections may be necessary to achieve satisfactory healing and retard inflammation. In later stages of the rehabilitation process, typically after the first week, ice should be discontinued and replaced with heat and massage.

It is imperative that any activity known to produce irritation or trauma to the plantar fascia be immediately discontinued, including any activity involving repeated impact of the heel on a hard surface, particularly, running. Should pain associated with the injury persist, additional diagnostic studies should be undertaken to rule out other, more exotic causes of heel pain including stress fractures, nerve compression injuries, or collagen disorders of the skin.

In unusual cases, surgical intervention is necessary for relief of pain. These should only be employed after non-surgical efforts have been used without relief. Generally, such surgical procedures may be completed on an outpatient basis in less than one hour, using local anesthesia or minimal sedation administered by a trained anesthesiologist. In such cases, the surgeon may remove or release the injured and inflamed fascia, after a small incision is made in the heel. A surgical procedure may also be undertaken to remove bone spurs, sometimes as part of the same surgery addressing the damaged tissue. A cast may be used to immobilize the foot following surgery and crutches provided in order to allow greater mobility while keeping weight off the recovering foot during healing. After removal of the cast, several weeks of physical therapy can be used to speed recovery, reduce swelling and restore flexibility.

Prevention

- *Warm up properly:* This means not only stretching prior to a given athletic event, but a gradual rather than sudden increase in volume and intensity over the course of the training season. A frequent cause of plantar fasciitis is a sudden increase of activity without suitable preparation.
- *Avoid activities that cause pain:* Running on steep terrain, excessively hard or soft ground,

etc can cause unnatural biomechanical strain to the foot, resulting in pain. This is generally a sign of stress leading to injury and should be curtailed or discontinued.

- **Shoes, arch support:** Athletic demands placed on the feet, particularly during running events, are extreme. Injury results when supportive structures in the foot have been taxed beyond their recovery capacity. Full support of the feet in well-fitting footwear reduces the likelihood of injury.
- **Rest and rehabilitation:** Probably the most important curative therapy for cases of plantar fasciitis is thorough rest. The injured athlete must be prepared to wait out the necessary healing phase, avoiding temptation to return prematurely to athletic activity.
- **Strengthening exercises:** Below are two simple strength exercises to help condition the muscles, tendons and joints around the foot and ankle.
 1. **Plantar Rolling:** Place a small tin can or tennis ball under the arch of the affected foot. Slowly move the foot back and forth allowing the tin can or tennis ball to roll around under the arch. This activity will help to stretch, strengthen and massage the affected area.
 2. **Toe Walking:** Stand upright in bare feet and rise up onto the toes and front of the foot. Balance in this position and walk forward in slow, small steps. Maintain an upright, balanced posture, staying as high as possible with each step. Complete three sets of the exercise, with a short break in between sets, for a total of 20 meters.
- **Stretching exercises:** Below are two simple stretching exercises to help improve the flexibility of the muscles and tendons around the foot and ankle.



Kneel on one foot and place your body weight over your knee. Keep your heel on the ground and lean forward.



Kneel on one foot with your hands on the ground. Place your body weight over your knee and slowly move your knee forward. Keep your toes on the ground and arching your foot.



The stretches above are just a small sample of the many stretches in The Stretching Handbook. In fact, if you suffer from plantar fasciitis or other foot and ankle problems, there are over 22 different stretches that will help you. Remember...

Stretching is one of the most under-utilized techniques for improving athletic performance, preventing sports injury and properly rehabilitating sprain and strain injury. Don't make the mistake of thinking that something as simple as stretching won't be effective.



For an easy-to-use, quick reference guide of **more than 100 clear photographs of every possible stretch**, for every major muscle group in your body, get a copy of The Stretching Handbook. You'll also learn the benefits of flexibility; the rules for safe stretching; and how to stretch properly. [Click here to learn more about The Stretching Handbook.](#)

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