

[IMAGE]

# Plantar Fasciitis: A Major Pain in the Foot

## What It Is, What Causes It and What You Can Do

By Drs. David Ryan, Thomas Lee and Heather Kight-Isaly

It's really only a matter of time until you experience some type of foot pain, particularly if you are an athlete, and in many cases, plantar fasciitis - inflammation and pain across the bottom of the foot - may be the culprit. Fortunately, there are some simple steps you can take to avoid the pain or relieve it once it occurs. It's time for a lesson in foot anatomy, plantar fasciitis and potential ways to treat this painful condition.

What is plantar fasciitis (PF)? In general, it refers to any foot pain that is associated with the bottom of your feet and involves irritation to any combination of the muscles, tendons, ligaments, but specifically to the area known as the *plantar fascia* - the connective tissue on the bottom of the foot that extends from the calcaneus (heel bone) to the back of the toes. As you might imagine, it's pretty easy to have problems with that area since you're standing, walking and/or running on it all the time. Let's take a closer look at the anatomy of the feet and see how plantar fasciitis (and other common foot conditions) can occur.

### Foot Anatomy 101

*The Bones:* The bones of the foot include the five metatarsal bones, which make up the meat or thickest part of the area, and the phalanges or toes. The first toe is the largest and thickest, and it bears most of the weight and force. For example, when you propel yourself forward, the "big toe" bears most of the weight and provides most of the force to allow this movement to occur. Most of the tendons of the muscles also attach to the first toe. Now stop and think: When you run or walk, the majority of your body weight is on that one toe. Is it any wonder why you might have foot problems?

Plantar Fasciitis - Copyright © Stock Photo / Register Mark The rest of the bones generally provide stability. The bones of the foot are well-protected, but don't respond well to strong pulling or stretching forces, which is why most of the common injuries occur to the toes. The heel bone or calcaneus is the common site for plantar fasciitis. Other more common areas of pain surround the heel bone, but are more toward the toes.

*The Ligaments:* Holding all of these bones together are the ligaments. The most common reason for chronic pain in the foot is related to the ligaments and tendons. When these structures fail, it often leads to bones moving out of their normal position and wearing abnormally on other bones or soft tissue. Early detection of foot problems is a major factor in preventing more complicated conditions later. Simply trying to ignore the pain and hoping it goes away often leads to significant problems.

Tendons and ligaments can be mechanically strained/sprained, often resulting in a disruption to the local blood supply. Once the blood supply is interrupted, it further disrupts normal formation and repair of the collagen fibers in the ligaments and tendons. This weakens the entire area, and a chain reaction occurs: the adjacent fibers begin to take on the additional mechanical stress, and then are also injured. All of this eventually involves micro-tearing, swelling and nerve irritation.

Pain is the obvious result of this progression of mechanical breakdown and loss of blood supply. This cycle can expand progressively to other structures and lead to stress fractures, muscle strain, lymphodema, more pain, etc.

*The Muscles:* The muscles in the bottom of the foot are small, thin and easily injured. The most commonly associated is the flexor digitorum brevis (FDB) muscle. Other muscles are the abductor and adductor hallucis and the abductor digiti minimi. Any or all of these muscles may be involved with the mechanical breakdown of the plantar surface and hence the distribution of pain across the plantar fascia.

## **Treatment Options**

Treatment of plantar fasciitis begins with the correct diagnosis. Depending on the intensity and duration of the condition, a single treatment approach or multiple approaches may be necessary. Many times the failure of PF treatments is directly related to the inappropriate treatment directed at something other than the true root cause of the problem. Here are a few of the possible treatment techniques your doctor may consider:

*Orthotics:* These come in a wide variety of forms. Some are prepackaged and may be successful since they are geared at correcting the common problems; other more specific problems require more specialized orthotics. These may have to be molded or cast, and the cost is usually higher for them. The function of an orthotic, which is inserted into the shoe, is to reduce the physical strain placed on the plantar surface of the foot. While orthotics can help stop the pain cycle associated with PF, they may not increase blood supply sufficiently to allow for complete healing, and other mechanical factors that can lead to the manifestation of

PF may not be addressed by simply using orthotics. As mentioned, a combination treatment approach may be necessary.

*Strassburg sock:* This is a commercial product that is basically a long, soccer-type sock with a long piece of fabric sewn onto the toe. A ringlet is on the top and front of the sock to allow for the fabric to pull the toes upward, thus stretching the bottom of the toes and the bottom of the foot up. There is an orthotic boot that is also used, but it often doesn't provide enough flexion at the toes and heel; thus no stretch is noted. The device is worn while you sleep and often takes several days to allow for progressive shortening of the fabric band. It is patented, but this idea was originally used by soccer players who used to sew the toes of their socks end-to-end and then slip on the one sock and tie the free sock end around the knee.

*"ABC" exercises:* General exercise helps strengthen the foot. Most of us don't exercise the bottom muscles in our feet and just run on them and pound them with countless hours of cardio. Simply sit down and prop up your lower leg on a foot stool. Using your big toe as the lead, begin by making the letter "A" in the air as large as you can without moving the rest of your leg. Continue until you have made all the letters in the alphabet. Time yourself and progressively challenge yourself by completing the alphabet three times in less time, but with the same amount of foot movement.

*Foot grip strength:* Begin by placing a towel on a smooth, flat surface, like a hardwood floor. Place your heel on the towel and make sure your toes are free to move. Use your toes to grip the towel and pull it toward your heel. Once you have bound up the towel, reverse the direction and push the towel away from your heel. If you have a carpeted floor, you can work the foot by picking up a towel or some tissue paper with your foot, then dropping it and repeating the exercise. These exercises are all designed to work the muscles in the bottom of your foot and promote improved blood supply and muscle tone.

*Running/walking grip:* This is a simple concept that involves learning to gently grip the ground with your feet as you run or walk. The proper amount of tension is equal to that of a steady handshake; variations will help keep your foot from cramping. This helps promote plantar muscle tone and is a must for anyone with flat feet.

*Hamstring stretches:* Very commonly the rear of the legs are stretched by bending forward and touching the toes. If you are over age 65 or get dizzy, then elevate the foot to about knee height with the leg straight and then bend forward and hold for 10, 15, and then 30 seconds. Several studies have shown that tight hamstrings result in back pain and also PF.

*Chiropractic and other techniques:* Other factors that have been proven to work with PF include chiropractic manipulation to the joints of the foot to provide mobility; massage and/or rolling sticks to the muscles to provide skeletal muscle flexibility, and cortisone injections to help break the pain/spasm cycle and reduce persistent inflammation.

Remember, when it comes to your feet, proper diagnosis is critical in obtaining the correct treatment. If you're suffering from foot pain and/or suspect plantar fasciitis, it's vital to consult with your doctor to get an accurate diagnosis and treatment plan. It's also important to talk to your doctor about a different strategy if you don't seem to be improving after a few weeks of any given treatment.

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### **Common Causes of Plantar Fasciitis**

- Large body mass
  - Bad arch support or weak feet
  - Direct trauma to the foot
  - Hyperflexion, hyperextension, hypersupination, hyperpronation; alone or in combination
  - Foot fractures
  - Standing too long
  - Running, walking or standing on improper or old shoes
  - Tight hamstrings
  - Sleeping with the toes in a pointed position
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