



Plantar Fasciitis - "Heel Pain"

This handout explains the physiology, interventions, and self-care at home:

What is the plantar fascia: Your foot has a thick, non-stretchable fibrous band just inside the skin on the sole of your foot. That is the plantar fascia. It is not attached to the skin, but rather attached at the beginning of your toes and going all the way back to the calcaneous bone (heel) for the other attachment site. Its purpose is to make the sole of your foot thicker and making it more difficult for foreign objects to penetrate the sole.

Fasciitis means that there is inflammation in the plantar fascia. It occurs mostly at the attachment site by the heel as this smaller area is more concentrated.

The cause of plantar fasciitis: First we need to look at what causes the inflammation. As explained in the handout, "The structure of your foot," in a "normal" gait-cycle, the **subtalar joint**, between the calcaneous (heel) bone and the above talus bone, causes the inner longitudinal arch of your foot to turn downward appropriately when your foot pronates (one of the three motions of pronation.) This is in the beginning of the gait-cycle when the heel strikes the ground.

*If there is a lot of stress or other problems to the subtalar joint, your longitudinal arch may turn downward too much, causing "over-pronation" and a flattened arch in the beginning of the gait-cycle. This makes it impossible for the foot to have the other side turn downward when it tries to "supinate" in the final phase of the gait cycle. Normally, the relaxed ligaments caused by the pronation of the foot become rigid with the supination of the foot. But, when the foot is over-pronated, the ligaments stay relaxed and the arch remains flat throughout the gait cycle. **The foot will get longer, pulling on the non-stretchable plantar fascia by the heel, causing inflammation; sometimes tears; and always heel pain when you first get up or throughout the day.***

People who hike, run, walk, or stand a lot are more likely to create an unstable sub-talar joint and get plantar fasciitis. Extra body weight can contribute.

Changes to your heel bone: In an attempt to make the plantar fascia longer to equal the longer flattened foot and eliminate the pulling, tearing, and inflammation of the plantar fascia, your foot may grow a heel spur where the plantar fascia is attached to your heel bone. The inflammation may or may not go away; however, the potential problems from the over-pronated foot remain. See page 2 under "Surgical Remedies."

The associated heel pain can be caused by:

The Inflammation of the plantar fascia by the heel that causes swelling when the foot is at rest. When you place the heel on the ground, the pressure around the heel intensifies. Sometimes, the pressure pushes the extra fluid away, and the pain is relieved. Other times, the inflammation is so severe that the pain continues as long as the person is weight-bearing. **The heel spur** may also cause additional pain when weight-bearing. Sometimes the heel spur is reabsorbed by the body after the over-pronation is resolved.



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Surgical remedies for controlling the heel-pain of plantar fasciitis include:

- Release of the plantar fascia, with or without surgical removal of the heel-spur.

Such surgeries **do not address the other problems that an over-pronated flattened foot may cause over time**, such as abnormal structural changes in the unstable foot like bunions and hammer-toes; as well as pain in the ankle, knee, hip, and lower back joints from an unstable subtalar joint and the heel turning inward when weight-bearing.

Remedies to reduce the swelling and stabilize the foot are better choices:

- Ice compression around and under your heel, such as a frozen bag of peas, to reduce the swelling. Limit the time to avoid damage to your skin.
- NSAIDS to reduce the swelling.
- Steroid injections to reduce the swelling.
- Stretching exercises to reduce tension in the foot and calf. You can do **an online search for "plantar fasciitis stretching exercises."** You will find explanations, as well as videos that show how these exercises are done. Such exercises would be beneficial; especially if they help stabilize the subtalar joint.
- Low-dye taping to temporarily bring up the arch and eliminate the over-pronation. You can do **an online search for "low-dye taping for plantar fasciitis."** You will find explanations, as well as videos that show how this is done. This taping of the foot in a dangling, neutral position is often used prior to getting an orthotic.
- It can be very difficult to find a **shoe** with an insole that corrects the pronated foot and flattened arch; however, if you find one, by all means use it.
- For the surest solution, you can get an **orthotic** that fits your own arch when your foot is in a neutral, dangling position to be able to correct the over-pronation.
 - **Custom-made orthotics, hand-crafted from a plaster-cast of your foot in a neutral, dangling position** are the surest way to prevent your foot from over-pronating when weight-bearing and the surest way to correct plantar fasciitis.
- **Be aware that the heel pain will not go away instantaneously after you start using the correct orthotic.** The extra length of the foot will be reduced to its normal length; the flattened arch will be changed back to a "normal" arch; the pulling of the plantar fascia will stop; and the inflammation will then go away.

See the handouts on **The Structure of Your Feet,*
**Insoles, Orthotics, and Custom-made Orthotics, and *Shoes & Shoe Modifications.*