

# Help for Heel Pain:

## The Facts About Plantar Fasciitis, Part 1

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Photos by author  
Illustrations by Sole Supports, Inc.

“When I wake up in the morning and get out of bed I can’t walk. The pain in my heel hurts badly. After a few steps the pain starts to ease and eventually decreases as the day goes on. And if I sit for any length of time and get up, it starts over again.”

I am a competitive agility enthusiast as well as a practicing podiatric physician. I have seen and treated many agility handlers both locally, nationally, and internationally. Since heel pain seems to be one of our most common physical complaints, here I’ll share my experiences regarding the causes and treatments of this ailment.

I mention heel pain instead of plantar fasciitis (pronounced *plan-ter fash-ee-ye-tus*) because not all heel pain is plantar fasciitis. Most handlers who have heel pain self-diagnose with the help of the Internet or a doctor and/or friends who have suffered heel pain. Almost always, whether or not it is correct, the diagnosis is plantar fasciitis. Then we educate ourselves about what to do to treat plantar fasciitis.

If we do the correct self-treatments and the problem is plantar fasciitis, the condition improves, and we are back to running our dogs with no heel pain. If the treatment fails, however, our condition gets worse, our frustrations grow, and our quality time with our dogs diminishes. This is usually because plantar fasciitis is the wrong diagnosis, or the way we are treating it is wrong.

First we’ll discuss what plantar fasciitis is and how it occurs. Then we will begin our discussion on treatment by covering how to stretch correctly for plantar fasciitis. I have found stretching to be the single most important treatment for plantar fasciitis.

### What Is Plantar Fasciitis?

Have you ever eaten spare ribs and pulled the meat off the bone? Did you notice that thin membrane that seems to rip off the bone? This membrane (periosteum) is wrapped around all of our bones including the heel bone. As the Achilles tendon comes down the back of the leg, it grabs onto the heel bone (calcaneus) and makes a turn underneath the heel extending out to the toes. As it wraps

around the heel, it attaches to the membrane around the heel bone. The Achilles tendon is now renamed the plantar fascia since it is now connecting bone to bone rather than muscle to bone. If for some reason, the pull at the attachment of the plantar fascia to the heel bone is too great, it rips the membrane away from the bone and we have just created plantar fasciitis, or an inflammation of the membrane (periosteum). See **Figure 1**.



So what causes the membrane to rip from the bone, and why is it so prevalent with agility handlers? To answer this, we first have to understand the mechanics of the foot and then the mechanics of the foot during our sport. There are volumes of technical information on the Internet discussing plantar fasciitis from a biomechanical/medical point of view, and if interested, spend some time doing your research. (Caution: Remember there are no editors on the Internet). For our purposes, here is a simplified overview.

During locomotion (movement of the body), the foot goes through a locking and unlocking mechanism. This is known as pronation (unlocking) and supination (locking). The term pronation means the movement of the arch is collapsing. The term pronated is the position of the foot with the arch collapsed. The term supination means the movement of the arch is rising. The term supinated is the position of the foot with a high arch. See **Figure 2**.



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When the foot is pronating, the bones of the foot unlock for the purpose of creating shock absorption, keeping our balance, and allowing our foot to adapt to uneven terrain. When the foot is supinated, the bones of the foot lock and the foot becomes rigid to work as a lever arm to lift our body off the ground during propulsion.

When the arch collapses, the foot pronates, and there is an increased stretch of the plantar fascia. Ideally, this occurs when the foot first hits the ground. At this time the weight-bearing leg is rotating internally. Then as you move forward, the opposite leg swings through the air and the weight-bearing leg starts to externally rotate, raising the arch to create supination (the arch gets higher). There is a decreased stretch on the plantar fascia during supination and the foot functions as a rigid lever arm to propel us forward. See **Figure 3**.

Plantar fasciitis develops when the foot is still pronated as we propel ourselves forward. Many people fail to regain their arch when they propel themselves forward. So the plantar fascia gets strained as it tries to compensate for the lack of foot rigidity that comes with a flattened arch.

Simply put, do you want a strong foot that rolls forward easily like a wheel, or a weak foot that squashes flat and overstrains the plantar fascia and the other foot ligaments? Strong healthy feet do not develop plantar fasciitis.

If you understood the last five paragraphs, congratulations. The key things to understand are that when the foot overpronates, the arch collapses and the plantar fascia pulls on the heel bone. When the foot supinates, the arch raises and the pull of the plantar fascia on the heel bone is decreased as seen in **Figure 3**.



## How Does Agility Increase Your Vulnerability to Plantar Fasciitis?

So let's look at our locomotion as handlers while we run our dog in agility. To the sports medicine specialist, our sport engages in quick acceleration and deceleration, and quick turns.

Let's look at quick acceleration and deceleration first. Acceleration involves weight-bearing mostly on our forefoot. If our arches are too flat, we accelerate inefficiently and with greater strain on the plantar fascia, especially at the attachment of the plantar fascia to the heel bone, which helps to create plantar fasciitis. We're safer during the deceleration phase since it involves relatively more force on the midfoot and heel, rather than the forefoot.

Now, look at quick turns. Front crosses, rear crosses, blind crosses, sharp turns, and so on all involve rotational movement. Usually we achieve these movements while we are on our forefoot and toes. While turning, one foot rapidly pronates and one foot supinates. With these quick turns, our body leans or banks, which also increases the pronation and supination of each foot. The rapid excessive pronation during quick turns will also create excessive pull on the plantar fascia, helping to create plantar fasciitis. See **Figure 4**.

## Variables that Increase Your Vulnerability to Plantar Fasciitis

So you can see that a sport with quick acceleration/deceleration and quick turns can make you vulnerable to plantar fasciitis. However, if this by itself was the sole cause of plantar fasciitis, dog agility would be a sport where 100% of us would have the condition. So we must look at additional variables that can create excessive pronation and arch flattening. Some



are structural variations: shapes of bones of the foot, leg, pelvis, back, and the rest of the body skeleton. Some are functional variations: muscles, tendons, ligaments, and soft tissues of the body. Either we were born with these variables or we created them through habits or injury.

Determining what structural and/or functional variations are occurring sets a road map for how plantar fasciitis should be treated. The key to successful treatment of plantar fasciitis is being able to identify which variations are the cause.

Over the years, I have observed that the single most functional variation causing plantar fasciitis is a tight calf muscle. The most common treatment for a tight calf muscle is stretching correctly.

### Why Is Stretching the Calf Muscles Important?

Before explaining proper stretching for plantar fasciitis, I'll explain why it is important to stretch the calf muscles to prevent or to treat plantar fasciitis. Going back to our earlier discussion on how the

foot functions, we also need to look at how the body moves during locomotion.

When the foot hits the ground, the heel strikes first and then the forefoot rapidly moves downward toward the ground. As this occurs, the ankle movement is called plantar flexion (similar to pointing your toes). As our body moves forward over the foot, the ankle joint works as a hinge to allow the body to move over the foot. This ankle movement is called dorsiflexion and is similar to lifting your toes. See **Figure 5**.

For the body to have forward motion, the body must fall over the foot allowing the weight of the body to move in a forward direction. With a tight calf muscle, this motion is restricted, and the foot and body must compensate. The body has the potential to compensate in many ways. The most common includes lifting the foot up early and bending the toes, hyperextending the knee and bending at the knee, and hyperextending at the low back by increasing the curvature of the spine.



### IF YOU HAVE A NIGHT SPLINT

For those of you who have a night splint to help with your plantar fasciitis, if used while you sleep, the splint will only decrease the symptom of the plantar fasciitis when you first wake up in the morning. You can also use a night splint to stretch your calf muscle, which may help heal your plantar fasciitis. Put the night splint on, and suspend your foot on a surface such as a table. If you have an adjustable strap, tighten the inside strap tighter than the outside strap, which will put your foot in a supinated position. For 10 minutes, sit with your leg elevated so there is no support under the thigh and your knee is straight. Do this in the evening and watch how fast your calf muscles stretch.



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The single most common way to compensate, however, is to overpronate the foot. This causes the foot to unlock, flatten the arch, and function as a virtual ankle joint. When this occurs there is a significant increase of tension on the plantar fascia, and if this occurs repetitively you can develop plantar fasciitis.

### Proper Stretching to Prevent or Treat Plantar Fasciitis

If you read the literature on how to treat plantar fasciitis, you will read over and over again that stretching the calf muscle is the most effective treatment. However, I have seen many handlers stretch their calf muscles incorrectly, actually creating plantar fasciitis or making it a long-term condition.

When you have plantar fasciitis and stretch your calf muscle while your foot is in a pronated position, your plantar fasciitis will likely become worse and prolong the problem. Simply put, to do your stretching correctly, your foot *must* be supinated to lock the bones of your foot to decrease the stretch on your plantar fascia while you are stretching your calf muscles.

I have found that the most effective way to stretch your calf muscles is as follows:

- **To stretch the upper calves (gastrocnemius muscles):** To do these stretches properly you must face a fence, wall, or something you can lean on with your upper body. Stand a little bit away from the support and rest your forearms on it with your forehead on the back of your hands. Now, bend one knee and bring that knee forward toward the wall or support you are using. Keep your other leg straight with the heel down as you move your hips toward the wall, keeping your toes pointed straight ahead and your knee lined up over the center of your foot (you may have to lift the arch, rotating the leg outward). See [Figure 6a](#).

- **To stretch the lower calves (soleus muscles):** Using the basic position described above, move both feet forward approximately 6" and bend the back knee slightly, keeping the foot flat and pointing straight ahead, and keeping the knee directly over the foot. This gives you a much lower stretch, which is also good for maintaining or regaining ankle flexibility. See [Figure 6b](#).

While stretching, it is important to remember that muscles must be relaxed. Standing on a curb, or stairs, and letting your heel hang off to stretch your calf muscle will only tighten the muscle and stretch the plantar fascia. This will help to cause/aggravate plantar fasciitis. You cannot relax your calf muscle while hanging off a curb or stair.

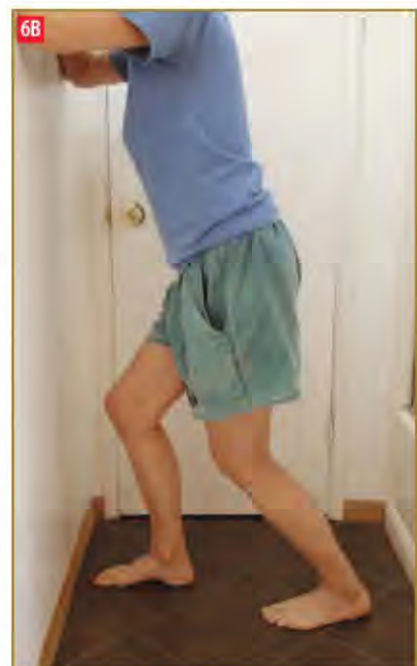
Studies have shown that for a muscle to both stretch and lengthen, the muscle must be warmed up to about 101°. For this reason, it is best to stretch in the late afternoon or evening when your core temperature has increased. It is also effective to stretch after you have exercised.

Again, the most important thing to remember and understand from this article is to stretch correctly; that is, make sure your foot is in a supinated position while doing your stretch to prevent additional strain to your plantar fascia.

### Next Month

In the second part of this article, we'll discuss shoe gear, orthotics, medications, and other causes of heel pain that are often mistaken for plantar fasciitis. The first two topics, shoe gear and orthotics (along with stretching), pertain to treating the cause of plantar fasciitis. The next topic, medications, pertains only to treating the symptoms of plantar fasciitis. 🐾

*Author's Note: I would like to give special thanks to my friend Don Bursch, PT for reviewing, editing, and illustrating this article to help it make sense, since this topic is very complex.*



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