

# Treatment of Plantar Fasciosis

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Plantar fasciosis is an extremely painful disorder of the foot affecting 10% of the population at some point in their lives (DeMaio, 1993). To date, most treatment among naturopathic physicians and other healthcare providers is focused on reduction of inflammation and pain, but little is done to actually address the cause and ultimately cure this problem.

## Plantar Fasciosis vs. Plantar Fasciitis

Note the use of the term "plantar fasciosis" instead of "plantar fasciitis." This change in terms came about due to a study by Harvey Lemont, DPM. In his study, biopsies were taken of the plantar fascial ligament in patients with severe plantar fasciitis. The result was not the finding of inflammatory tissue, but of necrotic tissue. Lemont concluded that plantar fasciitis is not an inflammatory process but a degenerative process characterized by microtears and necrosis of the plantar fascial ligament and intrinsic flexor muscles of the foot at their attachments on the calcaneus. Hence, this disorder is better termed plantar fasciosis (2003). This also provides cause to question the logic of using therapies aimed solely at reducing inflammation and accounts for the questionable effectiveness of these

treatments (Atkins, 1999; Buchbinder, 2004; Lemont, 2003).

## Causes of Plantar Fasciosis

One possible cause of necrosis and pain in the plantar fascial ligament is decreased blood supply to the area due to entrapment of the posterior tibial artery by the flexor retinaculum. When the first toe is held in an adducted and extended position, the abductor hallucis pulls on the flexor retinaculum and can restrict blood flow through the artery. As blood supply is decreased to the sole of the foot, tissue in the foot begins to degenerate, with the fastest degeneration occurring in the tissue sustaining the most trauma. Athletes and people who stand for long periods of time on hard surfaces are most prone to plantar fasciosis. They also sustain the most trauma to the sole of the foot.

Most Americans spend the bulk of their lives with their great toe in an adducted and extended position. Three features that are almost ubiquitous in modern footwear are responsible for this unnatural position: heels, toe spring and tapered toe box.

Most people know that a heeled shoe is not good for the feet or posture, yet almost every modern shoe (including athletic shoes) has at least a 2:1 heel-to-forefoot ratio. Among other problems, this causes the toes to be held in an extended position.

The extended position of the toes is exacerbated by toe spring. Place almost any



Notice the toe spring and heel typical of most shoes, including this running shoe. Photos/Glenn Ingram



The shoe on the left has the typical tapered toe box compared to the more anatomically shaped toe box of the shoe on the right.



The toe extensor stretch being performed.

shoe on a flat surface and it can be seen that the sole of the shoe curves up in the front. This places the ends of the toes as much as two inches above the ball of the foot.

The first two features lead to extension of the toes; the third feature, tapered toe box, leads to adduction of the first and fifth toes. The best way to assess the position of the toes in a particular shoe is to pull the liner out of the shoe and stand on it. Any part of the foot that is coming off of the liner

is being forced to fit that liner when wearing the shoe. There will likely be calluses, corns, blisters or erythematous skin where the foot falls off of the liner due to excess pressure against the side of the shoe.

To gain an appreciation for the position in which a foot is held in modern footwear, simply push the toes together, raise the heel and pull the toes into extension. This position will greatly increase tension in the flexor muscles on the bottom of the

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foot as well as the plantar fascial ligament. When a person functions in this position by running or walking, he or she constantly traumatizes these structures. The tension on the flexor retinaculum can be seen and felt on the medial side of the heel by moving the first toe from neutral position to the adducted and extended position of modern footwear.

When humans are born, the toes are the widest part of the foot. Feet of American adults are widest at the ball of the foot; this is the shape of American footwear, not the shape of a human foot. In cultures where people spend the majority of their lives barefoot or in sandals, adults' toes are splayed out wide and the muscles on the bottom of the foot are strong. This is the shape of the healthiest feet in the world. Note that the fastest endurance runners in the world, who hail from parts of Africa and Latin America, display these wide, healthy feet. The incidence of injuries related to running and plantar fasciosis are extremely rare in cultures that remain barefoot most of the time (Robbins, 1987).

### Treatment Appropriate Shoes

The most important treatment for plantar fasciosis is getting the patient into a shoe that allows his or her foot to be in its natural position: heel flat and level with the forefoot, toes down against the support surface level with the ball of the foot and toes spread out. Such a shoe is flat, wide at the toe box and has no toe spring. We also recommend shoes that are flexible throughout the entire sole. Unfortunately, such a shoe is difficult to find, especially in professional/dress shoes and, ironically, athletic shoes. As of late, many companies have been coming out with shoes that are closer to the shape of a human foot, but most still have at least one problem feature. For this reason, we often modify shoes by stretching the uppers, stretching out toe spring, pulling the liners out of shoes to provide more room inside, and even cutting the shoe at points to make the upper more flexible. We sometimes cut off heels of shoes to make them flatter.

### Additional Treatment

Allowing the foot to be in its proper position is enough to cure some patients, but others will relate that their pain is worse when barefoot. These patients have a foot that has been deconditioned by footwear to the extent that they can no longer get their foot into its natural state.

They usually have hammertoes, bunions and weak intrinsic foot flexors. Along with getting these patients into better footwear, a program to rehab their foot must be instituted. Such a rehab program is designed to stretch tight muscles and strengthen weak ones. Two stretches and two exercises are typically necessary to begin balancing the muscles of the foot.

The first stretch is the toe extensor stretch. It stretches the toes into plantar flexion at the metatarsal phalangeal (MTP) joints. It is most easily performed when sitting in a chair or stool. From this seated position, extend one leg back behind the body and place the dorsal surface of the toes on the floor. This should bend the toes at the MTP joint. Then, plantar flex the foot fully by pressing the heel down toward the floor. The stretch should be felt across the dorsum of the foot and anterior lower leg. As these muscles become more flexible, bring the foot forward relative to the body to provide a better stretch. It is possible to stretch both feet at the same time in this way. I usually tell patients to have a stretch with their meals. Hopefully this will not only stretch their extensor muscles, but also force patients to sit down for meals. The exercise that goes along with this stretch is simply walking and functioning in a flexible shoe as often as possible. Flexibility in a shoe allows the joints of the foot to bend during activity and the muscles of the foot to engage, especially the intrinsic flexors. After walking in a flexible shoe, many patients relate that their arches feel "tired" or "sore" – a sign that those muscles have to work.

A more advanced exercise specifically targeting the intrinsic flexor muscles is one that we typically do not introduce to patients until they have gained flexibility in their MTP joints. To perform the exercise, use a small ball, such as a "hacky sack," or a rolled towel. Place the ball on the floor and grasp it using the toes, always keeping the heel firmly planted on the floor. This stretch/exercise set will reduce hammertoes, decrease tension on the plantar fascial ligament and increase the strength of the arch.

The other set of stretches and exercises we typically recommend are designed to move the first toe into a more abducted position. The stretch involves pulling the first toe into abduction while applying counterpressure to the medial first MTP joint. The exercise that goes with this is spreading the toes using the intrinsic foot muscles. This is difficult for many people, but the more it is practiced, the stronger

the abductor hallucis will become and the neural connections can be regained. It is often helpful to abduct the thumb at the same time as attempting to abduct the first toe. These stretches and exercises are helpful to reduce bunions, improve the medial longitudinal arch strength and improve blood flow through the flexor retinaculum and, therefore, to the sole of the foot.

Another method used to rehab the foot is splinting the toes and placing pads while the patient is wearing an appropriate shoe. A metatarsal pad is helpful for pulling the toes out of the extended position into neutral position. It gives the intrinsic flexor muscles of the foot a needed advantage, as they have been at a disadvantage for so long while in shoes with toe spring and heels. We place a simple adhesive felt pad inside the shoe.

Another useful tool is a toe spacer (also called a toe wedge or bunion splint). This can be worn when walking with no shoes as well as in a shoe with room in the toe box. Do not use toe spacers in a shoe that does not have enough room in the toe box. This can be checked by having the patient stand on the shoe liners with the toe spacers in place between the toes. Wearing a toe spacer while active has the advantage of not only applying a mild stretch to the adductor hallucis, but also allowing the abductor hallucis and flexor hallucis longus to function from normal anatomical position, giving those muscles an advantage that is missing when the first toe is held in adduction by tapered shoes. This helps strengthen the abductor hallucis, and also allows the flexor hallucis longus to support the medial longitudinal arch.

After the cause (modern footwear) has been addressed and a program to correct the muscle imbalances in the foot has been put in place, most patients will recover on their own. Of course, many patients will require further treatment to reduce any pain and secondary inflammation that can develop, but unless the cause is addressed, they will continue to be plagued by this painful and debilitating disorder. ▀



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