What A Pain!

A Guide to Treating Heel Pain

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Introduction

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Dr. Trevor Haynes is a board-certified foot and ankle surgeon. Dr. Haynes practices with Elite Foot & Ankle Associates, LLC in Sandy and Portland, OR. Dr. Haynes attended Weber State University in Ogden, UT. He graduated with a B.S. in Microbiology in 2006. Dr. Haynes then attended the University of Louisville where he worked in research until beginning podiatry school at The Ohio College of Podiatric Medicine (now known as the Kent State University College of Podiatric Medicine). He graduated with his doctor of podiatric medicine in 2012. Dr. Haynes then attended his surgical reconstructive foot and ankle residency in Houston, TX under the renowned Dr. Samuel Mendicino. Dr. Haynes performed over a thousand procedures during his time in Houston working under podiatrists, orthopedists, plastic surgeons, general surgeons and even cardiovascular surgeons. In 2015, Dr. Haynes moved his family to South Dakota where he practiced for nearly three years for Avera Medical Group. After his time in South Dakota, Dr. Haynes relocated to Portland, Oregon in 2018 where he founded and is the managing partner of Elite Foot & Ankle Associates, LLC. Dr. Haynes is board-certified by the American College of Foot and Ankle Orthopedics and Medicine. He is board-qualified by the American Board of Foot and Ankle Surgery. He is a Diplomate of the American Board of Podiatric Medicine, a member of the American Podiatric Medical Association, Oregon Podiatric Medical Association, American College of Foot and Ankle Surgeons, American College of Podiatric Sports Medicine, and the International Academy for Dance Medicine and Science.
What are the Causes of Heel Pain?

Plantar heel pain is very common and is estimated to affect over 2 million Americans each year. 10% of the population will at some point have some sort of heel pain during their lifetime. The most common form of heel pain is plantar fasciitis. 11-15% of all foot ailments requiring medical attention is attributed to plantar fasciitis. Other causes of heel pain that can affect the plantar fascia are, rheumatoid arthritis, seronegative spondyloarthropathy, systemic lupus erythematosus, gouty arthritis, psoriatic arthritis. Heel pain that causes pain in the bone can be attributed to stress fracture of the calcaneus (heel bone), bone infection, and bone tumor. Finally, fat pad atrophy, circulation, and neuropathies can cause heel pain. For this booklet we will be focusing on the more common causes like plantar fasciitis, Achilles tendon insertional tendinopathy and nerve entrapments.

Anatomy

Understanding the anatomy is important to fully understand what is going on in the heel when having pain. Let’s start by working our way from the skin to deep down to the bone. Just deep to the skin on the bottom of the foot you have what’s called the plantar fat pad. The plantar fat pad is very important and specialized structure. The fat is composed of adipose tissue or fat that is highly organized with many fibrous septa. These septa are bands that attach to the skin, bone, and each other to keep the structure and integrity of the fat pad. The fat pad has been shown to begin deteriorating as early as 40. This is important as the fat pad’s job is to absorb impact and when walking or running. Just deep to the plantar fat pad we have the plantar fascia. The plantar fascia is thick, strong, and fibrous. It is composed of three bands that originate from the plantar aspect of the calcaneus or heel bone and insert into the bases of the toes or proximal phalanges. The three bands are the medial, central and lateral band. The lateral band however, does not extend to the toes but rather inserts in to the base of the 5th metatarsal. The central band is by far the thickest and strongest of the three bands. The band can be felt in the arch by pulling your big toe upwards, this tensions the plantar fascia and elevates the arch. Next, we have our nerves, arteries and veins. In regards to heel pain, we will focus on the nerves. Along the inside of your ankle you can feel your medial malleolus or ankle bone, just behind (towards the Achilles tendon) it lies you posterior tibial nerve. The posterior tibial nerve splits into three branches just before it dives down under the foot. These branches are called the medical calcaneal nerve, medial plantar nerve, and lateral plantar nerve. The medial calcaneal nerve runs closest to the back of the heel. It is a sensory nerve that innervates the inside and bottom of the heel. Of the other two nerves the lateral plantar nerve seems to play more of a roll in plantar heel pain. The first branch of the lateral plantar nerve has been noted to be a source of plantar heel pain. This nerve can become entrapped as it passes deep to the fascia of what is known as the abductor hallucis muscle. (See Figures 1 and 2)
Plantar Fasciitis

Plantar Fasciitis is a degeneration of the plantar fascial band. It can be caused by trauma, overuse (repetitive trauma) leading to micro-tears in the fascia. Plantar fasciitis is characterized by signs of inflammation, such as pain, swelling, and if painful enough loss of function. Some recent studies have demonstrated that plantar fasciitis may be non-inflammatory, a degenerative process which may be more appropriately called plantar fasciosis. For our purposes the etiology is multifactorial, age, weight, foot type, and tight musculature all play a roll in the development of plantar fasciitis. In my practice I typically tell patients that those that are very active, work on their feet all day, or those that are couch to marathon performers are the most as risk, however, any one with the above mentioned problems are all at risk of the developing plantar fasciitis. It is estimated that plantar fasciitis accounts for 25% of all running injuries. Now let’s talk about the elephant in the room, the heel spur. Those of us that have ever had heel pain have likely at some point been told it was probably heel spurs. The Association of Orthopedic Foot and Ankle Surgeons have shown that less than 5% of all heel spurs are actually painful. This means that it is unlikely that the heel spur is causing your pain. I usually go by a clinical diagnosis of if you have a really large spur or if you have plantar fat pad atrophy then maybe we could state the spur
as a culprit of the pain. But if you have a small heel spur and your 30 years old, I am less inclined to blame the spur as a source of pain. The symptoms of plantar fasciitis are typically pain along the bottom and inside of the heel. (See Figure 3) Pain is typically worse in the A.M. and gets better as the foot “warms up”. Then after any period of rest the pain seems to resolve, until we get up to walk again. The pain then comes rushing back and we once again hobble around until the foot “warms up” again.

Achilles Insertional Tendonitis

Achilles insertional teninopathy can be referred to as a host of differing problems. For some it is exactly what it sounds like pain in the insertion of the Achilles tendon. It is caused by overuse and commonly seen in active patients such as runners who do a lot of training on hills and hard surfaces. It is can sometimes be characterized by spurring within the Achilles tendon. The spur or calcification of the tendon indicates the chronicity of the disease process (see Figure 5). Unfortunately, in my practice I see this more in patients that are female, over 40, and overweight. However, this is not the only patient population that suffers from this problem. Insertional tendinopathy can also be confused with what is known as a Haglund’s deformity. While the pain associated with insertional tendinopathy and Haglund’s is very similar they are very much different. A Haglund’s deformity is not a pathological condition but rather a large prominence on the top of the heel bone that can predispose a patient to a bursitis near the the Achilles tendon which in time can lead to insertional tendinopathy. Pain with insertional tendinopathy is typically felt right in the middle of the back of the heel where the Achilles tendon inserts
into the heel bone (See Figure 6). Pain with a Haglund’s deformity is typically felt to the upper outside of the heel bone right next to the Achilles tendon. There is typically a large prominence that can be palpated in the area.

![Figure 5](image1.png)  ![Figure 6](image2.png)

**Other Causes of Heel Pain**

As stated before there are other causes of heel pain. The next most common cause of heel pain in my opinion is entrapment of the first branch of the lateral plantar nerve. This nerve is responsible for the sensation of the inside and plantar part of the heel. This nerve can become entrapped just as it passes around the heel secondary to hypertrophy of the nearby Abductor Hallucis muscle as well as secondary to a prominent heel spur. Pain associated with nerve entrapment is indistinguishable to the patient most of the time. Clinically the pain is noted more with compression of the heel and pain to the inside of the heel vs. at the bottom of the heel as noted with plantar fasciitis. On occasion the pain may radiate or “shift” to the lateral heel. Another thing to note is that pain that does not respond well to anti-inflammatories could be a good indicator that it may be a nerve entrapment.

Rheumatoid arthritis, psoriatic arthritis, reactive arthritis, ulcerative colitis, gout can all be a source of heel pain. We won’t go into detail on these, however, it is important to note that if you suffer from one of these conditions, it is important to understand that they may be a contributing factor to your heel pain. It is also important to note that your heel pain could be multifactorial. For instance, if the bottom of your heel is painful to palpation and the medial or inside part of your heel is painful on compression, it is not unique to have both plantar fasciitis as well as a nerve entrapment. Osteoarthritis in itself does not cause plantar fasciitis. It is however possible to develop plantar fasciitis or heel pain secondary to a gait imbalance or
compensation for ankle pain, knee pain, hip pain, tight hamstrings or calf muscles, even things such as a stress fracture in the foot or a neuroma of the foot.

**How to Treat Plantar Fasciitis**

Whether you have a mild case of plantar fasciitis or severe case there is no way of hiding it. It causes pain from the moment you get out of bed. My mentor taught me that 95% of patients with plantar fasciitis will get better with conservative treatments. I believe that whole heartedly. However, the other 5% must be carefully evaluated. Surgery for plantar fasciitis is not a perfect surgery and a lot of times patients still have pain after the surgery. Typically 5% or less will end up with surgery and it could be due to recalcitrant plantar fasciitis or quite possibly misdiagnosis. Of those 5% or so that end up with surgery, if the right surgery is performed, (I perform a plantar fascial release with a 1st branch of the lateral plantar nerve decompression) only about 1% will continue to have pain. In essence, conservative treatment is the way to go. Each and every doctor has their “stepwise” approach for treating plantar fascial pain. Since this is my book, I am going to give you my approach. Does that mean my approach is the best? Absolutely not, but I do believe that my approach brings results and I get people better. However, early intervention is the best. I would say here that if you are having heel pain consult with your PCP (primary care physician) and have them refer you to me if needed. The problem with that approach is that I find most PCP’s tend to treat to long and don’t really understand the treatment anyway. Then by the time you get to me you have chronic pain which is much harder to eliminate in comparison to acute plantar fasciitis. So, I am going to throw a plug for all my podiatry colleagues out there, see a podiatrist and get it treated the first time.

Let’s say patient X comes into my office with left heel pain. I am first going to evaluate the patient and identify what causes the heel pain, when does the pain start, what do you do to alleviate the pain, was there any trauma? If they tell me, “Doc, it hurts in the AM, getting up to the bathroom is a real task. It hurts when I drive my car, it hurts after I sit for a short period of time and then get up and walk again.” At that point I am almost 99% sure I am dealing with plantar fasciitis. If he tells me it doesn’t hurt in the AM but tends to hurt more as the day goes on, I do not rule out plantar fasciitis but may lean more towards a nerve entrapment. Being the foot swells more as the day goes on which may in turn cause compression of the nerve. It is also important for me to get a thorough medical history to make sure they don’t have any other medical conditions that can cause heel pain. Next, I send the patient to x-ray. The reason I send patient to x-ray is to evaluate the heel and the foot type. If the patient has a heel spur, in my mind it relates long term tight plantar fascia which leads to degenerative changes at the insertion to the heel which causes the spur to form. I also have to look at the size of the spur and determine that the spur is not the source of the pain. Other conditions such as a stress fracture, Achilles insertional tendinopathy, or Haglund’s can be diagnosed via x-ray. Once I have gathered all that information, If I still suspect plantar fasciitis, the next step is ultrasound. Ultrasound is a great diagnostic tool in that the plantar fascial band
is typically around 4mm thick at its insertion and can double or even triple in thickness when pain and plantar fasciitis is present. All this is visible with ultrasound technology (see Figure 7).

Once I have officially diagnosed the patient with plantar fasciitis, my 1st line treatment is a corticosteroid injection. I do this for two reasons. One the injection has local anesthetic in it, this causes temporary numbness to the area which provides pain relief. This can be an easy early indicator of whether the pain is actually caused by the plantar fascia. I also do this under ultrasound to ensure the injection is given to the plantar fascial band and right in the inflammation. A steroid is a powerful anti-inflammatory but also has its own drawbacks. Too many steroid injections can lead to tissue damage and can speed up fat pad atrophy. Remember, fat pad atrophy can be a cause of plantar fasciitis. Studies have shown that one injection is typically not harmful but more than three to any area of the body in less than a three-year span can actually be cytotoxic or toxic to cells and tissue. Also, it is important to note the in some diabetics steroids can actually raise their blood sugars. I educate the patient that the majority of damage happens when you walk with pain in the morning. What happens is the fascia contracts and heals as you sleep. When you get up and walk in the AM you are actually stretching the plantar fascia and causing small micro-tears which in turn causes the extreme pain when getting out of bed. To help prevent this trauma it is highly important to stretch before ever getting out of bed. The stretches I think help the most are: 1. Get an elastic band and with the knee extended and locked, place the band around the ball of the foot and pull back. This should dorsiflex the ankle (bend the ankle and foot towards your head), this stretches the calf and the plantar fascia (see Figure 8). I typically tell my patients to perform 5 reps of 20 seconds each. You would do this for each foot. Next, I have my patients cross their legs, grab the toes and pull them upwards towards the head. This activates the plantar fascia and stretches it out with the pressure of walking on it. I also recommend ice, ice is a natural anti-inflammatory. This is best performed by using a frozen water bottle or a cold tennis ball, racquetball, etc. Again, prior to getting out of bed, roll the cold object in the arch to loosen it.
up, if it hurts when you do it on the heel, then don’t. Just do it in the arch to help “warm up” the foot.

Figure 8

Figure 9

So up to this point we have anti-inflammatories, stretching, and icing. Finally, I advocate for support. It has been shown that high arches are more prone to plantar fasciitis. As of today there has been no real correlation between flat feet and plantar fasciitis. Either way, support will help the foot. Recent studies have shown that a good over-the-counter orthotic is can be just as effective for acute plantar fasciitis as a custom orthotic. No, Dr. Scholl’s is not a good over-the-counter orthotic. I prefer Powersteps or Superfeet. This are not custom but will help support the arch and take some of the tension of the plantar fascial band. It is important to note that orthotics have a break in period and it’s important to properly break them in to avoid aggravating the pain and injury. For chronic pain, I believe a custom orthotic to work better. In my office we offer Light Orthotics. These are orthotics that we use infrared light to make and cure the orthotics in house. This allows us to fit you with a custom orthotic while you wait and you can walk out with your new orthotics at your 1st visit.

Great, we have made it through the first visit. Two weeks later, patient X comes in and states that he is 80% better, he states that he has been doing the stretching, icing, and wearing his orthotics. My response is great, stick with it and the pain should resolve over the next month or two. If he comes in and states, I am only 10% better. Then I am likely to take a step back and re-evaluate. In my practice, I have noted that chronic plantar fasciitis rarely responds well to one steroid injection, however, acute plantar fasciitis does very well with one injection. Typically with acute, I am shooting for 50-70% improvement, with chronic I am hopeful for 30-40%. If a patient has less than 40% improvement, I am probably going to give them a second steroid injection. I never do three injections. If two don’t work, in my opinion it is unlikely that a third will work. Sometimes I get that patient back that had heel pain for one
month and they come back for their follow up and state that they only got about 10-20% better. When I ask, “did you stretch and ice?”, I usually get no. It is extremely important to get both the injection and do the stretching, icing, orthotics at the same time. I see worse out comes in those that are afraid of the injection and choose not to get it and opt only for the stretching and icing. I also see the same when those that get the injection and opt not to do the icing, stretching, and orthotics. I feel that the steroid works best when accompanied by the other modalities.

Great, I’ve done my job. Now it’s up for you to be compliant. Plantar fasciitis is an overuse injury and repetitive trauma and high impact activity can dramatically slow down healing. If you are a runner you may need to slow your running down. You have to limit the activity that causes pain. I don’t want you to stop exercising as that has its own negative impacts. These include increased heart disease, weight gain, etc. If you are already overweight this can also decrease healing time. So losing weight and watching what you eat can help with weight loss, this can in turn help with your heel pain.

Let’s say steroids didn’t work, you still have pain, whether you saw some improvement or not. My second line of treatment is a multifactorial approach, this consists of a night splint and physical therapy. A night splint is a boot that you wear when you sleep. This boot holds your foot in a dorsiflexed position (foot bent up towards your head as much as possible), this keep the plantar fascia and Achilles stretched out while you sleep (see Figure 10). I personally don’t like these as patients are highly non-compliant and hate wearing them. But there is good evidence out there that they do work.

![Figure 10](image)

Physical therapy can also be of benefit as they can help identify problems associated with your gait and help strengthen the muscles that are needed to avoid compensation as
compensation may be the cause of the plantar fasciitis. If you improve with PT and the night splint, awesome, you’re pain free. Let’s say that didn’t work either. Now we are getting serious, sometimes we just have to rest the plantar fascia, or sometimes the plantar fascia is actually torn. By placing you in CAM boot or fracture fascia boot we immobilize the fascia and the tendon and reduce the stress on the plantar foot. I recommend four weeks in the boot. I will also supplement this with NSAID therapy or ibuprofen if the patient can tolerate and take ibuprofen. I advocate 800mg of ibuprofen three times-a-day for two weeks. This is our last resort for treatment. I may even through in an MRI if needed. If this fails it is on to surgery for this patient.

If you have pain associated with a nerve entrapment, treatment for me is the same as plantar fasciitis. I typically don’t have the same results as the nerve entrapment is harder to treat but by reducing the stress to the bottom of the heel we can reduce the pressure and stress placed on the nerve and surrounding tissues. If heel pain is due to an Achilles insertional pain or Haglund’s, I typically treat with a round of 20mg of prednisone for 5 days and modification of shoe gear with heel lifts and over the counter orthotics. If the pain subsides with the oral steroid, no further treatment other than shoe gear modifications are needed. If the pain does not improve or is only better when taking the oral steroid, then we move directly to the fracture boot and immobilization for four weeks. For the other types of heel pain it is important that the underlying medical condition is being treated as that is likely the cause for the heel pain.

One important thing we haven’t mentioned to this point with conservative treatments for all types of heel pain is proper shoe gear. It is very important that you wear the right shoes for the right activity. One should never run in walking shoes, but you can walk in running shoes. What I mean by that is chose the shoes that fit your activity. A majority of shoes, especially running shoe companies make shoes that fit each foot type. If you pronate or roll in, then you need a shoe for an over pronator, this for lack of better words makes you roll out more to avoid stress to the inside of the foot. If you supinate or roll out, then you should be finding a shoe that rolls you in to take the stress off the outside of the foot. Make sure your shoe fits and that you aren’t buying too large or too small of shoes as this adds stress to the foot which can end up on some way or another causing pain in the foot. Change your shoes periodically, shoes that are worn down in the heel can alter your gait which can alter your biomechanics and cause plantar fasciitis.

New treatments that can be given in place of the above treatments or done as a third option are things like platelet rich plasma injections or amniotic injections. These are a type of regenerative medicine and “stem cell” like cells are injected into the heel to help promote healing and decrease inflammation. These will become more mainstream once insurance covers them. In my experience these are the best treatments out there for fasciitis and tendinopathies. The promote healing rather than decrease inflammation, although they do
both. Shock wave therapy is another effective option, I don’t personally do this but it is shown to work but is another modality not covered by insurance.

Surgical Options

Surgery is a last resort. I perform surgery on patients that have not shown any improvement with the above-mentioned treatments. Surgery is typically done under local anesthesia and light sedation. The plantar fascia is partially cut to relieve the tension, any spur to the area is removed and I always perform a nerve decompression at the same time. I have had good luck with this treatment but still always try to avoid surgery when possible. I am not going to go into too much detail here. I make patients non-weight bearing for two weeks, at that point, they may slowly begin walking as tolerated with 4-6 weeks of limited activity. If I determine that the patient has a very tight Achilles tendon, I also perform a tendon lengthening. This doesn’t lengthen the plantar fascia but reduces the stress and ground reactive forces to the heel. If the pain is more of an Achilles insertional pain or Haglund’s, surgery works great but involves cutting the Achilles tendon to access the spurring and then reattaching the tendon to the heel bone. Due to the trauma to the Achilles, the patient must remain non-weight bearing to the foot for 5-6 weeks. At which point the patient begins walking in a boot with a heel lift for 2-3 more weeks and then returns to regular shoe gear with up to 6 months of limited activity until the patient can return to full activities.
Conclusion

I have treated thousands of patients with heel pain. I employ a conservative first approach. The most important part of the puzzle is early diagnosis and correct diagnosis of the problem. I feel that my method of treatment works well for me. I have seen patients get better that have had years of heel pain. Correct treatment and understanding of the underlying problem is the best way to treat heel pain. Too many doctors are stuck old-fashioned ways based on old fashioned treatment. Patient that are treated accordingly go on to have chronic pain. Those that are diagnosed properly or treated properly tend to end up needing surgery down the road due to uncontrolled pain, inflammation, and degeneration. I specialize in sports injuries and plantar fasciitis is a common sports injury. I enjoy regenerative medicine and the results that I have seen with these new treatments out there. If you have heel pain of any kind, whether acute or chronic, whether you have seen someone before or not. Heel pain does not go away on its own if you don't change what caused the pain. It tends to wax and wane and will be a constant “pain” in your foot until treated properly.

If you want your heel pain treated properly call us today at Elite Foot & Ankle Associates. Our number is (503) 668-5210, email us at officemanager@elitefaor.com, or visit our webpage at www.elitefaor.com.