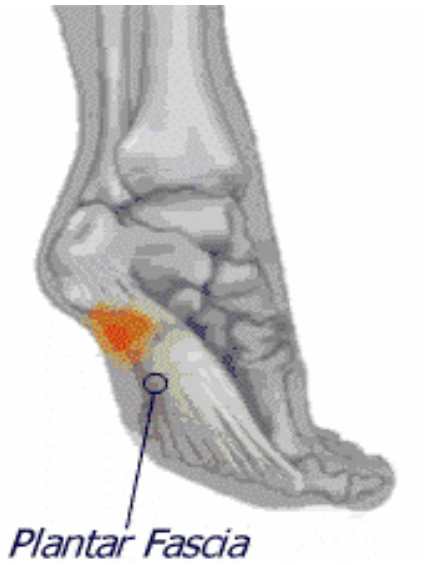
FOOT & ANKLE CLINIC
AT LINDSAY PARK

HEEL PAIN TREATMENT



The Treatment of Plantar Fasciitis

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HEEL PAIN

- If You Suffer From Heel Pain You Are Not Alone -

Over 60 Million North Americans Suffer from Heel Pain or Plantar Fasciitis

Over 75% of North American's experience foot pain at some point in their life. Heel pain or plantar fasciitis is one of the most common foot problems. Each year over 60 million North Americans suffer from "heel pain syndrome" often referred to as "heel spurs." This is probably an underestimate of the number of people suffering from this debilitating condition. The significant impact of plantar fasciitis in our society is further demonstrated by the vast number of articles written in newspapers and magazines as well as health reports on television. In the medical literature hundreds of articles have been written on this problem. Most articles provide an overview of current treatment modalities, but research has not conclusively determined the exact cause of plantar fasciitis. The Internet is also source of over 500 thousand references and sites dedicated to heel pain and the sale of items related to the treatment of this common problem.

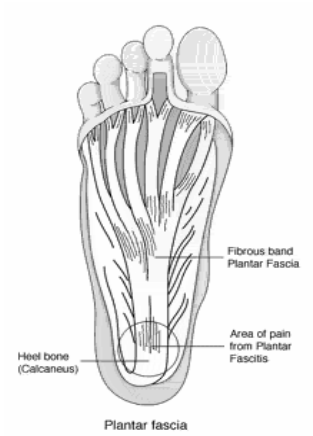
Heel pain is typically noted as severe pain when first stepping out of bed in the morning. After a few minutes of walking the pain subsides, but this is just a false sense of relief. After walking throughout the day and then sitting for a while, pain is again noted when getting up and resuming walking. This intermittent pain often progresses to a daylong nagging pain often described as a toothache in the heel.

In general, plantar fasciitis is a self-limiting condition. Unfortunately, the time until resolution is often six to 18 months, which can lead to frustration for patients and physicians.

We have developed this treatment system, which if followed will result in complete resolution of your heel pain problem. We can provide you with the system but you are responsible for the effort to make the program work.

THE HUMAN FOOT

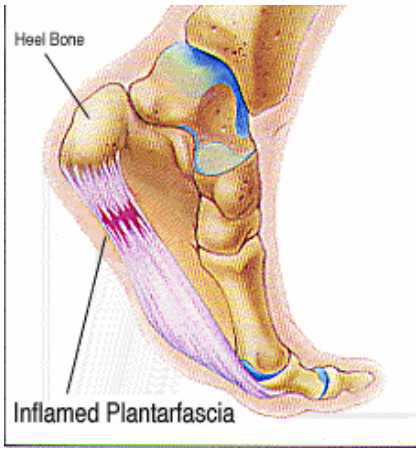
The human foot is a strong, flexible, and complex structure containing within its relatively small size 26 bones, 33 joints, and a network of more than 100 tendons, muscles, and ligaments, as well as nerves and blood vessels. The average person spends four hours on their feet and takes between 8,000 and 10,000 steps each day. During this time the feet support a combined force equivalent to several hundred tons, with each step exerting a tremendous force upon them, about 50% greater than the person's body weight.
In addition to supporting weight, the foot acts as a shock absorber and as a lever to propel the leg forward. The feet also serve to balance and adjust the body to uneven surfaces.



The plantar fascia is a band of fibrous connective tissue that originates from a bump or tubercle on bottom of the heel bone. This bony prominence also serves as the point of origin for three small intrinsic muscles that the plantar fascia encapsulates. The plantar fascia works like a rubber band between the heel and the ball of your foot to form the arch of your foot.
The purpose of the plantar fascia is to prevent the foot from flattening and spreading out and it prevents the arch from collapsing by acting as a bowstring. It provides stability between the front and rear of the foot against the ground when the heel lifts off the ground. Once the foot is stabilized against the ground the action of the plantar fascia, in conjunction with the calf muscles, will lift, pull forward and restore the medial longitudinal arch.

HEEL PAIN

Plantar fasciitis is an inflammation and degeneration of the plantar fascia ("plantar" means the bottom of the foot, "fascia" is a type of connective tissue, and "itis" means "inflammation"). The plantar fascia encapsulates muscles in the bottom of the foot, but it also supports the arch of the foot by acting as a bowstring that connects the ball of the foot to the heel. It endures tension that is approximately two times the body's weight during walking at the moment when the heel of the trailing leg begins to lift off the ground. This moment of maximum tension is increased if there is lack of flexibility in the calf muscles. An increase in body weight also causes an increase in tension on the plantar fascia.



SYMTOMS OF HEEL PAIN

The symptoms of plantar fasciitis include pain in the center of the heel with weight bearing. Usually the pain in the heel is worst on taking the first several steps in the morning, with the symptoms lessening as walking continues. During the day similar pain is experienced when standing after sitting for a period of time. By the end of the day a bone bruise sensation is often experienced in the heel. If the pain in your heel is continuous throughout the day with no relief, seek medical advice, as this may be a different condition.

Classic Signs of Heel Pain

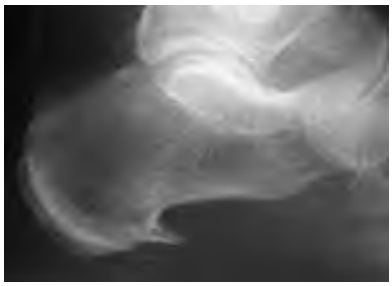
- Worst pain occurs when standing after sleeping.
- Pain is stabbing, burning or throbbing.
- After 5 to 10 minutes of walking, the pain subsides.
- Standing up after sitting will re-aggravate the pain.
- The pain usually gets worse toward the end of the day.
- There is little or no pain when resting.
- Pain on direct palpation on the bottom of the heel.

Alterations in Your Gait

The longer a person with heel pain waits to receive care, the more difficult it can be to resolve the symptoms. This is largely due to the individual compensating for the pain, which will alter his or her way of walking and standing. As a result of this longtime compensation for pain, you inadvertently create a new gait pattern.

One of the most common forms of compensation seen is when the individual with heel pain walks on the outside of the foot while contracting the toes. This will usually aggravate the heel pain by adding stress and strain to the plantar fascia, especially where it attaches to the heel bone.

Alterations in gait and stance will commonly generate secondary problems and pain in other areas. Many individuals may say that this new secondary pain is more severe than the heel pain.



Heel Spur - diagnostic of the problem but not the cause of heel pain.

Secondary Complaints of Heel Pain

- Leg cramps during the night or early morning from overuse
- Achilles tendon (heel cord) or posterior tibial tendonitis
- Lateral ankle or leg pain
- Lateral knee pain from the loss of shock absorption
- Low back pain
- Opposite foot or leg pain
- Tension headaches from dealing with the stress of walking in pain.

THE CAUSE OF HEEL PAIN

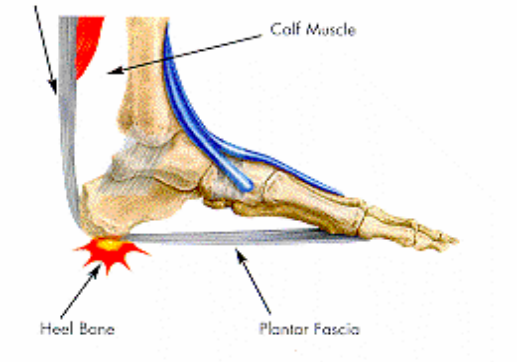
The exact cause of plantar fasciitis is not completely understood. The most common cause of heel pain seems to be a biomechanical abnormality that leads to stress on the plantar fascia. Heel pain syndrome can occur via a numerous of causes. Risk factors such as weight gain, foot type (flat feet, high arched feet), a high level of activity, sports, overuse, improper shoe gear, improper support of the feet, trauma, tightness of muscles and daily activities can trigger the classic symptoms. Often, there is no single cause, but a culmination of several risk factors. It is imperative to address all of these factors to treat this condition successfully.

Repetitive impact on your feet and legs over time causes your flexor muscles/tendons to become short and tight. The repetitive impact on short, tight muscles/tendons causes micro tearing at the point where your tendons attach to your heel and toe bones. Repetitive micro tearing at the point of attachment causes progressive scarring of tissue, inflammation and pain. Over a period of time heel spurs may develop.

Tight Ligaments and Tendons

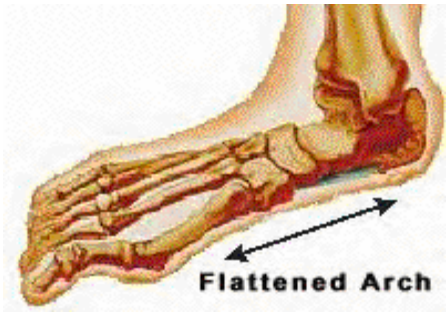
As we get older, the plantar fascia becomes less like a rubber band and more like a rope that doesn't stretch very well. Excessive tension place on the tight ligament results in irritation where the fascia attaches to the bone.

The Achilles tendon also tightens, as we get older due to decreased elasticity of your body's tissues, decreased activity and/or wearing high-heeled shoes. The Achilles tendon attaches to the heel bone. The plantar fasciitis is also attached to the heel bone and connects to the base of the toes. If the Achilles tendon is too tight, this tension gets redistributed along the plantar fascia. When you're not walking, your Achilles tendon is relaxed and naturally shortens in length. With each step, it must elongate and stretch out all over again, which puts stress on the plantar fascia. This explains why your heel pain is usually worse in the morning or when you stand up.



Flat Feet

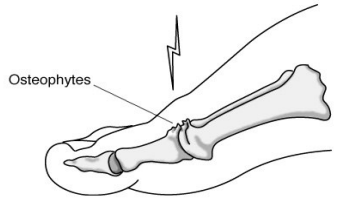
A mechanical fault of the foot that results in the arch to fall significantly increases tension on the plantar fascia. Normally, while walking your foot will strike the ground on the heel, and then roll forward toward your toes and inwards the arch. Your arch should only dip slightly during this motion. If it lowers too much, you have what is known as excessive pronation. The collapsed arch produces additional stress on the plantar fascia, particularly where it inserts into the bottom of the heel bone. The small muscles of the foot that lie beneath the plantar fascia are also put under strain when the arch flattens. When you are off of your feet these muscles tighten up, so when you stand up again they are stretching out causing further discomfort.



As the arch flattens the foot lengthens, placing strain on the plantar fascia.

Stiff Big Toe Joint

Big toe joints that are stiff and lack a normal range of motion contribute to plantar fasciitis. Normally when we are walking, the heel lifts off the ground as the body weight moves forward and the bending that occurs is the metatarsal head moving around the toe, which is fixed, on the ground. Big toe joints that don't bend very well produce strain and load on the plantar fascia. A big toe must bend upwards approximately 65-70 degrees for the foot to function correctly while walking. Restriction of motion at this joint will result in an ineffective plantar fascia, which will not resist the flattening of the foot and lowering of the arch. Without proper range of motion, excessive forces will occur along the plantar fascia.



Poor Footwear

Poor footwear is an important factor in the development of plantar fasciitis. Footwear that is old and worn out, or lacks support in the arch will contribute to the development of plantar fasciitis. Dress shoes are often stiff and lack any shock absorption so the foot absorbs all the force when the foot strikes the ground. Flat shoes and floppy sandals can also aggravate the problem as they lack any form of arch support.

Increase in Body Weight

Being overweight or obese places significant stress on the foot and thus is an important causative factor in the development of plantar heel pain.

In a study carried out over ten years ago researchers found a statistically significant correlation between heel pain and increased body weight as documented in a series of consecutive patients presenting with plantar heel pain.

A recent study determined that the body mass index of individuals with heel pain appears to play a greater role in heel pain than doses foot structure. Comparing two groups, those that presented with heel pain and those presenting for another foot problem, the researchers determined that no structural commonalties could explain the heel pain complaint. The researchers felt that a body mass index of 25, the target for decreased cardiovascular risk, represents a reasonable goal for weight loss that may reduce heel pain.
A study conducted in 1989 demonstrated a statistically significant relationship between heel pain and increased body weight.

Sudden Increase in Daily Activities

The benefits of walking and physical activity in the maintenance of a healthy lifestyle cannot be understated. A sudden increase in daily activities such a starting a new job where you are on your feet all day, or starting a walking program or increasing the intensity of an existing program may trigger the problem. This increase in activity will result in repetitive strain on the plantar fascia and the subsequent onset of pain.

TREATMENT OF HEEL PAIN

The treatment of heel pain is often a difficult and frustrating process. Symptoms usually resolve more quickly when the time between the onset of symptoms and the beginning of treatment is as short as possible. If treatment is delayed, the complete resolution of symptoms may take 6-18 months or more.

The Heel Doctor's Treatment System was developed to provide you with the most appropriate form of home treatment available. There is no quick fix for this problem. The Heel Doctor's Treatment System consists of a number of medically proven treatment modalities that if followed will result in the alleviation of your heel pain.

FOOT SUPPORTS

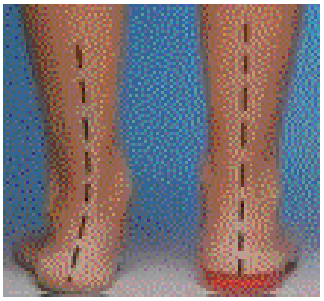
PowerStep® Arch Supports

The PowerStep® arch supports must be worn at all times and a change in footwear must be made if the arch supports do not fit into your current footwear. The PowerStep® arch supports will maintain arch height, thus reducing the strain placed on the plantar fascia where it inserts into the bottom of the heel bone.

When your start wearing the PowerStep® arch supports you will immediately notice the benefits. Your arch supports will gently control the motion of your feet and cushion your heels, providing the right mixture of support and comfort to alleviate the strain on the plantar fascia where it inserts into the heel bone.
The arch supports are also designed to restore function of the big toe joint helping further reduce strain on the plantar fascia.

Custom Foot Orthotics

Custom orthotics are usually made by taking a plaster cast or an impression of the individual's foot and then constructing an insert specifically designed to control biomechanical risk factors such as flat feet, valgus heel alignment (heel falls inwards) and discrepancies in leg length. For patients with plantar fasciitis, the most common prescription is for semi-rigid, three-quarters to full-length orthotics with longitudinal arch support. Two important characteristics for successful treatment of plantar fasciitis with orthotics are the need to control overpronation and metatarsal head motion, especially of the first metatarsal head.



Notice how the orthotics keeps the foot in the properly aligned position.
This supports the arch and reduces the strain on the plantar fascia.

STRETCHING

Stretching is an extremely important component in the treatment of heel pain. Not only does it stretch out the tight plantar fascia and small muscles of the foot but it also stretches out the calf muscles which are frequently tight and an important factor in the development of heel pain.

Morning Stretch

You can perform these exercises first thing in the morning while lying or sitting in bed. Simply flex the foot (pull it towards your head), stretch the toes toward your nose and hold that position for five seconds. Try to bring your toes as close to your nose as possible while keeping the leg straight. Pulling on a towel placed around the ball of the foot can be very helpful in performing the exercise. You could experience some discomfort or some slight burning in the back of the calf as well as the bottom of the heel. Ideally, you should perform this exercise eight to 10 times in the morning. When these exercises are performed properly, you will discover a significant reduction in your symptoms when first getting out of bed.

Plantar Fascia Stretching Program

This program is designed to stretch and strengthen the calf muscles, increase the upward bending of the foot at the ankle joint and stretch the plantar fascia.

Position. Perform the stretching on the bottom step. Stand with your feet shoulder width apart, with the balls of both feet over the edge of the step. Use the handrail for support. With your toes pointing straight ahead raise up on your toes and then lower your heels below the level of the step.

Speed. The program has two speeds, slow and fast. When you perform the fast drops, drop very quickly. At the bottom of the drop your movement should stop suddenly, so that you feel a bouncing or jerking motion. Raise back up slowly. You will fee a little nervous at first but will quickly develop confidence.

Calf & Plantar Fascia Stretching Program	
3 sets of 20 repetitions daily	
Both legs slow	7 days
Both legs quick drop, slow up	7 days
Single leg slow	7 days
Single leg quick drop, slow up	7 days

Daytime Maintenance Stretch

The maintenance stretch should be carried out twice a day while completing the Calf & Plantar Fascia Stretching Program. Once you have completed the program carry on with the maintenance stretch until the symptoms have resolved.

1. Get in a push-up position against the wall, one foot about 24 inches in front of the other with your palms up against the wall.
2. Slowly lean forward while pressing the heel of your rear foot into the ground. Keep your toes pointed forward and your back knee straight.
3. While still pushing against the wall, bend your rear knee until you feel your heel wanting to rise off the floor. Hold this position for a three count.

ANTI-INFLAMMATORY MEDICATION

A short course of an oral anti-inflammatory such as the over-the-counter medication ibuprofen may be suggested or a prescription medication such as Celebrex. Frequently a topical anti-inflammatory know as diclofenac gel 8% will be prescribed. This is applied to the area of pain four times daily.

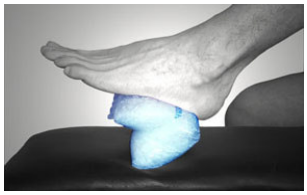
FOOT EXERCISES

The importance of carrying out these foot exercises is to keep your feet subtle and mobile. Tight joints, muscles and tendons will further aggravate the painful heel. These exercises should be performed every day to begin with, then every other day once your heel pain has diminished.

Golf Ball Roll
Roll a golf ball under the ball of your foot for 2 minutes. This is a great massage for the bottom of the foot and good for people with plantar fasciitis (heel pain syndrome).
Towel Gathering
A towel is extended in front of the feet. The heels are firmly planted on the floor with the forefoot on the end of the towel. Then attempt to pull the towel with the feet without lifting the heels from the floor. Repeat 10 times.

Ice Therapy

Ice should be applied to the heel for 20 minutes two to three times a day, especially when your heels are very painful. The ice will constrict the blood vessels in the area reducing the inflammation.



Friction Massage

Cross-friction massage is an effective tool for plantar fasciitis because it's an area you can do yourself. Where most massage methods use some form of skin lubrication, Cross Friction Massage uses none so that the finger (usually one, but sometimes two) doing the massage is not sliding across the skin, but rather is taking the skin with it, allowing for the force to be transmitted directly to the deep tissue. The motion is small, maybe an inch or so, back and forth "across the grain" of the plantar fascia. The amount of pressure should be moderate, which will often cause some amount of discomfort, but this should never be too painful. The massage should be done for 5-10 minutes and should be followed by some gentle stretching of the tissue and then 10 minutes of icing. Once (or twice if tolerable) per day should suffice.

Night Splint

Night splints usually are designed to keep a person's ankle in a neutral position overnight. Most individuals naturally sleep with the feet plantar-flexed, a position that causes the plantar fascia to be in a foreshortened position. A night dorsiflexion splint allows passive stretching of the calf and the plantar fascia during sleep. Theoretically, it also allows any healing to take place while the plantar fascia is in an elongated position, thus creating less tension with the first step in the morning. A night splint can be molded from plaster or fiberglass casting material or may be a prefabricated, commercially produced plastic brace.

NO BAREFOOT WALIKING

Never go without supportive footwear and wear your arch supports in your shoes at all times. If it is summer time or you usually walk around the house in bare feet, then get a pair of contoured sandals like Birkenstocks™ or Merrell™. Keep the sandals at bedside and after completing your morning stretches slip them on when getting out of bed so that your feet are supported immediately.
Do not wear the *flip-flop* style of sandals as these do not provide your feet with any support and will aggravate your problem.

PROPER FOOTWEAR

Shoes are important for good foot health not only for protection, but also for stability while walking.

Shoe Buying Tips

- Shop for shoes late in the day, when your feet may be slightly larger from swelling.
- Ask the salesperson to measure the length and width of each foot, as they may vary in size. Buy shoes that fit your largest foot.
- Have your feet measured while you're standing.
- Always try on both shoes, and walk around the store.
- Always buy for the larger foot; feet are seldom precisely the same size.
- Don't buy shoes that need a "break-in" period; shoes should be comfortable immediately.
- Don't rely on the size of your last pair of shoes. Your feet do get larger and shoe styles change.
- Shop for shoes later in the day; feet tend to swell during the day, and it's best to be fitted while they are in that state.
- Select a shoe with a leather upper, stiff heel counter, appropriate cushioning, and flexibility at the ball of the foot.
- Buy shoes that don't pinch your toes, either at the tips, or across the toe box.
- If you wear special insoles you should take them along when trying on shoes.

ACTIVITY MODIFICATION

One of the most frustrating aspects of suffering from heel pain/plantar fasciitis is the interruption of your fitness activities. Frequently, an individual has just started a fitness program as part of a weight management program, as is forced by heel pain to stop the activity.

Any activity that raises your pulse rate and makes you breathe at an increased rate is helping you to become more fit because it is building your heart and lungs, known as aerobic fitness. Cycling and swimming are especially good activities for those who suffer with heel pain because they work the leg muscles as well as the heart and lungs. In addition they are non-impact activities, which mean that unlike walking or running, the body does not impact the ground making these activities an excellent choice for people with heel pain.
Weight lifting builds muscle and is non-impact activity. Working the muscles will result in an increase in your body's metabolism resulting in increased calorie burning. Consult a personal trainer to initiate a weight-training program that is right for you.

There are a number of non-impact activities that you can do in order to burn calories and strengthen your cardiovascular system. These activities should be done a minimum of 3 times a week for a minimum of 15 to 20 minutes.

Non-impact Activities

- Stationary or Regular Bike
- Elliptical Trainer
- Swimming
- Aquacise
- Water running
- Rowing machine

If you have any health problems consult your physician before starting any fitness activities.