PLANTAR FASCIA PAIN

Presented By:

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The plantar fascia (a.k.a plantar aponeurosis) is a thick band of connective tissue that runs along the bottom of the foot from the heel to the base of each of the five toes. It is thinner and weaker at the heel and gets thicker and stronger as it fans out towards the toes. Because of this structure it is more susceptible to micro trauma, tearing and inflammation at the heel which causes the resulting pain and irritation. When the problem is left untreated and becomes chronic, the plantar fascia starts to degenerate. This complicates the problem and may severely prolong the recovery and rehab process.

The functions of the plantar include absorbing shock, supporting the longitudinal arch of the foot, and stabilizing the metatarsal bones during foot strike. This means that stress is placed on the plantar every time you stand, walk or run. Stresses of up to three times body weight can be placed on the plantar when running. Irritation in the plantar may take a significant amount of time to settle down because of the constant stress that is placed on it with everyday activities. To add to the problem, the plantar does not get very much blood flow which also slows the healing process.

The pain itself is generally localized at the inside base of the heel and may extend down the inside arch of the foot towards the big toe. It is usually worse the first few minutes after getting out of bed in the morning or when getting up after sitting for a long period of time. Standing or walking for extended periods will also aggravate the pain. It may be a little stiff for the first few minutes of running and then loosen up, only to get sore again towards the end of the run and even more so after you finish. In severe cases it will prohibit you from running all together. It tends to be more of a problem when doing faster running with less supportive shoes such as racing flats or spikes, when running hills or on harder surfaces such as concrete.

Causes

Plantar pain is fairly common among runners and comprises approximately 5-10% of all running injuries. The causes of plantar pain can be put into two categories; training factors and biomechanical/structural factors. The training factors can all be easily controlled and prevented. One of the most common training errors is simply increasing your mileage and/or intensity too quickly. Other training factors that can irritate the plantar include running in old, worn out shoes, wearing the wrong running shoes for your foot type, running on unstable surfaces such as a sandy beach, running on a crowned surface, logging a lot of miles on concrete and excessive hill running.

The biomechanical factors are more difficult to deal with but must be addressed nonetheless. One of the most common biomechanical causes is tightness and restricted range of motion in the calf and ankle which puts increased stress on the plantar. Other factors may include weaknesses in the foot and ankle, joint restrictions in the foot and ankle, over-pronation, hamstring tightness and/or gluteal weakness. Plantar fascia pain occurs more frequently in people with flat feet as well as in people with high rigid arches. Occasionally a bone spur (a calcified growth) may be present on the bottom of the heel. This may be the result of the plantar pulling on the calcaneous but there is no evidence to support the case for bone spurs actually causing plantar pain.

Treatment

It is extremely important to start to treat plantar pain as soon as possible. It can last a long time and can often times take months to recover from. The sooner you start to treat the problem the more quickly it will go away. The first course of action is to get the pain and inflammation under control. This should include ice and non-steroidal anti-inflammatories such as ibuprofen or naproxen sodium. For the first week to two weeks I recommend icing as much as 5-6 times a day for 10 minutes at a time. (In the initial stages there is usually inflammation even though swelling may not be detectable by normal sight and touch).

During this time you should be stretching the hamstring and calf. Keeping this tissue loose will take some strain off of the plantar. You should also be lightly stretching your foot as well. DO NOT stretch to the point where you feel pain in the plantar. Follow the stretches that are outlined in this packet. (NOTE: If any of the stretches cause irritation in the plantar stop immediately!) If possible you should start to wear a splint or other device at night which will help prevent the plantar from shortening while you sleep. This should help with the pain and stiffness that is experienced first thing in the morning. You should also make sure to stay out of high heels and ill-fitted or uncomfortable shoes. If walking barefoot irritates the plantar then try to walk in comfortable shoes (preferably running shoes) as much as possible. There is also a way to tape the foot (called Low-Dye Taping) which can help take some strain off of the plantar and allow it to heal more quickly. A good podiatrist, physical therapist, massage therapist, athletic trainer or chiropractor should be able to help with this.

Within a few days (2-4) it is important to start to mobilize the tissue of the plantar fascia. This is accomplished both with self-massage and professional deep tissue sports massage. (This can be painful but is necessary to make sure that the tissue stays loose and that any scar tissue development is kept to a minimum.) Self-massage can be accomplished by rolling your foot on a tennis ball or golf ball and should be done regularly for 5-10 minutes 1-2 times per day followed by icing. A professional therapist will be able to do deeper, more focused and aggressive work, which should be done 2-3 times per week for 3-4 weeks.

When the pain starts to diminish you need to begin to strengthen the muscles of the foot and ankle. Follow the strength exercises that are outlined in this packet. These should help to prevent the problem from coming back in the future. The effects of strengthening will not be felt right away. It will take 6-8 weeks to start to get the benefits of strengthening. You should attempt to complete the strength drills outlined in this packet 5-6 times a week for the first 2 months. You can then back down to 2 times a week to maintain the benefits that you have gained. If any of the exercises irritate the plantar STOP that exercise immediately.

You can start to run again once you can walk pain free. Make sure to start out with a few very short runs of 10-15 minutes before you build up to longer runs. And don't forget to have a specialist or someone who works at a running shoe store evaluate your feet and make sure that you are wearing the appropriate shoes for your foot type.

The pain won't go away!?!?

In the vast majority of plantar pain cases the treatment protocol outlined above will take care of the problem. In rare cases you may find that the pain simply will not go away. There are still a few options that you can pursue. Both podiatrists and orthopedists have had some success by injecting the plantar fascia with a corticosteroid such as cortisone. This can be effective at breaking down more stubborn scar tissue and any thickening that has occurred in the plantar. Your foot biomechanics may also require that you have a custom orthodic made to correct any abnormalities that cannot be addressed by a running shoe alone. (NOTE: Make sure that the Podiatrist or Physical Therapist is able to find something specific that they are trying to correct. Putting in an orthodic simply for the sake of putting in an orthodic is not appropriate and may result in other problems down the road!) In cases where nothing else works you can try a surgical procedure called a fasciotomy where an incision is made into the fascia to take tension off the irritated tissue.

Other Causes of heel Pain

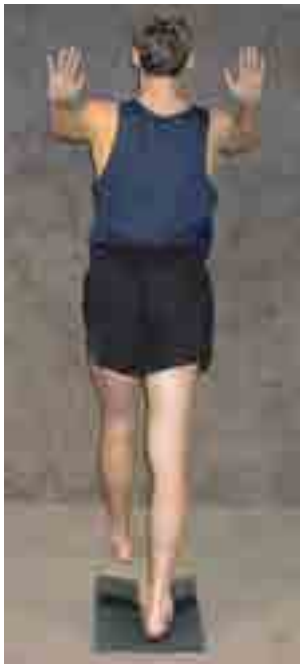
Sometimes the pain that you feel on the inside of the heel is not caused by the plantar fascia at all. There are other problems that can mimic plantar fascia pain. These problems include sciatica, adverse neural tension of the plantar nerve, entrapment of the lateral plantar nerve, tarsal tunnel syndrome, fat pad atrophy or a calcaneal stress fracture. It is advisable to rule out these other possible causes of heel pain before pursuing more invasive treatments of plantar pain such as an injection or surgery.

STRETCHES

The stretches outlined here should be completed 2-3 times per day when treating plantar fascia pain. When performing the stretch slowly move into the stretch and hold until you feel the tissue release. This should take somewhere from 15 to 45 seconds. Repeat 2-3 times. Do not hold any stretch for longer than 60 seconds, An uncomfortable stretch is OK, but make sure that you do not cause pain or irritation during or after any of these stretches.

Hamstring Rotational Stretch
Standing Version

To stretch your left hamstring stand on your right foot and place your left heel on a surface well below waist level. Face straight forward and keep your left leg straight but do not lock your knee. Lean forward from the waist and keep your back straight until you feel a good stretch down the back of the thigh. Rotate your torso right and then left so that you are alternately facing to the inside and outside of your leg. Hold the positions where you find the most restriction. Try pointing your toes towards your head and away from your head in order to modify the stretch.



Calf Stretch

Adjust distance from wall according to your height. Bend the knee closest to the wall and let your pelvis shift forward. Stretch is on the leg furthest from the wall.

Gastrocnemius
Keep your back knee locked.

Soleus
Perform the stretch with your knee bent.

YOUR WEIGHT SHOULD BE SUPPORTED ON YOUR HEEL, NOT YOUR FOREFOOT.

Tri-Plane Achilles Stretch

Start in the same position as for the soleus stretch with the knee bent. The only difference is that you turn the slant 45 degrees clockwise as well as 45 degrees clockwise to focus the stretch more on the inside or the outside of the Achilles.

Foot Stretch

Put your toes up against a wall as shown. Your heel and the ball of your foot should be on the floor. Roll your foot in and out while the ball of your foot and your heel remain on the ground. Hold the positions where you find the most restrictions. You can modify the stretch by bending and straightening your knee.

STRENGTH EXERCISES

These exercises are specifically designed to strengthen the muscles in the foot and ankle. By strengthening these muscles it will help to take stress off of the plantar fascia. None of these exercises should irritate the plantar fascia. If irritation does occur then STOP that exercise immediately.

There are three levels of strengthening exercises outlined in this guide. If the plantar is somewhat irritated with normal walking only use the beginning exercises. As the plantar can handle more and more stress and is not irritated with normal walking progress to the intermediate exercises. Incorporate the advanced exercises when you are actually able to run. I recommend doing all of the exercises barefoot which will be the most effective way to strengthen the muscles in the foot and ankle.

Beginning Exercises

Figure 1

1. Toe Walking

Keep you upper body erect and hold your hands behind your low back as shown. As your left foot lands, let your left heel come as close to the ground as possible without touching and then come up onto your toes as high as possible before pushing off the ground. Take very short steps and walk for 15 meters with your toes pointed straight ahead and repeat for 15 meters with your toes pointed in at a 30 degree angle and again with your toes pointed out 30 degrees.

Reps:

Sets:

2. Heel Walking

Keep you upper body erect and hold your hands behind your low back as shown. Lift your toes as high as you can. Your toes should never touch the ground through the entire exercise. Take very short steps and walk for 15 meters with your toes pointed straight ahead and repeat for 15 meters with your toes pointed in at a 30 degree angle and again with your toes pointed out 30 degrees.

Reps:

Sets:

Figure 2

Figure 3

3. Toe Crunches (using towel)

Stretch out a towel in front of you. Pull the towel towards you by curling your toes under. For added resistance place a weight on the end of the towel.

Reps:

Sets:

4. Foot Extension

Wrap the elastic band around the top of your foot as shown. Pull the foot straight up against the resistance of the band. Take 2 seconds to pull the foot up and then take 5 seconds to return to the starting position. Repeat by pulling the foot up again but this time at an angle 15 degrees to the inside and a third time 15 degrees to the outside.

Sets:

Reps:

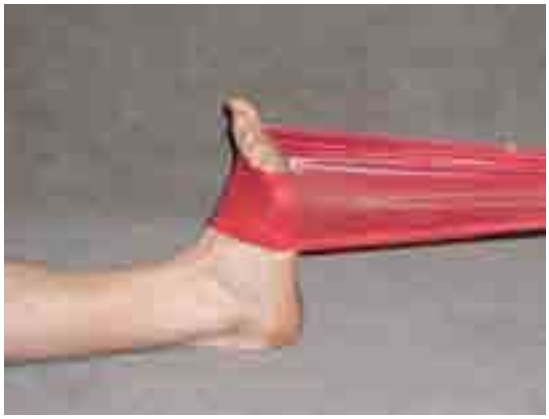


Figure 4

Intermediate Exercises

Figure 5A

5. Ankle Inversion using Rubber band

Start with your foot pointed up and out and the band pulling up and out in the same direction. Slowly turn your foot down and inwards against the resistance of the band. The motion down and in should takes two seconds. Then slowly let the foot turn back up and out to the starting position. This motion should take five seconds.

Reps:

Sets:

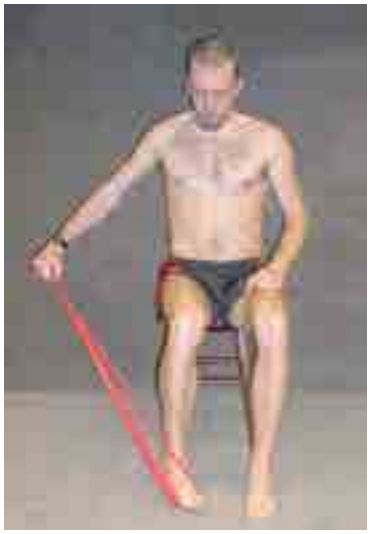


Figure 5B

6. Ankle Drops

Stand on your toes with both heels over the edge of a stair or ledge (*Figure 3A)*. Your knees should be slightly bent for the entire exercise. Lift your left foot off the stair and slowly drop the heel of your right foot down as far as you can *(Figure 3B)*. (This should take 5 seconds.) Hold the position for 2 seconds and then put both feet back on the stair and push up onto your toes again. Repeat with your right foot pointed 30 degrees to the right *(Figure 3C)* and 10 reps with your left foot pointed 30 degrees to the left. Try to keep most of your weight on your feet and use your fingertips against a wall to keep your balance.

Reps:

Sets:

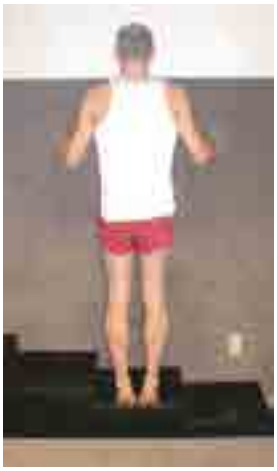


Figure 6A

Figure 6B

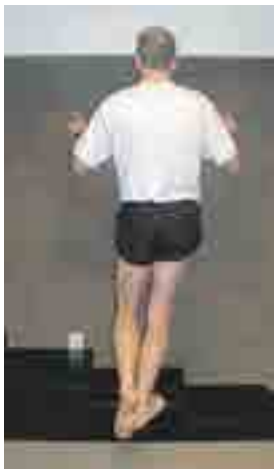


Figure 6C

Advanced Exercises

6. Toe Hopping

Hop in place on one leg. Your leg should act like a spring. Do not pause when your foot hits the ground. Your heel should never touch the ground for the entire exercise. Start out with short hops and progress to higher hops.

Reps:

Sets:

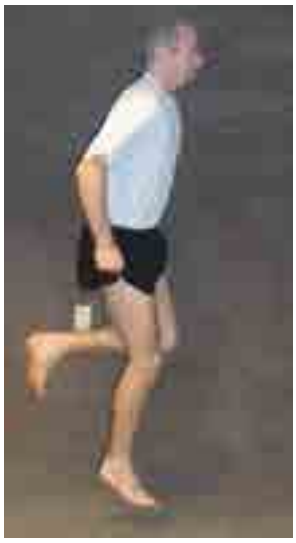


Figure 6

7. Low Box Hops

This exercise is very similar to toe hopping except this time you are hopping up and down from a 6" box or stair. Let your heel drop down below the edge of the box.

Reps:

Sets:

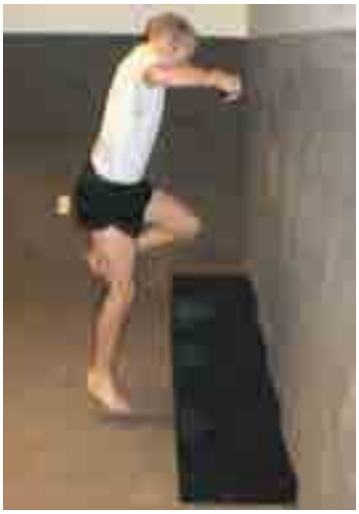


Figure 7

Other Exercises

These exercises are not specific exercises to strengthen the calf/achilles complex. They do address certain biomechanical aspects of running that could play into calf/achilles problems and are very good exercises for runners to do on a continuous basis.

8. The Runner

This exercise must be completed using a theraband. Close the knotted end of the band in a door. To strengthen the left side stand with your left side facing the door. Balance on your left leg with the knee slightly bent. With the right leg in front of the left wrap the theraband around your right thigh as shown *(Figure 8A)*. Keeping the left knee slightly bent move your right leg and arms in a running motion. Repeat with the right leg behind the left *(Figure 8B)*. For a more advanced version, when the right leg is in front and you drive the right leg forward straighten your left leg and come up onto your toes at the same time.

Reps:

Sets:

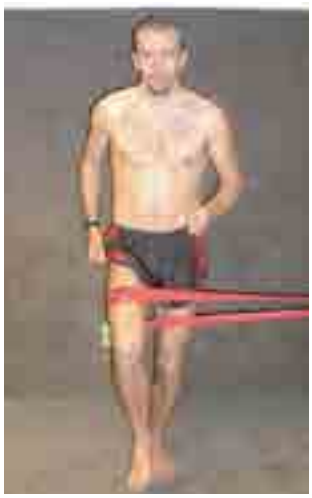


Figure 8A

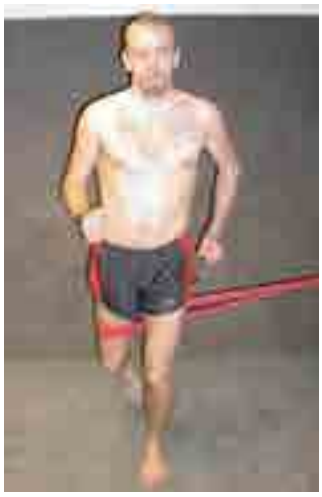


Figure 8B

9. Barefoot Running

Barefoot running is one of the most effective ways to strengthen the muscles in the foot, ankle and lower leg. You should do this on a soft grass surface (the infield on the inside of a track often works well). Make sure that you have no pain when you are actually running barefoot. I recommend running a mile or so barefoot at the end of a run 2-3 times a week. You can also use it as a cool down after a hard workout.

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SMI provides the highest level of care in the best possible environment. Our facility boasts nine private rooms for advanced manual therapy and a Physical Therapy clinic specializing in performance enhancement and the treatment and prevention of overuse injuries. Our newly constructed Human Performance Lab allows physiologists to conduct sophisticated exercise testing that complements our therapy services and provides our clients with the most advanced level of care available in the Bay Area. Our community center acts as a locale for athletes of all levels to stretch, strengthen, use cold hydrotherapy tanks, discuss training and just get together after hard workouts; all of which are free of charge to SMI clients, athletes and patients.

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SMI is a Public Benefit Nonprofit Corporation 501(c)(3) organized exclusively for education and charitable purposes. We are an institute, clinic and community center whose mission is to promote research, clinical development and delivery to the public of functional health services and advanced manual therapy treatments, particularly in the fields of injury prevention, injury rehabilitation and athletic performance. It is a further purpose of this corporation to support under-funded competitive amateur athletes from the youth level through the collegiate and post-collegiate levels, by offering affordable services and financial assistance. Our donation programs are designed to help subsidize the reduced rates that we offer our beneficiaries. If you have any questions regarding donations please contact our Development Manager Rachael Holloway at 650-322-2809 x329. Please keep in mind that donations made to SMI are tax deductible. Our federal tax ID # is 94-3256879.

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SMI has developed a partnership with the Leukemia and Lymphoma Society's **Team In Training** (TnT). We provide TnT with injury prevention, stretching, strengthening and injury rehabilitation services. SMI staff provides support for TnT with coaching, injury prevention and rehabilitation, strengthening and stretching. SMI has also developed partnerships with other Bay Area Teams and organizations. These include **Team Sheeper**, **TRIbe Triathlon**, **Team Diabetes**, **Asha** and **Joints in Motion**. All Team in Training members and Team Friends receive a discount on SMI services.

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