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PLANTAR FASCIITIS

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Plantar fasciitis is one of the most common clinical diagnoses of the foot, affecting approximately 10% of runners, as well as numerous athletes in basketball, tennis, soccer, gymnastics, and nonathletic populations (Gudeman SD: Treatment of Plantar fasciitis. *AmJ Sports Med* 1997;25(3):312-316). Overall, it is estimated that more than 2 million Americans receive treatment each year for the condition (Pfeffer, G: Comparison of custom and prefabricated orthotics in plantar fasciitis. *Foot Ankle Int* 1999;20(4):214-221). It is thought to be the result from repetitive micro trauma due to faulty mechanics, muscular imbalance or fatigue, changes in normal activity or exercise routines, training errors, improper footwear, or a combination of these factors. The condition often becomes chronic because treatment is not typically sought until and interruption in daily activity occurs.

SYMPTOMS

The typical complaint of plantar fasciitis is a gradual onset of infero-medial heel pain. This area serves as an important point of attachment for several structures that help maintain the integrity of the long arch of the foot. The plantar fascia (plantar aponeurosis) is a thick band of longitudinally arranged fibers which originate from this area and run the length of the foot before dividing into five slips to insert into the base of the toes. This area also serves as the attachment site for three intrinsic muscles of the foot- abductor hallucis, flexor digitorum breves, and quadratus plantae. Thus, management of this condition must also address these contractile tissues and not just the plantar fascia. Pain may also be reported in the arch region of the foot and is usually most significant during weight bearing activities, being more pronounced in the morning upon arising or after a prolonged period of sitting. A sensation of a nodule underneath the heel is another common complaint.

CAUSES

Plantar fasciitis is common in sports that involve running and nonathletes whose occupations require prolonged weight bearing. Repetitive microtrauma with heel strike to the ligaments, tendons, and nerve structures has been implicated as the cause, especially in middle aged, overweight, nonatheltic individuals who stand on hard, unyielding surfaces as well as in long distance runners. It occurs most commonly in persons with a pronated foot posture. When excessive pronation occurs, the arch is flattened, resulting in an increased stretch on the plantar fascia. Excessive pronation can also lead to increased stress on the soft tissues (especially ligaments) and an over reliance on muscular support. Tightness of the gastrocsoleus (calf) and Achilles tendon may also predispose a person to plantar fasciitis. Bone spurs may be associated with plantar fasciitis, but are not believed to be the cause of it. Many studies show no clear association between spurs and plantar fasciitis.

TREATMENT

Plantar fasciitis can be difficult to treat and no single therapy intervention has been shown to be most effective (Cornwall J, McPoilT. Plantar fasciitis: Etiology and treatment. *Journal of Ortho and Sports PT.* 1999;29(12):756-760). Phase 1 treatment is initiated in the acute stages when the pain is first noticed.

Phase 1:

- Towel stretch: Sit on a hard surface with your injured leg stretched out in front of you. Loop a towel around the ball of your foot and pull the towel toward your body keeping your knee straight. Hold this position for 15 to 30 seconds then relax. Repeat 3 times. When the towel stretch becomes to easy, you may begin doing the standing calf stretch.

- Standing calf/achilles stretch: Facing a wall, put your hands against the wall at about eye level. Keep the injured leg back, the uninjured leg forward, and the heel of your injured leg on the floor. Turn your injured foot slightly

inward (as if you were pigeon-toed) as you slowly lean into the wall until you feel a stretch in the back of your calf. Hold for 15 to 30 seconds. Repeat 3 times. Do this exercise several times each day.When you can stand comfortably on your injured foot, you can begin stretching the bottom of your foot using the plantar fascia stretch.

- Plantar fascia stretching: While sitting on the floor with your knee bent and heel on the floor, grab all five toes and pull them back toward your knee while your ankle is dorsiflexed (pulled up towards your shin). Hold the stretch for 20-30 sec. and repeat 5X. Repeat several times throughout the day, preferably before your first steps in the morning and before standing after prolonged periods of rest. An alternative method and more intense stretch is to sit back on your heels while squatting on your toes (don't do if you have a history of knee pain). A third alternative is to place your toes on a wall with your heel on the floor similar to the calf wall stretch noted below.
- Soleus stretch: Same as Achilles stretch but with the knee bent
- Relative rest: Discontinue running and walking as a form of exercise until asymptomatic for greater than one week. You may switch to low impact exercise (swim, cycling, deep water running) during this time to maintain fitness and sanity.
- Cushioned heel inserts
- Shoewear modification: Avoid rigid dress shoes that increase the tension on the Achilles tendon and walking barefoot or in flip flops which stresses the intrinsic muscles of the foot and plantar fascia
- Low-dye taping
- Ice Massage using an ice bucket, frozen water bottle or juice can, cryocup, or Dixie cup for 10 minutes several times a day.
- Anti-inflammatories as indicated

Phase 2: If the above measures fail to relieve symptoms, and you haven't done so already, seek medical guidance. Further diagnostic testing may be indicated to rule out calcaneal stress fracture and other causes of heel pain. Once they are ruled out the following treatments may be indicated:

- Night splints: The theory behind the use of a night splint is to minimize the change of tension on the fascia that occurs with each day's new activities as the splint holds the plantar fascia in a stretched state and prevents shortening overnight, thus limiting pain in the morning. Various types of splints are available on the market. Running Etc. carries the Strassburg sock (http://www.thesock.com/)
- Orthotics may be indicated for people with very high or low arches
- Cortisone injection: Injection of cortisone into the area close to the plantar fascia may improve pain but may also weaken the plantar fascia and place it at an increased risk of rupture.
- Modalities: May include iontophoresis, ultrasound, phonophoresis, deep friction massage, Active Release Technique

Phase 3: If phase 1 and 2 treatment approaches have failed, and the pain is affecting recreation and activities of daily living, surgical intervention or extracorporeal shock wave lithotripsy (ECSL) may be indicated.

Return to Activity: When pain with deep palpation and weightbearing has been eliminated, a gradual return to activity and exercise may be initiated. Exercises may include but are not limited to ankle strengthening exercises with elastic bands:

- **Resisted dorsiflexion:** Sit with your injured leg out straight and your foot facing a doorway. Tie a loop in one end of the tubing. Put your foot through the loop so that the tubing goes around the arch of your foot. Tie a knot in the other end of the tubing and shut the knot in the door. Move backward until there is tension in the tubing. Keeping your knee straight, pull your foot toward your body, stretching the tubing. Slowly return to the starting position. Do 3 sets of 10.

- **Resisted plantar flexion:** Sit with your leg outstretched and loop the middle section of the tubing around the ball of your foot. Hold the ends of the tubing in both hands. Gently press the ball of your foot down and point your toes, stretching the tubing. Return to the starting position. Do 3 sets of 10.

- **Resisted inversion:** Sit with your legs out straight and cross your uninjured leg over your injured ankle. Wrap the tubing around the ball of your injured foot and then loop it around your uninjured foot so that the tubing is anchored there at one end. Hold the other end of the tubing in your hand. Turn your injured foot inward and upward. This will stretch the tubing. Return to the starting position. Do 3 sets of 10.

- **Resisted eversion:** Sit with both legs stretched out in front of you, with your feet about a shoulder's width apart. Tie a loop in one end of the tubing. Put your injured foot through the loop so that the tubing goes around the arch of that foot and wraps around the outside of the uninjured foot. Hold onto the other end of the tubing with your hand to provide tension. Turn your injured foot up and out. Make sure you keep your uninjured foot still so that it will allow the tubing to stretch as you move your injured foot. Return to the starting position. Do 3 sets of 10.

- **Static and dynamic balance exercises**

A. Place a chair next to your non-injured leg and stand upright. (This will provide you with balance if needed.) Stand on your injured foot. Try to raise the arch of your foot while keeping your toes on the floor. Try to maintain this position and balance on your injured side for 30 seconds. This exercise can be made more difficult by doing it on a piece of foam or a pillow, or with your eyes closed.

B. Stand in the same position as above. Keep your foot in this position and reach forward in front of you with your injured side's hand, allowing your knee to bend. Repeat this 10 times while maintaining the arch height. This exercise can be made more difficult by reaching farther in front of you. Do 2 sets.

C. Stand in the same position as above. While maintaining your arch height, reach the injured side's hand across your body toward the chair. The farther you reach, the more challenging the exercise. Do 2 sets of 10.

- Toe curls with a towel
- Marble pick up with the toes
- Walking barefoot on your toes and heels
- Calf raises
- Speed work, hill work or any activity that involves jumping should be discouraged during the initial stages of return to activity.

In summary, plantar fasciitis is one of the most common painful disorders experienced by runners but the prognosis for full recovery is more than 90% in athletes. If you have persistent heel pain that is not responsive to self treatment, you should consult with a medical professional to determine the cause of your pain and proper form of treatment. Pain relief is just a step away!