

The Clinical Picture of Plantar Fasciitis

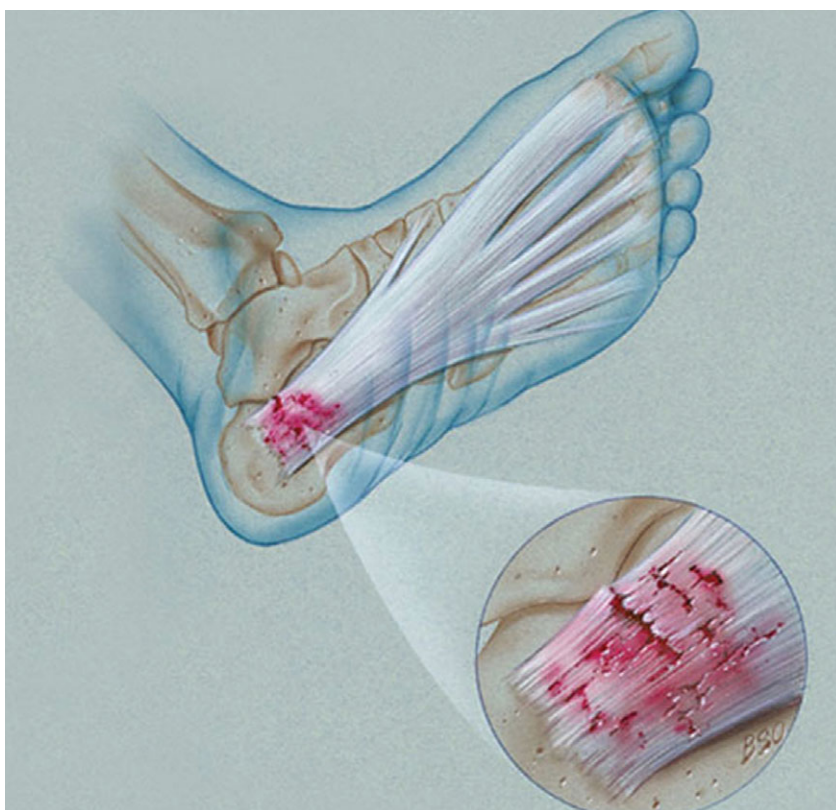
Time may indeed wound all heels—but will you be able to tell what’s causing the pain?

Heel pain is one of the most common complaints seen in urgent care settings. The usual etiology is mechanical, but heel pain can be caused by traumatic, neurologic, arthritic, infectious, neoplastic, or other systemic conditions. Plantar fasciitis is a frequent cause of heel pain, affecting about 10% of the U.S. population and leading to an estimated 600,000 outpatient visits annually. In most cases, plantar fasciitis can be treated successfully at the primary care level, with referral for refractory cases or non-plantar fasciitis symptoms.

This article will review the typical presentation of plantar fasciitis, the appropriate diagnostic work-up, other causes of heel pain, and current treatments.

THICK APONEUROSIS

The plantar fascia is a thick aponeurosis in the subcutaneous tissue of the plantar foot. It extends from the heel bone (calcaneus) to the metatarsal heads distally and is made up of three distinct parts: the medial, central, and lateral bands. Its function is to support the longitudinal arch of the foot, while providing both static support and dynamic shock absorption to the foot. Hicks described the plantar fascia as acting like a windlass mechanism to provide tension



and support through the arch of the foot (see illustration on page 36).

Any abnormal tension on this dense aponeurosis is thought to stress the plantar fascia. Anatomically, this may include pes planus (flat feet), pes cavus (high arches), equinus (tight calf muscles), excessive pronation, limb length discrepancy, fat pad atrophy, and high body mass index.

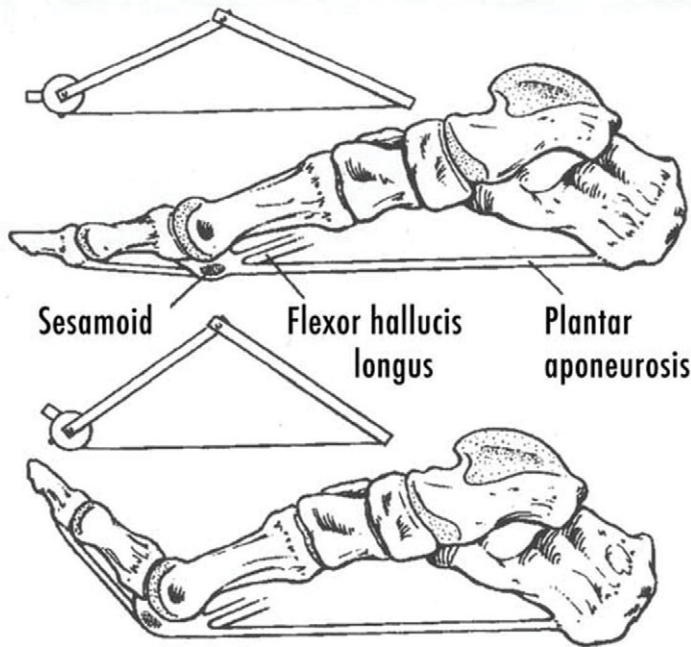
Functionally, an increase in weight-bearing activity or any other kind of

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>Windlass mechanism. The plantar fascia provides tension and support through the arch of the foot.

physical activity is a common cause of plantar heel pain. The increased activity leads to pathologic stress on the plantar soft tissues, which is thought to disrupt the attachment to the heel bone, causing a local inflammatory response. Plantar fasciitis can evolve over time as this chronic inflammatory response thickens the plantar fascia and leads to formation of a plantar heel spur.

>>FAST TRACK<<

Morning pain that is gradually relieved by activity is pathognomonic for plantar fasciitis.

Scar tissue and loss of blood flow from chronic plantar fasciitis (lasting 6 to 12 months) may also lead to plantar fasciosis, which is not an inflammatory process. In this condition, collagen degenerates at the origin of the plantar fascia.

PAIN USUALLY WORSE IN THE MORNING

Typically, the patient with plantar fasciitis has pain at the plantar medial aspect of the heel,

which is usually worse in the morning when he gets out of bed or puts weight on the heel after any prolonged rest. Morning pain that is gradually relieved by activity is pathognomonic for plantar fasciitis. Pain after a period of inactivity is termed post-static dyskinesia and is thought to be caused by the disruption of any healing with weight-bearing, generating a chronic cycle of disruption and inflammation. This pain will usually improve somewhat as the day or activity goes on.

Patients may also present with a history of increased physical activity and tell you that the pain subsides when they rub the foot or that they can't walk barefoot due to the pain. The history will usually consist of the aforementioned pain in the morning and an increase in activity. Typically, the patient has no history of acute injury. A complete lower extremity physical exam should then be performed, including a neurovascular exam with range-of-motion and muscle strength testing.

On physical exam, palpation of the medial tubercle of the plantar fascia on the plantar side of the foot will elicit pain. This pain can be accentuated with dorsiflexion of the digits, which stresses the plantar fascia. The patient may also have a reduced dorsiflexion of the ankle secondary to a tight Achilles tendon.

Radiographs, magnetic resonance imaging (MRI), bone scan, or ultrasound may also help rule in or rule out the diagnosis of plantar fasciitis. Standard radiographs may reveal a calcaneal heel spur (see image on page 37), which indicates the condition has been present for at least 6 to 12 months. It is thought the heel spur is an example of Wolff's law: bone strengthens itself to adapt to the stress placed on it. It is important to note that the heel spur is not the cause of the pain, nor does it need specific treatment. Studies have shown that about 50% of symptomatic patients and 20% of asymptomatic patients have plantar heel spurs. The importance of radiographs is to rule out calcaneal stress fractures, bone tumors, or systemic arthritis.

Ultrasound and MRI can aid in the diagnosis of plantar fasciitis by demonstrating a thicker-than-normal plantar fascia. Also, in cases of atypical plantar fasciitis or recalcitrant fasciitis, these tests may rule out other pathologic processes.

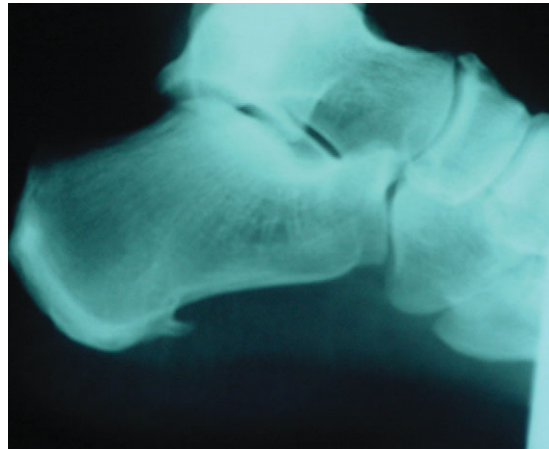
The differential diagnosis for heel pain includes calcaneal stress fracture, bone tumors (aneurysmal bone cyst, unicameral bone cyst, intraosseous lipoma), nerve entrapment syndromes (Baxter neuritis, tarsal tunnel syndrome), seronegative arthritis (rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, Reiter syndrome, diffuse idiopathic skeletal hyperostosis), lumbar spine disorders, infection, and trauma. Advanced imaging modalities, along with lab tests and electrodiagnostics, can help clinch the diagnosis. Recalcitrant heel pain lasting from six months to a year warrants further work-up.

MULTIPLE TREATMENTS

There are multiple treatment options for plantar fasciitis. Patients tend to respond differently to a given intervention, so the treatment plan needs to be individualized. One of the biggest challenges is managing patient expectations, but with a comprehensive approach and a compliant patient, plantar fasciitis usually improves or resolves in two to three months of treatment. However, while acute symptoms may be self-limiting, the patient may experience future flare-ups because foot structure and function are often the underlying cause of the problem.

Several studies have shown that symptoms will resolve in nearly all patients with conservative treatment, such as rest, activity modification, stretching, physical therapy, nonsteroidal anti-inflammatory drugs (NSAIDs), corticosteroid injections, night splints, and changes in footwear (such as orthotics and heel pads). In a study by Wolgin, patients found stretching (both active and passive, with a night splint), NSAIDs, and rest were most helpful.

Rest and activity modification. Patients with severe pain may need a cast or a boot walker to immobilize the limb. However, complete rest may not always be practical. Instead, patients are more likely to be compliant with a “relative rest” that offers alternative forms of activity (with avoidance of activities that aggravate the symptoms).



> Chronic bone build-up. In a calcaneal heel spur, the bone builds up to strengthen the area under stress.

Photo courtesy Gordon Cameron, MD

Stretching. Stretching the Achilles tendon is a key exercise in the treatment of plantar fasciitis. Lifting and lowering the heel or extending the leg with a towel wrapped around the forefoot, which pulls the foot into dorsiflexion, are two ways to increase the flexibility of the Achilles tendon-plantar fascia complex. Other exercises to strengthen the intrinsic muscles of the foot (for example, picking up marbles or other small objects with the toes) can also help.

Physical therapy. With physical therapy, the patient can learn the proper way to do stretching and strengthening exercises. In addition, ice, contrast baths, and iontophoresis have all been shown to improve the symptoms of plantar fasciitis.

NSAIDs. These medications can reduce the inflammation associated with acute plantar fasciitis. In the Wolgin study, 79% of patients using NSAIDs were in the successfully treated group. Disadvantages of NSAIDs include the risk of gastrointestinal bleeding, gastric pain, and renal damage with long-term use.

Corticosteroid injections. This can be an effective adjunctive treatment for patients with severe and recalcitrant cases of plantar fasciitis. Success

>>FAST TRACK<<

With a comprehensive approach and a compliant patient, plantar fasciitis usually improves or resolves in two to three months.

Treatment Guideline for Plantar Fasciitis

- Prescribe an NSAID and OTC orthotics as needed.
- Recommend performing Achilles tendon stretches three times a day for 10 minutes at a time and teach the patient how to do them.
- Advise the patient to reduce painful activities and switch to appropriate shoes.
- Follow up with the patient in six weeks. If the pain is unchanged or worse, add a dorsiflexion night splint to the treatment plan.
- Administer a cortisone injection to the insertion of the inflamed plantar fascia if symptoms warrant.
- If significant symptoms persist after another six weeks of treatment, consider referring the patient to a foot-and-ankle specialist.

rates as high as 70% have been reported with these injections. The risks include plantar fascial rupture and fat pad atrophy. It is recommended that no more than three steroid injections be given within a year.

Night splints. These devices can keep the patient's ankle in a neutral position relative to the leg. Most people sleep with their feet plantar-flexed. Night splints provide constant passive stretching of the Achilles tendon and the plantar fascia, which, in theory at least, helps the fascia to heal and creates less tension with the first steps in the morning. Studies have shown night splints to be effective in about 80% of patients who use them.

Footwear. Supportive shoes can help balance the foot mechanically and support the plantar fascia. In the Wolgin study, 14% of patients said changing shoes was the best treatment. Patients should also be instructed to avoid walking barefoot during treatment.

In most cases, excessive pronation is the cause of plantar fascial strain. Orthotics can be used to both support the longitudinal arch of the foot and control motion. A recent study found that over-the-counter (OTC) and custom orthotics were similarly effective in plantar fasciitis. The OTC orthotics can work well in the acute phase of plantar fasciitis; custom orthotics may be needed for more severe deformity and long-term treat-

ment. Heel pads can help in the acute phase by cushioning the heel, but they provide no support or control of motion. Heel pads are mainly for patients with fat pad atrophy of the heel.

COMBINATION OF TREATMENTS

The treatment modalities mentioned here are often used in combination. The patient's clinical response should be evaluated at about six weeks. If symptoms are improving, the treatment can be continued. If it isn't helping, consider adding another modality (see box). For example, let's say the patient was started with home stretching, an NSAID, OTC orthotics, a change of footwear, and activity modification. If symptoms don't improve after six weeks, you can add rest with cast immobilization, physical therapy, corticosteroid injections, custom orthotics, or night splints (or all of these interventions). This revised treatment plan can take 8 to 12 months to completely relieve symptoms.

An alternative noninvasive treatment, extracorporeal shock wave therapy, uses acoustic energy shock waves. Multiple studies have shown success rates ranging from 50% to 90%. This therapy offers a good recovery time for chronic plantar fasciitis (most patients will be able to walk in a shoe the same day as the procedure), with few risks (calcaneal stress fracture or fascial tear) that occur very rarely.

Surgery is reserved for patients with recalcitrant plantar fasciitis lasting longer than 12 months. Partial plantar fascial release, performed openly or endoscopically, is the mainstay of treatment and has been shown to have a 75% or higher success rate. New techniques using coblation radiofrequency and cryosurgery have also shown promise, although long-term, randomized, double-blind studies are still needed. As with any surgery, risk versus benefit must be measured.

ORGANIZED APPROACH

Plantar fasciitis is a common but challenging problem. Pay close attention during the history and physical exam to ensure that other potential causes aren't overlooked. Understanding the etiology and directing treatment accordingly in an organized, stepwise, and layered approach can help you achieve the best outcomes in the shortest time. □

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