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Plantar fasciitis: How best to treat?

In addition to stretching exercises and orthotics, consider steroid injections as part of your first-line treatment options. For recalcitrant pain, a newer injectable reparative treatment is showing promise.

PRACTICE RECOMMENDATIONS

- › Use plantar fascia—specific stretching to decrease pain in patients with plantar fasciitis. **(A)**
- › Consider recommending prefabricated orthoses, including night splints, to decrease pain. **(A)**
- › Consider using extracorporeal shock wave therapy for plantar fascial pain. **(A)**

Strength of recommendation (SOR)

- (A)** Good-quality patient-oriented evidence
- (B)** Inconsistent or limited-quality patient-oriented evidence
- (C)** Consensus, usual practice, opinion, disease-oriented evidence, case series

CASE ► A 43-year-old obese woman seeks advice for left heel pain she has had for 2 months. Before the onset of pain, her activity level had increased as part of a weight loss program. Her pain is at its worst in the morning, with her first few steps; it decreases with continued walking and intensifies again after being on her feet all day. There is no history of trauma, and she reports no paresthesias or radiation of the pain. Her medical history is otherwise unremarkable. She has used ibuprofen sparingly, with limited relief.

If you were this patient's physician, how would you proceed with her care?

Plantar fasciitis (PF) is a common cause of heel pain that affects up to 10% of the US population and accounts for approximately 600,000 outpatient visits annually.¹ The plantar fascia is a dense, fibrous membrane spanning the length of the foot. It originates at the medial calcaneal tubercle, attaches to the phalanges, and provides stability and arch support to the foot. The etiology of PF is unknown, but predisposing factors include overtraining, obesity, pes planus, decreased ankle dorsiflexion, and inappropriate footwear.² Limited dorsiflexion due to tightness of the Achilles tendon strains the plantar fascia and can lead to PF. Histology shows minimal inflammatory changes, and some experts advocate the term plantar fasciosis to counter the misperception that it is primarily an inflammatory condition.³

A patient's history and physical exam findings are the basis for confirming or dismissing a diagnosis of PF. Radiologic studies, used judiciously, can rule out important alternative diagnoses that should not be overlooked. Multiple treatment options range from conservative to surgical interventions, although studies of the effectiveness of each modality have had conflicting results. Clinical practice guidelines

TABLE

Rule out these causes of heel pain when considering a diagnosis of plantar fasciitis^{4,5}

Neurologic	Arthritic	Skeletal	Other
Tarsal tunnel syndrome	Rheumatoid arthritis	Calcaneal stress fracture	Vascular insufficiency
Entrapment neuropathy	Ankylosing spondylitis	Bone contusion	Neoplasm
Peripheral neuropathy	Reiter's disease	Osteomyelitis	Calcaneal apophysitis
Lumbar radiculopathy	Inflammatory arthropathies	Paget's disease	Enthesopathies
			Fat-pad atrophy
			Achilles tendonitis

generally advocate a stepwise approach to treatment.

Diagnosis

The differential diagnosis of PF (TABLE) includes significant disorders such as calcaneal stress fracture, entrapment neuropathies (eg, tarsal tunnel syndrome), calcaneal tumor, Paget's disease, and systemic arthritides.^{4,5}

What to look for in the history and physical exam

Severe heel pain upon initial weight bearing in the morning or after prolonged periods of inactivity is pathognomonic for PF.² Initially the pain presents diffusely, but over time it localizes to the area of the medial calcaneal tubercle. Pain typically subsides with activity but may return with prolonged weight bearing, as it did with the patient in the opening case.

Test range of motion of the foot and ankle. Although this is not needed for diagnosing PF, some patients will exhibit limited ankle dorsiflexion, a predisposing factor for PF.^{4,6} Look for heel pad swelling, inflammation, or atrophy, and palpate the heel, plantar fascia, and calcaneal tubercle. Lastly, evaluate for gait abnormalities and the presence of sensory deficits or hypesthesias.⁴

The most common exam finding in PF is pain at the medial calcaneal tubercle, which may be exacerbated with passive ankle dorsiflexion or first digit extension.^{2,4} If paresthesias occur with percussion inferior to the medial malleolus, suspect possible nerve entrapment or tarsal tunnel syndrome. Tenderness with

heel compression (squeeze test) may indicate a calcaneal fracture or apophysitis.

Imaging is useful to rule out alternative disorders

Radiologic studies generally do not contribute to the diagnosis or management of PF, but they can assist in ruling out alternative causes of heel pain or in reevaluation if symptoms of PF persist after 3 to 6 months of treatment.

Plain films lack the sensitivity to detect plantar fasciitis. While a plantar calcaneal spur is often seen on radiography, it does not confirm the diagnosis, correlate with severity of symptoms, or predict prognosis.⁴ Despite this deficiency, plain radiography remains the initial choice of imaging modalities, particularly to rule out other conditions.

Ultrasound accurately diagnoses plantar fasciitis. Plantar fascia thickness of more than 4.0 mm is diagnostic of PF.⁷ Additionally, a decrease in plantar fascia thickness correlates with a decrease in pain levels, and thus ultrasound can aid in monitoring treatment progress.⁸ If results of plain films and ultrasound are inconclusive and clinical concern for an alternative diagnosis warrants additional expense, consider arranging for magnetic resonance imaging.⁹

Noninvasive treatments

Conservative therapies remain the preferred approach to treating PF, successfully managing 85% to 90% of cases.^{10,11} A 2010 clinical practice guideline from the American College of Foot and Ankle Surgeons rec-



Severe heel pain upon initial weight bearing or after prolonged periods of inactivity is pathognomonic for plantar fasciitis.

FIGURE

Stretching techniques that can help relieve heel pain



In the seated plantar fascia–specific stretching technique (A), the patient firmly grasps the toes and simultaneously dorsiflexes the toes and foot, thereby stretching the plantar fascia and the Achilles-soleus complex. Have the patient hold this position for 10 seconds and release for 10 seconds, for a total of 10 repetitions. This exercise can also be done in a standing position with the knee slightly bent (B). To focus stretching on the Achilles tendon and gastrocnemius muscle, the patient can use a towel, with the leg straight (C).

IMAGES COURTESY OF: CARLTON J. COVEY, MD

➤ **Plantar fascia–specific stretching significantly diminishes or eliminates heel pain compared with traditional stretching movements.**

ommends conservative treatments such as nonsteroidal inflammatory drugs (NSAIDs), stretching, and prefabricated orthotics for the initial management of plantar heel pain.⁴ Emphasize to patients that it may take 6 to 12 months for symptoms to resolve.⁴

Stretching and trigger-point manual therapy are effective

The traditional primary treatment mo-

dality for PF has been early initiation of an Achilles-soleus (heel-cord) muscle-stretching program. However, studies have shown that plantar fascia–specific stretching (PFSS) (FIGURE) significantly diminishes or eliminates heel pain when compared with traditional stretching movements, and is useful in treating chronic recalcitrant heel pain.^{12,13} PFSS has also yielded results superior to low-dose shock wave therapy.¹⁴

In a 2011 study, adding myofascial trigger-point manual therapy to a PFSS routine improved self-reported physical function and pain vs stretching alone.¹⁵ This manual therapy technique is specialized and should be administered only by trained physical therapists. Data are limited and mixed regarding the effectiveness of deep tissue massage, iontophoresis, or eccentric stretching of the plantar fascia to alleviate plantar fascial pain. Support for therapies such as rest, ice, heat, and massage has largely been anecdotal.

NSAIDs for PF lack good evidence

Nonsteroidal anti-inflammatory drugs (NSAIDs) are often prescribed to treat PF, despite a lack of evidence supporting their use. A small randomized, placebo-controlled double-blind study established a trend toward improvement in pain and disability scores with the use of NSAIDs. However, no statistically significant difference was noted in the measures between the NSAID and placebo groups at 1, 2, and 6 months.¹⁶ We found no studies that demonstrate a significant reduction in pain or improvement in function with the use of NSAIDs alone.

Although NSAIDs carry their own risks, they may work for some patients. And studies showing a lack of significant pain reduction may have been underpowered. If patients are willing to accept the risks of NSAID use, it would be reasonable to prescribe a therapeutic trial.

Orthotics and night splints can help, depending on comfort and compliance

Foot orthotics help prevent overpronation and attenuate tensile forces on the plantar fascia. A 2009 meta-analysis confirmed that both prefabricated and custom-made foot orthotics can decrease pain.¹⁷ One prospective study showed that 95% of patients had improvement in PF symptoms after 8 weeks of treatment with prefabricated orthotics.¹⁸ A Cochrane review found no difference in pain reduction between custom and prefabricated foot orthotics.¹⁹ A recent study demonstrated that rocker sole shoes—a type of therapeutic footwear with a more rounded outsole contour—combined with custom orthotics

significantly reduced pain during walking compared with either modality alone.²⁰ More research needs to be conducted into the use of rocker sole shoes before recommending them to PF patients.

Night splints help keep the foot and ankle in a neutral position, or slightly dorsiflexed, while patients sleep. Several studies have shown a reduction in pain with the use of night splints alone.^{17,21,22} Patient comfort and compliance tend to be the limiting factors in their use. Anterior splints are better tolerated than posterior splints.²³

Shock wave therapy has better long-term results than steroid injections

Shock waves used to treat PF are thought to invoke extracellular responses that cause neovascularization and induce tissue repair and regeneration. A 2012 review article concluded that most research confirms that extracorporeal shock wave therapy (ESWT) reduces PF pain and improves function in 34% to 88% of cases.²⁴ ESWT is comparable to surgical plantar fasciotomy without the operative risks, and yields better long-term effects in recalcitrant PF compared with corticosteroid injections (CSI).²⁴ Many studies are underway to validate the effectiveness of ESWT. Currently, expense or lack of availability limits its use in some communities.

Invasive treatments

Corticosteroid injections may be used for more than just refractory pain

CSI have historically been reserved for recalcitrant heel pain. However, one systematic review cites evidence in support of CSI for the short-term management of plantar fascia pain.²⁵ Compared with placebo, CSI reduces pain at both 6 and 12 weeks and decreases plantar fascia thickness.²⁶ Additionally, the American College of Foot and Ankle Surgeons lists CSI as an acceptable first-line treatment for PF.⁴

The most common complication of CSI is postinjection pain. Other complications, such as fat pad atrophy, rarely occur.²⁷ While the evidence is limited, CSI may be part of an initial approach to treating PF in addition to heel-cord or plantar fascia-specific stretch-



Corticosteroid injections added to a regimen of stretching may accelerate a return to normal function for athletes or other active patients.

➤
Platelet-rich plasma has been shown to be as effective in reducing pain scores as corticosteroid injections at 3 weeks and 6 months.

ing, particularly for patients who desire an expedited return to normal activity.

Platelet-rich plasma therapy holds promise

Platelet-rich plasma (PRP) has been gaining popularity as a treatment for PF pain. PRP is a component of whole blood that is centrifuged to a concentrated state, treated with an activating agent, and injected into the affected area. Theoretically, injected PRP increases the release of reparative growth factors, enhancing the healing process.²⁸ PRP has been shown to be as effective in reducing pain scores as CSI at 3 weeks and 6 months.²⁹ PRP also decreases plantar fascia thickness and improves pain scores and functional ability.³⁰

To date, no trials have compared PRP with placebo injections. Postprocedural pain is the most common risk with PRP. While limited evidence exists, PRP seems to be a relatively safe and effective therapeutic alternative for treating chronic PF.

Surgery only when conservative measures fail

Reserve surgery for those who have not responded adequately after 6 to 12 months of conservative therapy.⁵ Endoscopic plantar fascia release is superior to traditional open surgery.³¹ Heel spur resection is no longer routinely practiced. Patients undergoing surgery should expect a return to normal activ-

ity in approximately 2 to 3 months, and up to 35% of patients may continue to have symptoms after surgical intervention.^{2,31}

Treatment options in perspective

Treat conservatively at first. Stretching the plantar fascia and heel cord, using prefabricated orthotics, and wearing night splints are backed by firm clinical evidence of benefit. Acute treatment of PF may also include CSI, especially for patients who are athletic or otherwise active and wish to return to full function as soon as possible, and are willing to accept the risks associated with CSI.

ESWT improves pain and function scores and may also relieve pain in patients with recalcitrant PF pain. PRP has limited but promising evidence for patients with chronic PF pain.

Surgical intervention remains the last line of therapy and is not always effective at reducing pain.

CASE ▶ You prescribe a conservative treatment program of plantar fascia-specific stretches and prefabricated orthoses for the patient in the opening scenario. At one month, her pain drops by 30%. At 6 months, her pain disappears, and she resumes a daily aerobic exercise program to assist in weight loss. **JFP**

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