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## Plantar fasciitis: Evidence-based review of current treatment modalities

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### Abstract

Various evidence based treatment options are available for the treatment of plantar fasciitis. This article is a review of recent literature comparing various treatment modalities used for the treatment of plantar fasciitis. This will assist health care providers to make a sound diagnosis and treatment of heel pain.

**Keywords:** Various evidence evidence-based current treatment modalities

### Introduction

The plantar fascia is a thick fibrous aponeurosis with its origin at the calcaneus and insertion on the tendons of forefoot and proximal phalanges. It supports the foot and acts as a shock absorber for pressure placed on the foot <sup>[1, 2]</sup>.

A series of repetitive micro-trauma to the plantar fascia causes inflammation and eventual degradation thus causing plantar fasciitis <sup>[1]</sup>.

Plantar fasciitis affects both sedentary and athletic populations <sup>[3]</sup>.

The mechanism by which the body heals a chronic degeneration is a mystery which makes the treatment very challenging.

### Discussion

The term plantar fasciitis is most recently been replaced by the term plantar fasciosis since inflammation is not the major cause of the pain <sup>[4]</sup>.

Symptoms include severe pain in the morning or after prolonged rest and improves on movement. Local examination findings are tenderness along the medial part of the heel, discomfort with passive dorsiflexion of first toe and sometimes a tightness of the Achilles tendon or the gastrocnemius muscle <sup>[5]</sup>. Risk factors for plantar fasciitis include excessive foot pronation or flat feet (pes planus), high arches (pes cavus), tight Achilles tendon or gastrocnemius muscle (equinus), tight intrinsic foot muscles, limb length discrepancy, obesity, running, prolonged standing or walking, poor-fitting shoes, and improper gait <sup>[4]</sup>.

### Diagnosis

Plantar fasciitis is most often a straight forward clinical diagnosis and imaging can only confirm or rule out other causes of heel pain. Ultrasound is another relatively inexpensive diagnostic tool that can rule out certain causes of heel pain (such as plantar fibromatosis, foreign body, and plantar xanthomas) and can aid in diagnosis by establishing plantar fascial thickness and the presence of fascial tears <sup>[6]</sup>. Various studies have shown that in patients with symptomatic plantar fasciitis, the plantar fascia thickness tends to be greater than 4mm on diagnostic ultrasound <sup>[7]</sup>.

### Treatment

The pain is self-limiting and resolves within a year but the constant hinderance to activities of daily living prompts the patients to seek treatment before the pain resolves. Conservative treatment is effective in 70% to 80% of patients <sup>[1]</sup> however a combination of therapies is usually used <sup>[4]</sup>.

Plantar fasciitis is initially treated with a combination of rest, ice fomentation, NSAIDs [4] and sometimes with acetaminophen or corticosteroids, however these often provide only temporary relief [4].

### Stretching

Plantar fasciitis as many believe may be caused by tight gastrocnemius and intrinsic foot muscles [8].

A physical therapy stretching programme is a low cost and effective method comprising of plantar fascia and heel cord stretching exercises which can even be done in an at-home basis.

### Orthotics

Orthotics with heel cups and arch supports are believed to treat the underlying biomechanics of plantar fasciitis such as flat feet, high arches and thereby reducing the peak plantar pressure [2]. Night splints worn while patients are sleeping prevents the foot from resting in a plantar-flexed position, increases calf and plantar muscle flexibility and reduces tension on the plantar fascia.

However night splints maybe cumbersome and limit patient adherence [9]. In one study the combined use of orthotics and night splints yielded better results in treating heel pain, compared with orthotics alone [2].

### Invasive treatments

Corticosteroid injections are one of the most popular invasive treatments for plantar fasciitis. Other types of injections include platelet-rich plasma and autologous blood. Although invasive, injections have few complications, most commonly seen are post injection pain and (rarely) fat pad atrophy, infection, nerve injury, and plantar fascia rupture [10]. A study compared corticosteroid injections with placebo and determined that corticosteroid injections provided short-term relief lasting no more than 1 month [10]. Corticosteroid injections can be costly and increase the risk of plantar fascia rupture. For these reasons, they mainly are used as short-term treatment, though some providers consider them first-line [10].

A study comparing corticosteroid injections with platelet-rich plasma (PRP) injections and found no significant differences in outcomes [11].

Autologous blood injections are a newer treatment and have not yet been studied thoroughly. One of the few studies revealed that 85% of patients had improvement and 68% remained pain-free at 12-month follow-up [12].

### Other treatment options

Extracorporeal shock wave therapy (ESWT) produces high energy sound waves that promote healing and growth factor incorporation in the degenerated fascia. In a recent study of ESWT, patients were given between four and eleven sessions of therapy, with an average of 2,000 pulses per session. The results were significant reduction of pain at 1 month, 3 months, and 1 year, with a pain intensity rating that continued to decrease as time went on. Treatment success rate was 98% at 1 year (measured as at least a 60% reduction in pain) with an 8% rate of symptom recurrence [6].

Local radiation for the treatment of plantar fasciitis decreases the inflammatory mediators and pain. In a study comparing corticosteroid injections with radiation therapy, patients received radiation 3 days per week for 2 weeks with follow-up at 3 and 6 months. At both follow-ups, patients who received radiation therapy had significantly lower pain scores than those who received corticosteroid injections. Radiation is

considered as a treatment option if other treatments fail [13]. Surgical treatment is the last option which includes partial or complete plantar fascia release and gastrocnemius release. The results after surgery are highly variable [1].

Complications like infection, nerve injury and fascia rupture are not uncommon. Recovery can take as long as 3 months and still may not have complete resolution of pain. Monteagudo and colleagues found that 60% of patients who had partial plantar fasciotomy had symptoms improvement, compared with 95% of those who had complete gastrocnemius release. Additionally, the patients with a proximal release had an average recovery of 10 weeks, compared with 3 weeks for patients with gastrocnemius resection [14].

Surgery may be the last option used for the treatment of unresponsive plantar fasciitis and should be discussed in detail with the patient regarding the expected outcomes and possible complications.

### Conclusion

Plantar fasciitis is a common condition and for most part very treatable. Treatment should begin with conservative management which should include heel cord and plantar fascia stretching exercises. NSAIDs and orthotics can be supplemented as and when necessary. Night splints can be used but are cumbersome and have as low compliance. If symptoms have not improved after these options, injections may be considered. If symptoms still continue to persist for 6 months or more then ESWT or radiation can be attempted. Surgical release is typically a last resort in cases of plantar fasciitis.

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