

Plantar Fasciitis Treatment

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- Plantar Fasciitis is the most common cause of painful heel.
- Approach to heel pain involves a detailed history, thorough clinical examination and relevant investigations.
- Majority of the patients respond to non-operative treatment
- Out of number of non surgical options available which one to use first and in which one in particular group of patients is not clear

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How to site this article: Gohiya A, Choudhari P, Sharma P, Verma R, Sharma S. Plantar Fasciitis Treatment. OrthopJMPC 2016;22(1): 34-40

Introduction

Plantar fasciitis is the most common cause of heel pain. Pain typically arise due to degenerative irritation at the insertion of plantar fascia on the medial process of the calcaneal tuberosity. In general plantar fasciitis is correlated with the heel spur which is not true. Approximately 10% of the United States population experiences bouts of heel pain, which results in 1 million visits per year to medical professionals for treatment of plantar fasciitis [1]. The etiology can be multifactorial however most cases are due to overuse stresses.

Even though the condition is self-limiting it poses a challenge to the treating orthopaedician. Most of the patients respond to non-operative treatment measures [2].

Treatment

Careful and complete history, thorough clinical examination, organized, evidence based, stepwise approach to treatment gives good outcome. Self-limiting nature of the disease gives 90% success rate with non-operative measures.

Understanding the etiology of the problem and directing treatment accordingly is the

key to successful treatment of plantar fasciitis. Close attention must be paid during the history and physical examination to ensure that other potential causes of heel pain are not missed. An organized, evidence-based, stepwise approach to treatment will help achieve good outcomes. Also essential is educating the patient about the expected time of recovery [3,4,5].

Pain is due to irritation due to inflammation, so initial measures are aimed at reducing inflammation like icing, nonsteroidal anti-inflammatory drugs (NSAIDs), activity modification, corticosteroids, orthoses. Other modalities aim at resolving degeneration like autologous blood injection, Platelet-rich plasma (PRP) injection, nitroglycerin patches, extracorporeal shock wave therapy (ESWT) and surgery. Physical therapy targets both goals. Combination of these modalities can be used

Icing

It reduces inflammation it should be done after stretching and strengthening exercises.

Activity modification

Activity modification to the level of relative rest is critical for improvement. In patients with severe pain, a period of casting or immobilization in a boot cast may be necessary. In one study, 25% of patients considered rest to be the most effective form of treatment [6].

NSAIDs

Anti-inflammatory drugs are first line in management. Although there is controversy as to whether NSAIDs actually assist in the physiologic healing process, these agents can be useful as an adjunct for controlling pain while the individual's plantar fasciitis is being treated with stretching, strengthening, and relative rest [6,7]. Daily dose during acute phase of treatment is necessary.

Corticosteroids

These can be used orally or via injections. Corticosteroid injections involve local, concentrated administration and are generally reserved for refractory cases [8]. Whether or not injected corticosteroids alter the long-term pathology of chronic inflammation, many patients experience acute symptomatic improvement [9,10]. One study found that ultrasound guided steroid injection provided short-term relief from pain in plantar fasciitis for up to 4 weeks and improvement in plantar fascia swelling for up to 12 weeks [11]. Whether or not the use of ultrasound guidance improves outcome of corticosteroid injections is unknown at present [12,13,14]. It can be relied on when palpation based injection has been unsuccessful [15]. A corticosteroid injection may be given through a plantar or a medial approach.

Studies have reported success rates of 70% or better [3, 16]. Corticosteroid injections have been shown to improve symptoms at 1 month but not at 6 months. It is

recommended not to give more than 3 steroid injections within a year.

A randomized, controlled study demonstrated that intralesional corticosteroid injection is more efficacious and more cost-effective than low-energy ESWT in the treatment of plantar fasciitis that has persisted for more than 6 weeks [17].

The complications of corticosteroid injection include skin atrophy, skin hypopigmentation, soft-tissue atrophy, infection, bleeding, and failure to work. A steroid flare-up, which consists of increased pain for up to several days, may occur in up to 2% patients [9]. Plantar fascia rupture was reported in 10% of patients in one case series [18]. Allergic reaction and infection are rare complications.

Botulinum toxin A

A short-term, randomized, controlled, double-blind study found that botulinum toxin type A injection appeared to provide significant improvements in pain relief [19]. Another study found that ultrasound-guided injection of botulinum toxin type A did not induce the complication of fat pad atrophy but was successful at improving the maximal center of pressure loading in the foot [20]. A randomized, controlled, double-blind study compared botulinum toxin type A injection to corticosteroid injection in 36 patients and found more rapid and sustained response in the botulinum toxin injected group [21].

Autologous blood

Injection of autologous blood into the calcaneal attachment of plantar fascia is thought to stimulate an acute inflammatory reaction, providing factors that stimulate fibroblast activity and vascular growth and thereby healing of lesion. Few studies support use of this modality for treatment of

heel pain attributed to plantar fasciitis [22,23,24].

Platelet rich plasma

There is some evidence to suggest that platelet-rich plasma may be beneficial in the treatment of chronic plantar fasciitis [25, 26]. Although both autologous blood and PRP injections appear to relieve symptoms of plantar fasciitis, these have no significant difference compared to corticosteroid injection [27,28].

Cryopreserved human amniotic membrane

Cryopreserved human amniotic membrane which contain growth factors, cytokines and matrix component are considered to promote tissue healing. This experimental treatment was evaluated by a randomized, controlled, double blind, study of 23 patients, at 12 week follow-up results were comparable to corticosteroid injection group [29].

Extracorporeal Shock-wave Therapy (ESWT)

ESWT has been proposed as a treatment option for plantar fasciitis. Bombardment of the tissue with high-pressure sound waves stimulate blood flow to stimulate healing, and shut down the neuronal pain pathways through the pulses hitting the affected nerves. ESWT is noninvasive, has few adverse side effects, and is associated with a satisfactory results in patients with chronic plantar fasciitis. In 2013, two meta-analyses concluded that ESWT could be a safe and effective nonsurgical treatment for plantar fasciitis [30, 31]. Some studies shown favorable results with success rate of 50-90% but overall results have been mixed so it is recommended to be used only after other measures have failed [32-35]. A Comparative study between ESWT and conventional physiotherapy showed similar results at 3 month follow-up [36].

Night Splints

During sleep plantar flexion leads to shortened plantar fascia, night splint maintain plantigrade position providing passive stretch to plantar fascia [37]. The passive stretching provided by night splint helps prevent microtrauma at the plantar fascia attachment with the first steps out of bed in the morning.

Use of night splint though cumbersome has 95% compliance [38] various studies shown excellent results in terms of improvement in symptoms [38-42]. Night splints are especially useful in individuals who have had symptoms of plantar fasciitis for longer than 12 months as suggested by some studies [38-42].

Night Splints

In one study 14 % patients considered shoe change a satisfactory treatment [6].

Shoe inserts can be used with shoes. A randomized, prospective study suggested that more supportive orthotics resulted in better pain relief as compared to softer, non-supportive orthotics [43].

Orthosis

Foot strike generates forces which are not absorbed and patients with low arch experience stress [44]. Studies support use of taping, arch support and custom orthotic devices for conservative treatment [6, 45, 46].

Taping may be more cost-effective for the acute onset of plantar fasciitis, whereas OTC arch supports and orthotics may be more cost-effective for chronic or recurrent cases of plantar fasciitis and for the prevention of injuries. Heel pads are widely used, but they are generally useful only for shock absorption and do not provide support or structural control [47]. A meta-analysis concluded that kinesiotaping was no more effective than standard taping techniques [48].

Physical Therapy

Physical therapy along with contrast bath, ultrasonography and iontophoresis help in resolution of symptoms. In one study, iontophoresis was found to improve symptoms faster but it had no effect on long-term outcome [49]. Physical therapy programs may be divided into stretching, strengthening, and maintenance phases.

- **Stretching:** Stretching of calf and foot resulted in successful relief in 83% patients, though the exact benefit are not known [6,50]. Wall stretching with the knee in both the extended and flexed positions, stair stretching, and towel stretching are all commonly employed. Stretching targeted at the plantar fascia are particularly important, passive stretching of toes and Achilles tendon increases the effectiveness [51].
- **Strengthening:** Strengthening of intrinsic foot muscles have proved beneficial [52] exercises include towel curls, marble pickups and toe taps [53].
- **Maintenance Phase:** Stretching and strengthening at least 2-3 times per week should be continued to prevent recurrence of symptoms.

Fasciotomy

Surgery may be required in 5-10% of patients not responding to non-operative measures for 6-12 months [3,4,5,54]. Plantar fascia release performed by sectioning part or all of the fascia has been the mainstay of treatment [55,56]. However

release of the plantar fascia results in instability of the medial column of the foot and lateral column pain due to overload [57]. 70 – 90 % success rate is reported with surgical release [58-63]. Bazaz & Ferkel [64] reported endoscopic release to provide improved outcomes for patients with less severe symptoms. Potential complications of surgical intervention include flattening of the longitudinal arch leading to strain and heel hypoesthesia [18, 65].

Percutaneous Partial Fasciotomy

Percutaneous release though offer quick return to function, have similar long term results as open fasciotomy [66].

Cryosurgery

A prospective study of 61 cases using small cryoprobe inserted percutaneously to destroy pathologic tissue at -70° C temperature concluded it to be an effective modality of treatment [67]. Another study reported 77% success rate at 2 year follow-up in 137 feet by this modality [68].

Bipolar Radiofrequency

Microdebridement

This new technique applies radiofrequency pulse to the plantar fascia, gives equivalent results as compared to traditional surgical methods. It has added advantage of earlier pain relief, decreased morbidity and early return to work. After 11 months of this procedure patients in a study achieved an average American Orthopaedic Foot and Ankle Society (AOFAS) hind foot score of 92 out of 105 [69]. Long term randomized double blind studies are recommended to prove it's superiority over other modalities.

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