

PLANTAR FASCIITIS: A REVIEW ARTICLE

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ABSTRACT

Plantar fasciitis is a common cause of heel pain in adults. It is a clinical diagnosis, as patients classically presents with pain that is particularly severe with the first few steps in the morning. Although it is a self-limited condition; however, due to the severity of the pain, medical attention is sought. Symptoms will ease quicker if risk factors are adjusted and multiple treatment modalities are started as early as possible. This article reviews plantar fasciitis; presents the most effective treatment options currently available.

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INTRODUCTION

Plantar fasciitis (PF) is also referred to as plantar heel pain, heel spur syndrome, or painful heel syndrome^[1]. It is an enthesopathy (an abnormality or injury at the site of attachment of a ligament or tendon to bone) of the origin of the plantar fascia at the medial tubercle of the calcaneus^[2]. This leads to inflammation of the thick tissue that creates the arch of the foot. Although commonly described as an inflammatory condition, researchers questioned the actual presence of inflammation in the entire procedure, thus related to the repeated microtrauma, from overstretch or overuse^[3,4].

Epidemiology, incidence and prevalence:

Plantar fasciitis (PF) is one of the most common musculoskeletal (MSK) complain of the foot as it accounts for about 80% of cases of heel pain^[5]. Researchers observed that 10% of the general population would experience it at least once in their lifetime^[6]. In the USA, it accounts for over one million visits per year to physicians' office^[7]. It thought to affects athletics alone, however, also observed in people with sedentary life style as well. It is affected, neither by age nor by gender^[7,8].

Etiology / Risk Factors:

Although the etiology is not clear, however, there are varieties of different data on proposed risk factors^[9]:

1. Excessive sudden weight load on the foot due to obesity or pregnancy. It have been observed that when the body mass index (BMI) > 25 kg/m², there is 2-fold increased risk for PF^[10].
2. Inflammatory arthritis such as rheumatoid arthritis (RA) and spondyloarthritis
3. Diabetes Mellitus^[11]
4. Hypothyroidism^[12]
5. Osteoarthritis^[13]

Local causes that lead to repeated microtruma of the plantar fascia suggested as follow:

- a. Mechanical imbalances of the foot problems are due to the foot itself or the use of shoes with poor arch support including flip-flops or soft soles. Foot and arch problems includes; pes planus (flat feet), pes cavus (high arches) and reduced dorsiflexion of the ankle (equinus gastrocnemius). Case-control studies reported the association between these mechanical risk factors increases the risk of plantar heel pain^[14,15].
- b. Heel spur (exostosis) studies have been conflicting for the association between PF and heel spur as it was observed in an X-ray of normal population (85% in patients with symptoms of plantar fasciitis vs. 46% of controls)^[16].
- c. Long-distance running, especially running downhill or on uneven surfaces^[17].
- d. Tight Achilles tendon, which is a common cause, prolongs

flexion of the foot causes shortening of the plantar fascia. Therefore, when the individual stand, it stretches the plantar fascia and accelerates pain^[18].

- e. Sudden changes in activities can easily place the tissue in repeated stress over a short period, such as a sudden jump, starting a new running program, or even changing of footwear^[19].
- f. Occupations requiring prolonged standing^[20].

Symptoms:

Plantar fasciitis (PF) is clinically diagnosed based on patient's history and physical exam. The most commonly reported symptom of PF is described as 'first-step pain' or 'post-static dyskinesia', which is pain or irritation at the heel rising after a period of non-weight bearing or inactivity. Such as rising from bed in the morning, standing up after working at the desk for several hours, or driving the car for a prolong period.

In severe cases, any activity that stretches the fascia as walking barefoot, climbing stairs, even toe walking will provoke pain. Thus, relieve by rest may radiate from the central part of the heel pad or the medial tubercle of the calcaneum to the medial longitudinal arch of the foot. The key physical finding is local point tenderness along the medial tuberosity of the os calcis^[21,22].

The pain could be trigger upon dorsiflexion of the patients pedal phalanges, which further stretches the plantar fascia (windlass mechanism)^[23].

The key diagnostic factors for PF are:

1. Presence of risk factors
2. Heel pain
3. Post static dyskinesia
4. Heel pain that is relieved by rest

Investigation:

Laboratory investigation performs to rule out underlying endocrine and inflammatory conditions. X-rays are required to rule out other causes of heel pain, specifically calcaneal stress fractures and not calcaneal spur, as its rules in the pathogenesis of PF is controversial^[17]. MRI is perform in patients who are resistant to treatment, to exclude alternative diagnoses that were not observed on the X-ray, such as a calcaneal stress fracture, calcium deposit, or soft-tissue tumor^[22].

Ultrasonography is the study imaging of choice due to its low cost when the diagnosis of plantar heel pain is unclear, but it requires a specialized training personal^[23].

Prognosis:

The natural history of PF is often self-limited and resolve in 80% of the patients with-in 1-4 years regardless of the treatment^[9]. What makes the patients seek medical attention is either the irritation or the incapacitating pain at the time of an attack. For that, trial of conservative therapies is advised before more invasive treatments are attempted^[23].

Treatment

Treatment for plantar fasciitis is divided into numerous categories:

1. Conservative care (patient education, orthotics, soft tissue therapy/massage, ice, heat, strengthening exercise, night splint, chiropractic therapy, electric modalities, acupuncture, and taping)
2. Extra-corporal shock wave therapy
3. Medication
4. Corticosteroids injection
5. Surgical intervention

Conservative treatment:

There is no consensus as to the proper way to manage plantar fasciitis due to the self-limiting condition. However, it is cost effective to try the low risk conservative interventions first, keeping in mind that patient who continue to have symptoms

despite 2-3 weeks of conservative treatment, referral to a specialist is recommended as CSI may be warranted^[9]. Acclaimed, all of these modalities are class B, which mean no large RCT conducted to evaluate it effectiveness; it only based on small studies.

Patient education: It is a self-limiting condition and the importance of combined multiple treatment regimens at the same time.

Physiotherapy: Many modalities are available at the physiotherapy department starting from the application of ice to the stretching exercises. Stretching of the plantar fascia and Achilles tendon considers one of the hallmarks in the management of PF as it relieve the stress on the plantar fascia. An RCT trail conducted on 66 patients showed that in the acute pain setting, Achilles tendon stretch was more effective than plantar stretch. However, at 1 year follow up, both stretching modalities relieved the pain in 90% of the cases^[24]. The main pain-relieving benefits of stretching appear to occur within the first 2-weeks to 4-months of the symptoms onset^[25,26]. Cochrane database systematic review stated that there was no evidence regarding the details of the stretching exercise, including number of repetitions or frequency of stretching, or if the stretch was done by a the patient or physiotherapist^[26-28].

Foot Orthotics: Wide variety of orthotic shoes are available ranging from over the counter prefabricated shoe inserts (e.g., silicone heel pad, felt pad, rubber heel cup) to custom made orthotics. The aim of orthotic therapy is to reduce strain on the plantar fascia by elevating the heel, supporting the medial arch and provide comfort. It is a useful tool for overweight.

Plantar fasciitis (PF) patients, by reducing shock and creating an even weight distribution over the plantar fascia^[29]. It is an effective method for both, short and long-term relief of pain as demonstrated in one of the longest studies with a follow-up period of 52-weeks. In the same study, the authors observed no differences between over the counter versus

custom made orthotic for pain relief^[21]. Furthermore, it has been document that combined treatment of stretching exercise and prefabricated foot orthotic was an easy and inexpensive modality to erase the pain^[30].

Splint: Posterior splint needs to be considered before repeating the CSI. It is worn at night to hold the patient feet at maximum dorsiflexion with toes in an extension position, creating a constant mild stretch of the plantar fascia. This allows the feet to heal at a functional length, preventing contraction and stiffening of the fascia especially in the morning. Limited evidence is found supporting the use of night splint in chronic cases^[25].

Extra-corporal Shock Wave Therapy (ESWT):

Few RCTs evaluated the effect of ESWT on the pain. Rompe et al. included 45 runners who had chronic heel pain for more than 12 months. They observed that 3 times per week treatments of ESWT significantly reduced morning pain in the treatment group at 6 and 12 months when compared with the control group^[31]. A recent study conducted by the same group showed that plantar fascia stretching program was superior to ESWT for treating acute symptoms^[32].

Medication:

The most common anti-inflammatory agents is cryotherapy (ice) followed by non-steroidal anti-inflammatory drugs (NSAIDs). They are helpful in decreasing both, acute pain and swelling, thus they decrease the pain temporary but not curatively. No studies were found evaluating the effectiveness of NSAIDs alone as it is a multifaceted approach^[33].

Corticosteroid injection (CSI):

Traditionally, CSI injections are administer to those with chronic heel pain after 3 weeks with no improvement on conservative treatment. Hence, keeping in mind that repeated CSI are associated with risk of plantar fascia rupture, fat pad atrophy and transient hyperglycemia in diabetic patients. It is a good method for short-term pain relief. Kim et al. retrospectively examined 120 patients with PF, rupture of the fascia was observed only in (2.4%) of the patients^[34]. The authors conclude that CSI therapy was safe and an effective form of non-operative treatment of PF associated with minimal complications. This is evidence by a Cochrane database systematic review, based on 19 published controlled clinical trials of fair or good quality, in which pain improvement was noticed at 1 month, but not after 6 months of the procedure^[26]. Interestingly, a recent systematic review Uden et al., showed that combined orthosis and CSI resulted in an acute pain relief of PF^[35]. The drawback of CSI, it needs to be performed by a trained physician and the intense post injection pain.

Surgery:

Surgery is rarely indicated. In a retrospective study done at the Mayo clinic, over a 12-year period, only 16 procedures were performed^[36]. Thus, reserve for patients who have continuous pain despite 9 months of conservative treatment. The most common procedure is a partial plantar fasciotomy which could be open, percutaneous, or endoscopically.

Closed is preferred from the open method due to the short recovery time. The success rate of surgical release is variable 70–90% and the recovery range from several weeks to few months^[37].

Nutritional Supplementation:

The following additions supplements to the diet have been recommended to ease the pain: Vitamin C, Zinc, Omega-3-Fatty acid and Glucosamine. Thus, keeping in mind that there is no evidence behind it, and if an individual chose to use it, it will be in addition to the conservative therapy under the doctor supervision^[38].

CONCLUSION

Plantar fasciitis is an overuse injury that disturbs the daily activity. It is a clinical diagnosis and a self-limited condition in majority of patients. Limited evidence is available for all the therapeutic options. However, it is successful treatable if more than one modality is used at the same time in the early symptoms.

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