The Effectiveness of the Fore Foot Mobilization (Grade I & II) and Stretching of Planter Fascia along with Ultra Sonic Therapy (continuous mode) in the Treatment of Planter Fasciitis.
Kanwal R1, Khan A2, Iram S3, Janjua U I4

Abstract

Objective: To evaluate the significance of fore foot mobilization (grade I & II) along with ultrasound (continuous) and planter fascia stretching techniques in patient of planter fasciitis.

Method: The study was started by selecting the 5 patients from the out patients department of Fauji Foundation Hospital Rawalpindi, with at least 4 months history of planter fasciitis and manual tests were performed to diagnose the planter fasciitis. Every session was started by assessment of improvement of the symptoms in each patient.

Results: After the completion of the treatment program it was observed that fore foot mobilization (grade I & II) along with ultrasound (continuous) and stretching of planter fascia are effective treatment modalities for planter fasciitis. The improvement in the condition was assessed by the improvement in the symptoms. At the end of study, these techniques improved the 90% of symptoms of planter fasciitis in all the patients.

Conclusion: it is concluded that fore foot mobilization (grade I & II) along with ultrasound (continuous) and stretching of planter fascia and patient education were very effective in the management of planter fasciitis.

Introduction

The plantar fascia is a thickened fibrous aponeurosis arises from the medial calcaneal tubercle and form the longitudinal foot arch. Its function is to support the longitudinal arch and dynamic shock absorption. Patients with pes planus or pes cavus are the risk for developing plantar fasciitis. Additional risks include overpronation, leg length discrepancy, excessive tibial torsion, excessive femoral anteversion, and increased body mass index. Functional risk factors include tightness or weakness of the gastrocneumius, soleus, Achilles tendon and intrinsic foot muscles (1).

Plantar fasciitis is a most common cause of heel pain in adults. The pain is commonly caused by collagen degeneration at the origin of the plantar fascia. This degeneration is due to repetitive micro tears of the plantar fascia that rise above the body’s capacity to repair (2).

The classic sign & symptoms of plantar fasciitis is that the worst pain occurs with the first few steps in the morning or in more severe cases, the pain worsens just before the end of the day (3). In general, plantar fasciitis is a self-limiting disease and takes 6–18 months to recover, which can lead to frustration for patients and physicians as well (4).

Many treatment options are available; one of the most effective is rest. Avoidance of aggravating activity provide significant relief. Stretching
programs correct functional risk factors, like tightness of the Achilles tendon and weakness of intrinsic muscles of the foot. One study quoted stretching and strengthening exercises as the treatment that worked best for 29 % of PF patients.\(^5\) Very important considerations for treatment include temporary stop the intense weight bearing activity as much as possible; avoidance of walking barefoot on hard surfaces; and substitute of any worn or ill-fitting shoes with new, more accommodating footwear. Stretching with manual therapy along with ultrasound is helpful for treatment and avoidance of recurrence. Three case reports were found in the literature which included impairment-based manual therapy intervention for plantar heel pain. Pollard and So reported full recovery.\(^6,\,7\) There are particulars to support the use of forefoot mobilization (Grade I and II) for pain and functional enhancement. Fore foot mobilization include anterior and posterior glides of the tarsometatarsal joint, distraction and mobilization according to cancavo-convex rule.\(^8\)

**Methods**

The study was started by selecting five patients from the out patients department of Fauji Foundation Hospital Rawalpindi, patients were selected randomly with at least four months history of plantar fasciitis. The patient pain was assessed by using numeric pain rating scale. Data was analyzed on bar charts. Every session was started by assessment of improvement of the symptoms in each patient.

**Cases**

Case-1: A 50 year old lady, nursing incharge by profession had insidious onset of pain on the sole of her right foot two months back. Pain gradually increased day by day in intensity, more in early morning when she started keeping her foot on the floor. On NPRS the intensity of pain was 7/10. (Figure I) On radiographs there was no bone abnormality. On inspection disuse atrophy of muscles of foot was observed. On palpation there was significant stiffness in muscles of sole of foot. Range of motion on ankle and first metatarsophalangeal joint found decreased. Windlass test is positive both in weight bearing and non weight bearing Positions

Case-2: A 37 years old female came to me with severe pain in her left foot. She was housewife. She complained of pain on the medial area of calcaneus of her left foot for two and half months back. Pain increased gradually in intensity; Pain intensity was 6/10 on NPRS. (Figure I) On palpation tightness in muscles of sole of foot was present. Range of motion at ankle was decreased which is positive sign for planter fasciitis. Windlass test was positive both in weight bearing and non weight positions.

Case-3: The subject was 55 years old male, who was a hawker. He developed pain on medial aspect of sole of his right foot 3 months back. He felt too much pain in early morning. The intensity of pain increased day by day and 7/10 on NPRS. (Figure I) In radiographs there were mild sclerotic changes at first metatarsophalangeal joint. The joint was also stiffed in morning along with tightness of the planter fascia. Windlass test was positive in the patients.

Case-4: A 35 years old female patient, who was supervisor in a factory by profession, had gradual onset of pain in muscles of sole of her right foot since last 3 months. The patient experiences moderate pain in her daily activities. Pain was 5/10 on NPRS. (Figure I) There was slight decrease in the flexibility of Planter facia.

Case-5: A 57 years old male patient, retired as a supervisor from a well reputed hotel came with
history of pain in his right foot one month back. He complained that pain was very severe on walking and stair climbing. The intensity of the pain was 8/10 on NPRS. (Figure I) He was taking Diclofenic Potassium (50mg) for pain relief but pain did not fully relieve. Radiograph shoed arthritic changes in the metatarsophalangeal joint.

![Figure I: Numeric Pain rating Scale before Treatment](image)

**Intervention**

The every subject received series of at least fifteen sessions; each session consist of 45-50 minutes. The sessions were given 5 times a week for three weeks and the sessions were administered by a physical therapist. Each session was focused to decrease pain, to increase ROM, to facilitate healing process and to strengthen muscles. Each subject also received therapeutic ultrasound (continuous) for 7 minutes with frequency of 1 W/cm². After application of ultrasound (continuous) each individual received stretching for planter fascia. Each stretching was performed for 30 second with 10 second rest. Every session consisted of 5 repetitions of stretching exercises. In the last every patient received manual mobilization of fore foot for at least 18-20 minutes. These techniques included joint distraction along with grade I & II mobilization.

After manual session, review of client state was taken with numeric pain rating scale. After manual mobilization strengthening exercise of plantar flexor muscles were performed. The clients were educated about the movement and position that in turn enabled the client to discover the movements and position which led the client to ease and comfort.

**Result**

After the completion of treatment sessions, it was included fore foot mobilization (Grade I & II) along with ultrasound therapy (continuous) and stretching exercises of planter fascia was effective in the treatment of planter fasciitis. There were total five clients in the study. Three out of five clients were fully recovered from the condition. Two of them were remained with mild pain which was associated with activity. The both clients had slight degenerative changes in first metatarsophalangeal joint that might be the cause of recurrent pain. The results of numeric pain rating scale were showed in Figure II.

![Figure II: Numeric Pain Rating Scale After Treatment](image)

**Discussion**

The manual mobilization Grade I & II, Stretching exercises and ultrasonic therapy used in this series were overwhelmed at pain due to planter fasciitis with the aim of re-establishing normal joint motion and evaluating the effects on the patient’s plantar foot pain. The reason that each patient received a treatment interventions besieged to the patient’s pain, the virtual benefits of all part of the treatment plan could not be determined. The clinical reasoning
method was based on treating joint or tissue impairments by means of Grade I & II Joint mobilization. Given the instantaneous improvement in pain and mobility after treatment, it seemed improbable for these improvements to be attributable. However, given the lacking in of control group for comparison purposes, no cause-and-effect relationships can be established.

The results of this case series are, alike to the conclusions of before reported manual physical therapy interventions, for plantar fasciitis. The fast improvement in pain rating and function from the treatment provided in this case series makes the episode of inflammation in these patients as the primary source of symptoms doubtful. Lemont reported on 50 cases that received heel spur surgery for chronic plantar fasciitis. Degeneration with no inflammation was established when evaluating the plantar fascia tissue for each case. Interestingly, there has been significant concentration in the current literature on the topic of tendinopathy and deficient in the identified inflammation in this disorder.

Perhaps true plantar fasciitis is alike to tendinopathy in the injury and repair process. Further research is obligatory to determine the efficacy of impairment-based physical therapy interventions for plantar heel pain and plantar fasciitis. Research must also attempt to classify which patients with plantar fasciitis are likely to respond to particular interventions, such as the subtalar joint distraction and for foot mobilization in an attempt to maximize patient outcomes.

In a current multicenter clinical trial, Pfeffer et al. established that use of ultrasound therapy in combination with a stretching program was the most effective treatment modality to decrease symptoms in patients with principally acute plantar fasciitis for duration of six months or less.

Turlik et al. reported on their study of shoe inserts for plantar fasciitis, and patients in their protocol could have ultrasound therapy if they so preferred

Principal considerations for treatment should contain temporary cease from extreme weight bearing activity as much as possible; avoidance of walking on tough surfaces; and substitute of any damaged with new, more accommodating footwear. Stretching with manual therapy all along with ultrasound is useful for treatment and prevention of recurrence.

Conclusion

At the end of the research study it was proved now that fore foot mobilization (Grade I &II) along with ultrasound (continuous) and stretching of planter fascia techniques are very effective treatment modalities in the management of planter fasciitis. These modalities have both the mechanical and physiological basis for their significance in the management of planter fasciitis. The mechanical basis is that its increase flexibility by releasing its hardness or tightness due to prolong immobility secondary to injury or compression. The second one is the physiological basis in which fore foot mobilization and ultrasound increases blood supply to the injured or effected part and nourishes the injured or effected portion. Manual mobilization of tarsal bones and stretching of the planter fascia technique have significant role in reducing the symptoms in planter fasciitis. In addition to that proper client education about position and movement’s awareness of the foot would help the client to control the symptoms of planter fasciitis and how to avoid recurrence of planter fasciitis by following proper guidance and education about
planter fasciitis. It is very important for therapist to teach the self mobilization and self stretching techniques to the clients so that can be eligible to mange planter fasciitis by themselves.

A variety of treatment options are available to patients. The most prudent approach to therapy is to employ conservative treatments first. Primary considerations for treatment should include temporary refrain from intense weight bearing activity as much as possible; avoidance of walking barefoot on hard surfaces; and replacement of any worn or ill-fitting shoes with new, more accommodating footwear. Stretching with manual therapy along with ultrasound is beneficial for treatment and prevention of recurrence

Due to small sample size and study design the result can not be generalized. However to to generalized results, comparative study with large sample for extended period of time would be needed.

References
Patients with Chronic Plantar Fasciitis. Journal of the American Podiatric Medical Association 95 (6): 517–524. PMID 16291842


