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### Effect of manual therapy versus conventional therapy in patient of plantar fasciitis

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#### ABSTRACT

##### Objectives

The objectives of the study were to find effectiveness of conventional therapy, manual therapy in decreasing pain in plantar fasciitis patient, and also to compare the effectiveness of conventional therapy versus manual therapy in decreasing pain in plantar fasciitis patient.

##### Method

The study was done at physiotherapy OPD , patients diagnosed with plantar fasciitis both in male and female having symptoms for at least 4 weeks or more were included in this study. 20 subjects who fulfilled the inclusion and exclusion criteria were equally divided into two groups by purposive method. The total duration of study was 2 weeks. Then they were evaluated for pain and disability using Foot Function Index.

##### Result

The analysis of significance was carried out by using unpaired t- test to compare the effectiveness of manual therapy (ankle mobilization & myofascial release therapy) on pain as compared to conventional physiotherapy. Results were found to be significant for t- value i.e 2.68 at p-value 0.05.

##### Conclusion

This study concluded that the manual therapy (ankle mobilization & myofascial release) is more beneficial than conventional physiotherapy to improving the pain in patients with plantar fasciitis.

**Keywords:** VAS, Range of Motion, Physical therapy, Manual Therapy, MFR, Heel Pain

## INTRODUCTION

Plantar fasciitis (PF) is a degenerative syndrome of the plantar fascia resulting from repeated trauma at its origin on the calcaneus. (14) PF is reported to be the most common cause of inferior heel pain in adults.(15) Other names for PF include painful heel syndrome, heel spur syndrome,(16) runner's heel, subcalcaneal pain, calcaneodynia, and calcaneal periostitis.(17) The word "fasciitis" assumes inflammation is an inherent component of this condition. However, recent research suggests that some presentations of PF manifest non-inflammatory, degenerative processes and should more aptly be termed "plantar fasciosis"(14,16). PF affects individuals regardless of sex, age, ethnicity, or activity level. It is seen in physically active individuals such as runners and military personnel, but is also prevalent in the general population, particularly in women ages 40-60.(19,20,21)

Etiology and Pathophysiology-The plantar fascia is a thickened fibrous sheet of connective tissue that originates from the medial tubercle on the undersurface of the calcaneus and fans out, attaching to the plantar plates of the metatarsophalangeal joints to form the medial longitudinal arch of the foot. It provides key functions during running and walking. In general, the purpose of the plantar fascia is two fold – to provide support of the longitudinal arch and to serve as a dynamic shock absorber for the foot and entire leg. As one walks, the heel makes contact with the ground. Just after this contact, the tibia turns inward and the foot pronates, stretching the plantar fascia and flattening the arch. This allows the foot to accommodate for irregularities in the walking surface that exceeds the body ability to recover. When PF occurs in elderly adults, it is often attributable to poor intrinsic muscle strength and poor force attenuation, secondary to acquired pes planus (excessive pronation of the foot) and compounded by a decrease in the body's healing capacity(22). Recent case-controlled studies have identified obesity or sudden weight gain, reduced ankle dorsiflexion, pes planus, and occupations that require prolonged weight-bearing as the greatest risk factors associated with PF. One study observed that individuals with a body mass index (BMI) > 30 kg/m<sup>2</sup> (the cutoff for grade-II obesity) had an odds ratio of 5.6 for PF compared to those with a BMI ≤ 25 kg/m<sup>2</sup>. The same study observed that risk of PF increases as the range of ankle dorsiflexion decreases(22). Individuals with <10 degree of ankle dorsiflexion had an odds ratio

of at least 2.1 for PF. The ratio increased dramatically as the range of dorsiflexion decreased. Reports state that 81-86% of individuals with symptoms consistent with PF have excessive pronation. Individuals with pes planus, associated with low arches or flat feet (23), are thought to be at greater risk for PF. However, individuals with pes cavus are also potentially at risk due to the inability to effectively dissipate tensile forces during weight bearing activities. Other potential anatomical risks include leg length discrepancy, excessive lateral tibial torsion, and excessive femoral anteversion. People with occupations requiring prolonged weight-bearing have long been considered at risk of PF because of the repetitive tensile load placed on the fascia. Heel spurs have commonly been implicated as a risk factor for PF. Approximately one-half of patients diagnosed with PF have heel spurs, although it is unclear how much influence heel spurs actually have on the condition.

### *Signs and Symptoms*

The classic presentation of PF is pain on the sole of the foot at the inferior region of the heel. Patients report the pain to be particularly bad with the first few steps taken on rising in the morning or after an extended refrain from weight-bearing activity. The pain can be so severe the patient limps or hobbles around with the affected heel off the ground. After a few steps and through the course of the day, the heel pain diminishes, but returns if intense or prolonged weight-bearing activity is undertaken. Initial reports of the heel pain may be diffuse or migratory; however, with time it usually focuses around the area of the medial calcaneal tuberosity. Generally, the pain is most significant when weight-bearing activities are involved, and can often be correlated to increased amount or intensity of physical activity prior to onset of symptoms. Diagnosis of PF is usually made on the basis of history and physical examination. Pain on first rising in the morning is typical of PF, and may be helpful in distinguishing it from other forms of heel pain. For example, in the case of a calcaneal stress fracture or nerve entrapment, pain would actually increase with more walking, rather than diminish after the first few steps. Associated paresthesia is not a common characteristic of PF. Nocturnal pain should raise suspicion of other causes of heel pain, such as tumors, infections, and neuralgia (including tarsal tunnel syndrome). PF is usually unilateral, but up to 30 percent of cases have a bilateral

presentation. Bilateral disease in young patients may indicate Reiter's syndrome. Patients should also be questioned about other features of seronegative arthritides. Physical examination presents with localized tenderness at the antero-medial aspect of the calcaneus. Pain may be exacerbated by passive dorsiflexion of the toes or having the patient stand on the tips of the toes. Tightness of the Achilles tendon (with dorsiflexion at the ankle limited by 5 or more) is found in almost 80 percent of patients. Diagnostic imaging is rarely indicated for initial evaluation and treatment, but may be helpful in certain cases to rule out other causes of heel pain. Plain radiographs can rule out calcaneal stress fracture and may detect an underlying spondyloarthropathy. Bone scans and magnetic resonance imaging (MRI) may also serve useful, but are not routinely used. Ultrasonography is another useful tool to diagnose PF.

### ***Need for Study***

Plantar fasciitis is a non-inflammatory degenerative syndrome of the plantar fascia resulting from repeated trauma at its origin on the calcaneus. Plantar fasciitis is the most common cause of heel pain. It has been estimated that it affects as much as 10% of the general population over the course of a lifetime. The condition is thought to be multi-factorial in origin with factors such as obesity, decreased ankle joint range of motion, prolonged weight bearing and increase in age are suggested to be commonly involved. Conservative management is reportedly very successful. Cryotherapy, therapeutic ultrasound with or without phonophoresis, electrical stimulation, whirlpool and administration of NSAID through iontophoresis are said to be effective. But there are evidences which support that manual therapy is effective in the management of heel pain. This study may be useful in determining the effective regime between conventional therapy and manual therapy in foot functional ability in plantar fasciitis patients.

## **MATERIALS AND METHODOLOGY**

The study was done to find out the effect of manual therapy versus conventional therapy in patient of plantar fasciitis between the age group of 30 to 50 years. The objectives of the study were to find effectiveness of conventional therapy, manual therapy in decreasing pain in plantar fasciitis patient, and also to compare the effectiveness of conventional therapy versus manual

therapy in decreasing pain in plantar fasciitis patient. The study was done at physiotherapy OPD , patients diagnosed with plantarfasciitis both in male and female having symptoms for at least 4 weeks or more were included in this study. Radiological evidence showing calcaneal spur, any acute inflammation in ankle-foot region, red flags to manual therapy (i.e. tumor, fracture, osteoporosis), prior surgery to distal tibia, fibula, ankle joint or rear foot region were the exclusion criteria for this study. Study design was a comparative study. Ethical clearance was taken from the institutional ethical committee before the commencement of work and the study was carried out for six months. A convenient sampling method was used for current study. Sample size was 20. The outcome measures used for the study were NPRS scale and Foot Function Index.

### ***Procedure***

The aim, objectives and method were explained to the participants willing to be included in the study. And informed consent was taken from each subject prior to participation. 20 subjects who fulfilled the inclusion and exclusion criteria were equally divided into two groups by purposive method. The total duration of study was 2weeks. Then they were evaluated for pain and disability using Foot Function Index.

### ***Treatment Regimen for Group A (Conventional therapy)***

Ultrasound with an output of 1.5 w/cm<sup>2</sup> for 7 minutes using a continuous mode with a frequency of 3MHz. Ice pack was given for 10 minutes over the heel region.

### ***Treatment regimen for Group B (Manual therapy):***

1. **Mobilization:** For Ankle-foot complex - Posterior glide and Distraction manipulations given patients position for ankle mobilization was in supine lying position and ankle joint was placed at the end of the couch. Kaltenborn mobilization with application of the grades of Maitland mobilization was given.

2. **Myofascial release technique** was performed by placing the ankle joint at the end of the couch in supine lying position.

The total duration of the treatment program for Group A and B was 2 weeks with 6 sittings with alternate days. The assessment was done at 2 weeks and

the parameter assessed was pain and disability scale using Foot Function Index.

## RESULTS

The paired t - test was employed to compare the mean difference in both the groups. Results were found to be significant for t- value i.e 2.68 at p-value 0.05. Table 1 describes the mean and standard deviation of FFI of the patient for group A and group B where mean

values of FFI of pre and post test group A and group B and the mean of pre-test is 15.32 while post-test value is 8.76 for group A as well as for group B the pre-test and post-test values are 15.32 and 5.62 respectively. This describes the FFI of the patient improves after manual therapy as compare to conventional physiotherapy. Table 2 describes the Comparison of difference of Mean Values of pre and post interval for Foot Function Index between Group A and Group B and t- value 2.68 is statistically significant at p-value <0.05.

**Table 1: Mean and SD of FFI for The Group A and Group B.**

FFI	Group A		Group B	
	Mean	SD	Mean	SD
Pre Test	15.32	1.28	15.32	0.81
Post test	8.76	0.55	5.62	0.49

**Table 2: Comparison of Difference of Mean Values of Pre and Post Interval for foot function Index between Group A and Group B.**

Mean diff. (Pre-Post)	Group A Vs Group B	
VAS Score	t- value	p-value
	2.68	P<0.05

## DISCUSSION

The results of the present study reported that the combination of ankle mobilization & myofascial release (manual therapy) may be useful for patients with plantar fasciitis. Though improvement was also seen in the other group receiving conventional physiotherapy but improvement in FFI was more in the manual therapy group.

This study showed that manual therapy is more effective in improving pain and disability in patients with plantar fasciitis. This is in accordance with the previous studies done by who support the use of manual physical therapy as superior approach in the management of plantar heel pain. They concluded in this study that patients of heel pain who were managed with manual physical therapy reported clinically meaningful reduction in pain and dysfunction. In plantar fasciitis, the fascia undergoes degeneration and becomes tight thereby leading to hypomobility within the ankle-foot complex, especially talocrural, subtalar and 1<sup>st</sup> tarsometatarsal joints. Limitation of talocrural joint dorsiflexion, would require compensatory

movements at more distal joints to allow forward progression of leg over the foot during stance phase of the gait.

In this study intensity of pain was measured using FFI. There was significant improvement in both the groups but more clinically meaningful changes were seen in the manual therapy Group.

The present study was done on 20 patients, 10 patients was selected for group A and another 10 was selected for group B. Group A received for conventional physiotherapy and group B received for manual therapy (ankle mobilization & myofascial release), before and after treatment foot function index was measured and found that foot function index score of group B(manual therapy) was improved early as compared to Group A (conventional physiotherapy).

## CONCLUSION

It is concluded that the manual therapy (ankle mobilization & myofascial release) is more beneficial than conventional physiotherapy to improving the pain in patients with plantar fasciitis.

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