

Efficacy of Myofascial Release in Addition to Conventional Physiotherapy for Plantar Fasciitis: A Randomized Controlled Trial

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Abstract: Background: Up to 10% of people experience inferior heel discomfort at some point in their lives due to plantar fasciitis, which is the most prevalent cause. This study aims to assess how myofascial release affected plantar fasciitis patients' pain, functional limitations and improve ankle range of motion. Methods: Two groups of thirty individuals having a clinical diagnosis of plantar fasciitis were randomly assigned into two groups. Group A (n = 15) was an experimental group that received both conventional physiotherapy and myofascial release; Group B (n = 15) was a control group that received only conventional physiotherapy. For six weeks, both groups received therapeutic intervention, with three sessions per week. The Foot and Ankle Disability Index (FADI) was used to measure functional disability, and the Visual Analogue Scale (VAS) was used to measure pain severity. In order to assess functional improvement, secondary outcomes were ankle range of motion (ROM), particularly dorsiflexion and plantarflexion. At baseline, the third week, and the sixth week after the intervention, measurements were taken. Results: When compared to baseline, both groups demonstrated a significant improvement in every outcome measure at three and six weeks. However, compared to the control group, the experimental group showed a considerably higher increase in functional capacity and a reduction in pain intensity ($p < 0.05$). Both groups showed improvements in their ankle range of motion (plantarflexion and dorsiflexion), with the experimental group showing the most improvement. Conclusion: Myofascial release, in conjunction with conventional physiotherapy, is more effective than conventional physiotherapy alone in reducing pain, enhancing functional abilities, and improving ankle range of motion in individuals with plantar fasciitis.

Keywords: Friction Massage; Heel Pain; Myofascial Release; Plantar Fasciitis; Stretching; Ultrasound Therapy.

1. Introduction

Plantar fasciitis (PF), a chronic degenerative illness that causes medial plantar heel pain, accounts for more than 1 million physician visits each year.^[1] This is defined as an inflammation of the plantar fascia. The injury is an enthesopathy of the plantar fascia origin at the calcaneal medial tubercle, produced by severe traction.^[2] Without regard for gender, persons between the ages of 40 and 60 years are most commonly affected by PF.^[3] Plantar fasciitis is more likely in those whose ankle dorsiflexion range is limited, who spend the majority of the day standing up and whose BMI is greater than 30 kg/m².^[4] Some workers even suggested the word "fasciosis" rather than fasciitis because of the chronic nature of the disorder and the presence of degeneration rather than inflammation.^[5] The prevalence of plantar fasciitis varies across occupational groups in India, with 35.13% reported among mall workers in Kolhapur and up to 54% among pharmacists, likely due to prolonged standing. Overall, prevalence increases with age, contributing to a higher occurrence in middle-aged and older working populations.^[6]

Plantar fasciitis is a biomechanical overuse condition characterized by degenerative changes at the plantar fascia insertion on the calcaneal medial tubercle. Repetitive tensile stress leads to microtearing and a chronic failed healing response. Contributing factors include enthesopathy and possible involvement of the flexor digitorum brevis. Poor

biomechanics, particularly in individuals with high arches, reduce shock absorption and increase plantar fascia strain during weight-bearing.^[7,8]

Pain in the inferior heel area of the sole is the traditional symptom of plantar fasciitis. The first few steps performed after awakening in the morning or after a prolonged break from weight-bearing activities are particularly painful. In many cases, the discomfort goes away after a few steps and throughout the day, but it comes back if vigorous or extended weight-bearing exercise is done. Although the heel pain may begin as widespread or migratory, it eventually tends to centre in the medial tuberosity of the calcaneum.^[3]

Plantar fasciitis is typically a self-limiting condition, so conservative therapy is the first line of treatment and includes NSAIDs, stretching exercises for the Achilles and plantar fascia, orthotics and physical therapy. Myofascial release (MFR) is a soft tissue mobilisation technique used for chronic conditions that cause tightness and restriction in soft tissues. Myofascial release technique leads to a change in viscosity of the ground substance to more fluid state, thus eliminating the fascia's excessive pressure on pain-sensitive structure and restoring proper alignment.^[9] Several studies have shown that Myofascial techniques have been shown to stimulate fibroblast proliferation, leading to collagen synthesis that may promote healing of plantar fasciitis and act as a catalyst in the resolution of plantar fasciitis.^[2] Deep stripping on the plantar surface of the foot towards the

calcaneus is a common soft tissue management technique in MFR, as is friction to the plantar fascia away from the calcaneus. MFR over the pressure pain area of the fascia, the calcaneus, and the gastrocnemius and soleus muscles was found to help lower pain and enhance function.^[10]

Therefore, the present study aimed to critically evaluate the true clinical efficacy of MFR by determining whether its integration with Conventional Physiotherapy yields superior outcomes in pain reduction and functional restoration compared to routine treatment alone.

2. Methods

Study design

The study was a randomized controlled trial in nature. The current study was approved by Ethical Committee, UCOP, Baba Farid University of Health and Sciences, Faridkot (No.BFUHS/2K25p-TH/22499). The relative design, conduct and data analysis of this research followed the recommendations of the CONSORT guidelines (Fig. 1)

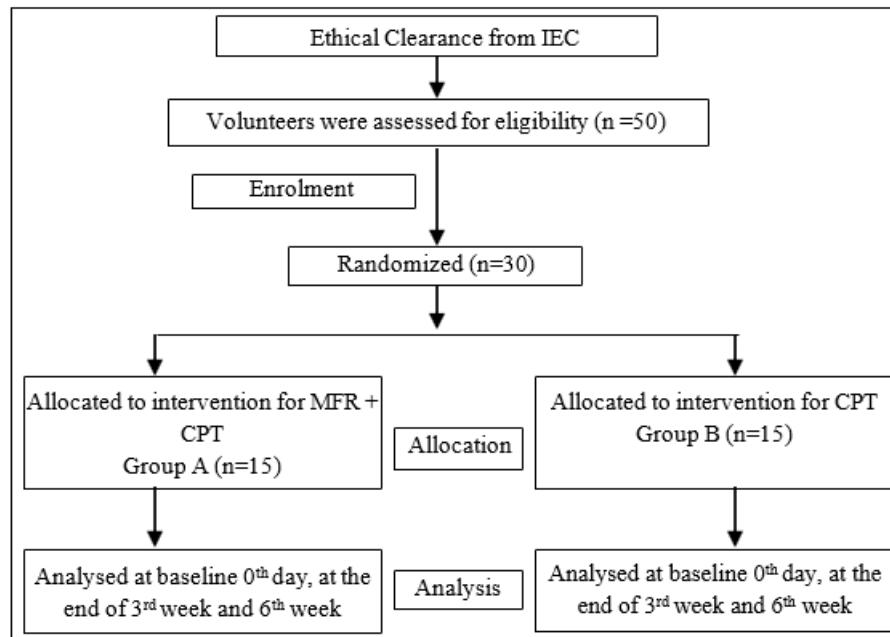


Figure 1: CONSORT flow diagram

3. Participants

A total of 30 patients, both male and female, aged 40-60 years, clinically diagnosed with plantar heel pain and assessed for Plantar Fasciitis, were enrolled in this study.

The inclusion criteria were as follows: (1) Both males and females were taken; (2) Patients with prolonged standing; (3) Patients experiencing heel pain on their first step in the morning; (4) Positive windlass test; (5) Limited ankle dorsiflexion range of motion. The exclusion criteria were as follows: (1) Patients with previous surgeries of foot and ankle joint; (2) Patients with any fracture of the foot or lower tibia; (3) Patients with any muscle strain or stress injury on foot and ankle joint; (4) Radiological evidence showing calcaneal spur.

4. Procedure

A total of 30 patients were included. All patients completed the full duration of the study. They were included in the study after taking their informed written consent, along with the explanation of the brief study protocol. The patients were assessed as per the assessment form. After meeting inclusion criteria, these patients were randomly divided into two groups, Group A (n=15) and Group B (n=15). Group A was the experimental group where Myofascial Release with Conventional Physiotherapy and Group B was the control

group in which Conventional Physiotherapy was given. The primary outcome measures included Visual Analogue Scale (VAS) for pain intensity and Foot and Ankle Disability Index (FADI) for functional limitation. The secondary outcome measure focused on ankle ROM. Patients in both groups were assessed at 0th day before the administration of physiotherapy intervention and after 3 weeks and 6 weeks of treatment.

5. Interventions

All patients received the intervention for 6 weeks, with 3 sessions per week. MFR was given for 15 min and conventional physiotherapy for 30 min.

Group A received Myofascial Release with Conventional physiotherapy

1) MFR for Gastrocnemius ^[11]

In prone with feet positioned for easy dorsiflexion, the index and middle fingers were placed on the gastrocnemius tendons at the femoral epicondyles. An inferior line of tension was applied with gradual, sustained pressure into the posterior knee, progressing into the superior fibrous portion of the muscle. (5 min×1).

2) MFR for Soleus ^[11]

In prone with the feet supported to maintain 10–15° knee flexion, the elbow was applied to the Achilles tendon. Gradual pressure was directed into the intermuscular

fascia between the soleus and gastrocnemius, with a superior line of tension, while the patient actively dorsiflexed. (5 min×1).

3) MFR on plantar fascia ^[11]

In prone with feet off the table, the knuckles engaged the soft tissue just anterior to the calcaneus. An anterior line of tension was applied, progressing toward the forefoot and deeper layers, while the patient performed toe flexion and extension (5 min × 1).

Conventional Physiotherapy includes:

Plantar fascia stretching was done by dorsiflexing the toes until tension was palpably felt in the medial arch; each stretch was sustained for 30 seconds and repeated five times. In contrast bath therapy the foot was submerged in warm water (40–45°C) for three minutes and cold water (15–20°C) for one minute. This process was repeated four to five times, ending with warm water immersion. During each therapy session, the thumb was used to apply circular deep friction over the area of greatest sensitivity. For five minutes, the plantar fascia was subjected to continuous therapeutic ultrasound at a frequency of 1 MHz and an intensity of 1 W/cm². ^[8,12]

Group B received only conventional physiotherapy.

Outcome Measures

Visual Analogue Scale (VAS)

The Visual Analogue Scale (VAS) is a pain rating scale. A single handwritten mark placed at one point along the length of a 10-cm line that represents a continuum between the two ends of the scale no pain on the left end (0 cm) of the scale and the worst pain on the right end of the scale (10 cm).^[13]

Foot and Ankle Disability Index (FADI)

This scale was developed based on the World Health Organisation's model of disability and handicap. The researchers who designed this scale also reported it to be reliable and valid in patients with lower extremity musculoskeletal conditions. The FADI has 26 items, and the

FADI Sport has 8. Each item is scored from 0 (unable to do) to 4 (no difficulty at all).^[14]

Universal Goniometer

The range of motion of ankle dorsiflexion and plantarflexion was measured using a universal goniometer.^[10]

Statistical analysis

The data were analysed using the Statistical Package for the Social Sciences (SPSS) version 27. Statistical analysis was performed using paired and unpaired t-tests. The paired t-test was used for within-group comparisons, while the unpaired t-test was used for between-group comparisons.

6. Results

Statistically significant differences were observed in 3rd and 6th week between Group A and Group B. VAS scores were comparable at baseline ($p > 0.05$) but showed significant differences at 3 and 6 weeks ($p < 0.05$). At 6 weeks, the experimental group had lower VAS scores (2.66 ± 1.23) than the control group (4.80 ± 1.08) (MD = 2.13).

FADI scores were similar at baseline ($p > 0.05$) but differed significantly at 3 and 6 weeks ($p < 0.05$). At 6 weeks, the experimental group had higher FADI scores (89.26 ± 4.71) than the control group (63.73 ± 3.76) (MD = 25.53).

Dorsiflexion ROM was comparable at baseline ($p > 0.05$) but significantly greater in the experimental group at 3 and 6 weeks ($p < 0.05$). At 6 weeks, values were 13.73 ± 1.66 and 7.86 ± 0.99 (MD = 5.86) for the experimental and control groups, respectively.

Plantarflexion ROM showed no baseline difference ($p > 0.05$) but was significantly higher in the experimental group at 3 and 6 weeks ($p < 0.05$). At 6 weeks, values were 46.40 ± 1.88 and 33.20 ± 1.01 (MD = 13.20) for the experimental and control groups, respectively.

Table 1: Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of VAS between Group A and Group B

Unpaired t-test	Comparison					
	Visual Analogue Scale					
	0 th day		3 rd week		6 th week	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Mean	7.600	7.600	5.200	6.333	2.666	4.800
S.D.	.985	.985	1.424	1.234	1.234	1.082
N	15	15	15	15	15	15
M.D.	.000		1.133		2.133	
df	28		28		28	
Unpaired t-test	.000		2.329		5.033	
Tab. value at 0.05	2.05		2.05		2.05	
P value	1.000		.027		<0.001*	
Result	Non-Significant		Significant		Significant	

Table 2: Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of FADI between Group A and Group B.

Unpaired t-test	Comparison					
	Foot & Ankle Disability Index					
	0 th day		3 rd week		6 th week	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Mean	46.733	47.133	69.533	56.00	89.266	63.733
S.D.	2.658	2.503	4.050	2.138	4.712	3.769
N	15	15	15	15	15	15
M.D.	0.400		13.533		25.533	
df	28		28		28	
Unpaired t-test	.424		11.443		16.387	
Tab. value at 0.05	2.05		2.05		2.05	
P value	.675		<0.001*		<0.001*	
Result	Non-Significant		Significant		Significant	

Table 3: Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of VAS between Group A and Group B

Unpaired t-test	Comparison					
	Ankle Dorsiflexion					
	0 th day		3 rd week		6 th week	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Mean	5.00	4.533	10.066	6.466	13.733	7.866
S.D.	1.000	.915	.961	1.355	1.667	.990
N	15	15	15	15	15	15
M.D.	.467		3.600		5.867	
df	28		28		28	
Unpaired t-test	1.333		8.390		11.715	
Tab. value at 0.05	2.05		2.05		2.05	
P value	0.193		<0.001*		<0.001*	
Result	Non-Significant		Significant		Significant	

Table 4: Unpaired t-test for comparison at 0th day, 3rd week and 6th week score measurements of VAS between Group A and Group B

Unpaired t-test	Comparison					
	Ankle Plantarflexion					
	0 th day		3 rd week		6 th week	
	Group-A	Group-B	Group-A	Group-B	Group-A	Group-B
Mean	26.067	24.600	35.667	29.000	46.400	33.200
S.D.	1.387	1.183	1.291	1.195	1.882	1.014
N	15	15	15	15	15	15
M.D.	1.467		6.667		13.200	
df	28		28		28	
Unpaired t-test	0.158		14.676		23.911	
Tab. value at 0.05	2.05		2.05		2.05	
P value	0.218		<0.001*		<0.001*	
Result	Non-Significant		Significant		Significant	

7. Discussion

The present study aimed to evaluate the effect of myofascial release on pain, functional disability and ankle range of motion in individuals with plantar fasciitis, given the limited evidence in the literature. The findings demonstrated a statistically significant reduction in pain, improvement in functional ability, and increased ankle dorsiflexion and plantarflexion range in both groups, with greater improvement observed in the experimental group. These outcomes may be attributed to the effects of myofascial release in reducing fascial restrictions, improving tissue extensibility, and decreasing mechanical stress on pain-sensitive structures. This technique is proposed to alter the viscosity of the ground substance, promoting a more fluid state and facilitating restoration of normal alignment.

The results of the present study are consistent with previous studies. Hemlata et al. (2019) reported that myofascial release was more effective than stretching exercises in reducing heel pain and improving functional outcomes in individuals with plantar fasciitis.^[8] Similarly, M.S. Ajimsha et al. (2014) demonstrated that myofascial release resulted in greater improvement in pain and functional ability compared to a control group, supporting its effectiveness in managing plantar heel pain.^[11]

Although a few studies have reported superior outcomes with alternative techniques, the overall evidence supports Myofascial Release as a reliable and beneficial treatment approach. Variations in outcomes across studies may be attributed to differences in treatment protocols, duration of intervention, sample characteristics and outcome measures. Thus, Myofascial Release can be considered a valuable

physiotherapy treatment in the management of Plantar Fasciitis.

This study has certain limitations. First, no follow-up was conducted, which limits understanding of long-term effects. Second, the intervention duration was relatively short (6 weeks). Third, the sample size was small. Future studies should include longer follow-up periods, extended intervention durations, and larger sample sizes.

8. Conclusion

The findings of this study demonstrate that the combination of myofascial release with conventional physiotherapy provides greater improvements in pain reduction, functional ability, and ankle range of motion compared to conventional physiotherapy alone in individuals with plantar fasciitis. Both interventions were effective in improving clinical outcomes; however, the combined approach showed superior results. Therefore, myofascial release may be considered as a valuable adjunct to conventional physiotherapy in the management of plantar fasciitis. Further studies with longer follow-up periods and larger sample sizes are recommended to confirm the durability of these effects.

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