

Role of Tissue Specific Plantar Fascia Stretching Exercises Versus Myofascial Released Technique in Chronic Plantar Fasciitis

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Abstract: Objective: The effectiveness of tissue specific stretching exercises and myofascial released technique on intensity of pain and Foot function was compared in chronic plantar fasciitis patients.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at Al-Ain Poly clinic Karachi between 2012-13.

Materials and Methods: Fifty patients with chronic plantar fasciitis were enrolled through convenience sampling and were randomly assigned into Stretching Exercise and Myofascial Release Technique groups. Intensity of pain and foot function were evaluated by Visual Analogue Scale and foot function index, respectively. Ten sessions were done for both groups. T-tests and ANCOVA test were used for statistical analysis ($p < 0.05$).

Results: The score of visual analogue scale (VAS) and foot functioning index (FFI) improved in both groups, though the decrease of intensity of pain was more in stretching exercises Group ($p < 0.01$). Additionally, improvement in foot functioning index did not significantly differ between two groups.

Conclusion: The stretching exercises can reduce pain and improve foot functioning in chronic plantar fasciitis.

Keywords: Chronic plantar fasciitis, supervised stretching exercises, Myofascial released technique, Pakistan.

INTRODUCTION

Plantar fasciitis is a common musculoskeletal condition that present with heel pain. With prevalence of 11-15% and peak incidence occurring at 40-60 years of age [1]. It involves frequent load on the plantar fascia that results in micro traumas that can eventually lead to inflammation and degeneration of the connective tissue in the fascia [2]. It affects adult population with disabling and constant clinical symptoms in 10% of plantar fasciitis patients [3]. The clinical symptoms associated with this condition have significant impact on physical mobility. The etiology of this disease is idiopathic and probably multi-factorial in nature. Obesity, disturbed foot biomechanics, poor foot wear, work related activity and over exertion are some contributing factors [4]. The most common cause of injury is overuse such as running and jobs with prolong standing that increases risk for repetitive micro trauma to the fascia [5]. Typical presentation involves pain on the sole of foot and specifically around inferior aspect of calcaneum. Patient reports early morning pain and after prolong weight bearing activity [6]. The other characteristic features of plantar fasciitis includes tenderness to the medial aspect of the heel and limited dorsiflexion of the ankle. The treatment aims to decrease pain severity, tissue inflammation, minimizing

stress on plantar fascia, improving flexibility of involved soft tissues and strengthening of the associated muscles [7].

Many treatment options have been applied for the management of planter fasciitis which includes rest, physiotherapy, shoe modification, anti inflammatory agents and surgery [4]. In physical therapy Interventions such as iontophoresis, ultrasound, mobilization/ manipulation, soft tissue release techniques and therapeutic exercise are commonly used to manage patients with plantar fasciitis; however, these have varying levels of evidences in regard to their effectiveness [8, 9]. Even though both stretching exercise and manual therapy myofascial release technique give better results in treating chronic plantar fasciitis. There was limited or no clear evidence available that directly compare the effectiveness between these two interventions. The main objective of this study was to evaluate the effects of specific plantar fascia stretching exercises and myofascial release technique in chronic plantar fasciitis.

METHODS

This was a randomized control trail conducted between 2012 and 2013. All patients with chronic plantar fasciitis were diagnosed and screened according to inclusion and exclusion criteria by orthopedic consultant and been referred to Physiotherapy. Study setting was Al-ain Poly Clinic Karachi and local ethics committee approved the study.

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After obtaining written informed consent all participants were randomly assigned into two groups i.e. Stretching exercises group (n=25) and myofascial release technique group (n=25). The examiner who assessed the outcomes was blinded to group assignment.

Participants

Fifty male and female patients, age between 20-40 years referred to physiotherapy department with the diagnoses of chronic plantar fasciitis. This study includes all those patients having heel pain when first stand on his or her feet after rest or prolong walking, history of heel pain for at least last six months and pain elicited on palpation of antero-medial aspect of the calcaneum. Patients were excluded if they reported any infective conditions of foot, tumor, calcaneal fracture, metal implant, history of systemic disease, skin disease, history of any major trauma or surgery in and around ankle joint and foot, impaired circulation to lower extremities, neurological disorders, foot deformities, arthritis and corticosteroid injections in heel preceding 3 months.

Data Collection

This study includes Visual Analogue Scale (VAS) and foot function index (FFI) as an outcome measures at baseline and after last treatment session.

Pain Assessment

For pain assessment, visual analogue scale was used. Pain is rated from 0 to 100 mm, no pain was represented by 0 and 100 depicted the maximum pain tolerance. Subjects were asked to marked the best number to explain their pain [10].

Assessment of Foot Function

The foot function index (FFI) was used to measure the foot function. The patients were asked to indicate how the foot pain has affected his/her ability to manage in everyday life. There are about 17 questions divided into 3 sections, the subjects have to score their pain and activities according to a scale from 0 to 10. Zero indicates no pain, no difficulty and none of the time. Ten indicates worst pain imaginable, so difficult unable to do and all the time [11].

Intervention

Patients were randomly assigned into stretching exercise group and myofascial release technique group. Every patient in both groups were given 10 consecutive sessions in 2 weeks.

Stretching Exercise Group

Stretching was given specific to plantar fascia. The patient was asked to lie supine and made comfortable. The therapist supports the patient's ankle with his one hand. With the other hand, he gives stretch to the plantar fascia. The foot is kept in neutral position. The therapist places his fingers on the patient's toes (distal to the metatarsophalangeal joints) and extends them till the patient feels the stretch on the plantar fascia. The stretch is checked by palpating tension over plantar fascia. Parameters for each session were included total 6 repetitions of 30-second hold with 15 seconds rest in between each stretch [3].

Myofascial Release (MFR) Group

In MFR group patients were asked to lie prone on a couch with feet out of the couch and a pillow under shin for support and patient comfort. The area of treatment has been cleaned and dried properly. The therapist evaluates the area of pain. Sustained gentle pressure in line with the fibers of plantar fascia from calcaneum towards the toes, using the thumb, is given. This pressure was held for 90 seconds followed by 60 seconds and was repeated 15 minutes [12].

Statistical Analysis

The study results presented as mean and standard deviation (SD). Kolmogorov Smirnov test was used to describe normal distribution. Criterion of significance was set as $p < 0.05$. Paired t-test was used to compare variables before and after interventions. ANCOVA test was used to compare variables between stretching and the Myofascial release group.

RESULTS

In this study, sixty patients with plantar fasciitis were enrolled, from which fifty patients participated in this study. With mean age 40.2 and 40.5 in exercises and myofascial release group respectively. The demographic and anthropometric details of patients are listed in Table 1.

Analysis of baseline measures has revealed no significant difference between stretching exercise and myofascial released groups.

Within Group Comparison

ANCOVA and chi-square tests were used for within group comparison before and after interventions. Both

Table 1: Summary of Baseline Measures

Measures	Stretching Group (n=25)	Myofascial Group B (n=25)
Age (yrs)	40.2 (28-65)	40.5 (29-54)
Gender (Male/Female)	8/17	7/18
Weight (Kg)	58.85 (47-78)	56.95 (46-74)
Body mass index	22.68 (19-26)	21.80 (19-26)
No of hours standing	7.70 (6-10)	7.65 (6-10)

group showed significant improvements in pain and foot function, VAS score showed significant improvement in both groups ($P < 0.05$). Similarly, both groups showed significant improvements in foot function index (FFI). However, mean improvement in stretching exercises group ($P < 0.01$) is relatively greater than myofascial release group ($P < 0.05$).

Between Group Comparison

For between group comparison ANCOVA test is used. The mean score of Visual Analogue Scale showed significant improvement in stretching group ($P < 0.001$). The score of foot function index has shown significant improvement in FFI ($P < 0.05$). However, it reveals no significant difference between both groups (Table 2, Figures 1 & 2). The result found to be

significant at ($P < 0.05$) for VAS and FFI, however stretching group shown more significant improvement in chronic plantar fasciitis patients.

DISCUSSION

Chronic plantar fasciitis is a common musculoskeletal problem and contribute a major proportion of patients referral to Physiotherapy outpatient department. Many studies support the use of non-pharmacological approach, such as physiotherapy in the management of chronic plantar fasciitis [13, 14]. Present study results show significant improvement in pain and foot function index in chronic plantar fasciitis patients in both study groups. However, results are relatively more pronounces in stretching group. The stretching exercises involve foot dorsiflexion with toes

Table 2: VAS and FFI Comparison between Stretching Exercise Group and Myofascial Released Group

Measures		Stretching Exercise Group	Myofascial Released Group	P-value
VAS	Baseline	7.3 ± 0.88	7.33 ± 0.84	0.88
	10 th session	2.37 ± 1.00	5.33 ± 0.99	0.001
Foot Function Index (FFI)	Baseline	77.43 ± 7.06	78.97 ± 7.32	0.41
	10 th session	37.73 ± 9.28	55.20 ± 10.45	0.05

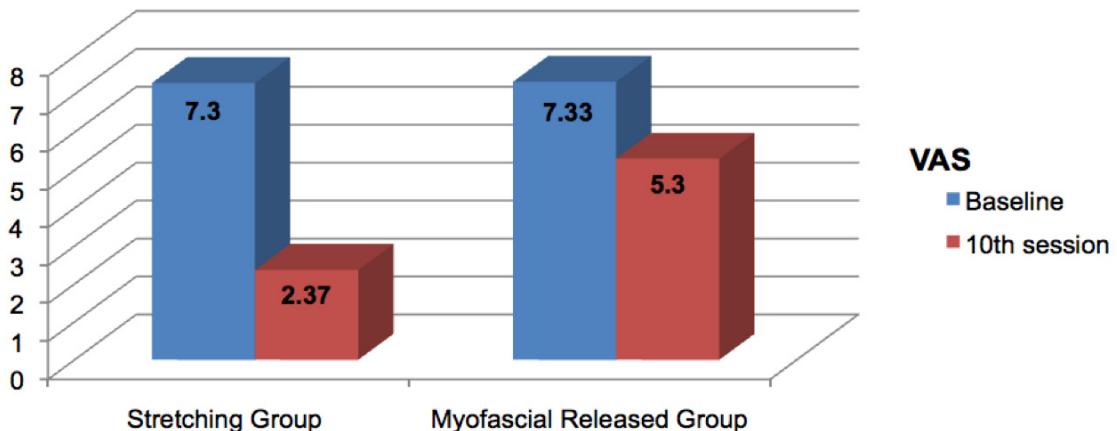


Figure 1: Mean improvement in Visual Analog Scale.

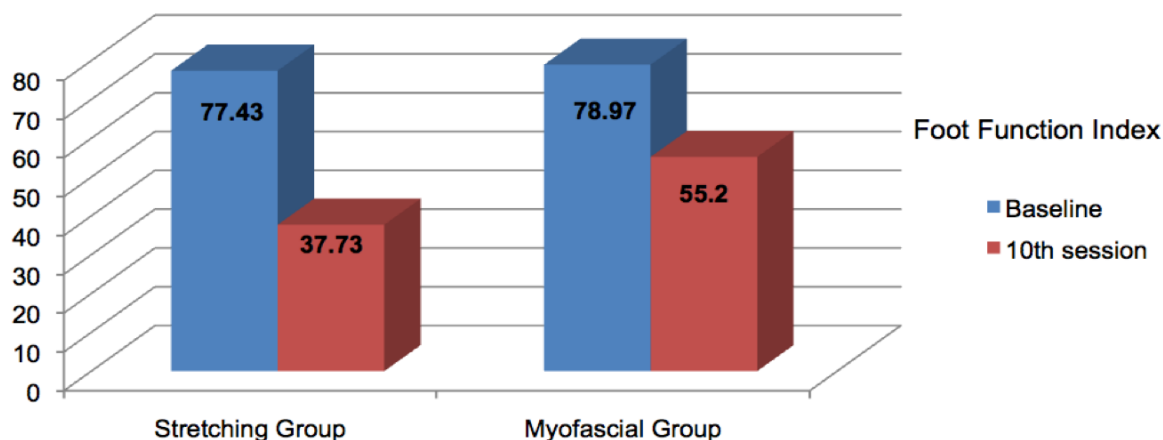


Figure 2: Mean improvement in Foot Function Index.

extension, effectively recreating the windlass mechanism. This promising result due to recreation of the windlass mechanism which support the role plantar fascia specific stretching exercises in plantar fasciitis [3]. These findings provided a specific option to the present standard of care in the non operative management of patients with chronic, disabling plantar heel pain. In regards to the visual analog scale scores and pain at eight-week follow-up evaluation, it showed noteworthy improvement from baseline favoring the group that was managed with the plantar fascia stretch. These findings were supported by another study suggested that stretches of the planter fascia significantly decreased pain and improved foot function. However, this study used descriptive analysis method and did not use statistical methods for analysis of the results. This study also followed participants for 2 years, which differs, from our study [15]. Significantly, notable in our study is that because there was no control (or non-intervention) group so if this outcome is exclusively a result of the plantar fascia stretch could not be made in general compared to stretching protocol. The results also showed significant improvements in myofascial release group. Another study also explored the use of myofascial trigger point manual therapy and suggested that myofascial trigger point manual therapy in combination with stretching exercises is more superior as compared to stretching exercises alone. We did not apply stretching exercises to myofascial release group hence still found significant results [16]. Particularly, these results are encouraging when considering the high level of pretreatment pain, and are the same as shown because of the visual analog scale scores and the fact that all the subjects had chronic symptoms for more than ten months. The expected rate for the progress is often a fundamental issue for the patients seeking for the treatment for

plantar fasciitis and important information is presented in this study regarding the treatment. The strength of this study is based in it, comparable study groups, special precaution to ensure that there were no defaulters (only those willing to give their telephone numbers were included in the study so that even if they did not show up, there was an alternate way to carry out the assessment). Additionally, strict criteria for patients inclusion were used. The patients who did not show the classic symptoms and signs of proximal plantar fasciitis, as well as tenderness localized to the medial calcaneal tubercle and pain with the first steps in the morning, they were disqualified from the study. Additionally, patients who had chronic symptoms for more than ten months were chosen intentionally to reduce the consequence of a natural improvement based on the passage of time that is often noted in patients who have acute plantar fasciitis. However, limitations for the study do exist. The sample size was small. Lack Long-term follow up and control group. The method of plantar fascia stretching is reinforced by this study for the patients who have chronic plantar fasciitis. For treatment, we believe, this component is important superior to the Myofascial release technique. These results provide us with an effective, inexpensive, and straightforward treatment modality for chronic proximal plantar fasciitis.

CONCLUSION

This study supports the use of the tissue-specific plantar fascia-stretching method as the key component of treatment for chronic plantar fasciitis. It includes obvious decrease in functional limitations and a higher satisfaction rate. An inexpensive, effective and straightforward treatment modality can be provided to the healthcare practitioner by this approach.

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