

# Effectiveness of Manual Physical Therapy in Treatment of Plantar Fasciopathy

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## ABSTRACT

**BACKGROUND:** Plantar fasciitis is now known as plantar fasciosis or fasciopathy (PF), is a common foot pain disorder in athletes and non-athletes. There is a pain along plantar side of the foot especially in heel and at the site of insertion of the fascia.

**OBJECTIVE:** To determine the effectiveness of manual physical therapy in management of plantar fasciopathy.

**METHODS:** Referred patients of plantar fasciopathy filled a self-reported questionnaire, containing the Foot and Ankle Ability Measure (FAAM) and the Numeric Pain Rating Scale (NPRS). All measures were taken at baseline and at 6 weeks follow up. Treatment of PF in term of pain and function was measured with paired sample T-test.

**RESULT:** Thirty (30) eligible patients (mean age 45.63 years ( $\pm$ SD10.81); 73.3% female) signed the consent form. The manual physical therapy group showed clinically sensitive and significant progress in term of pain and function over group II of ultrasound and exercise. The group I showed clinically significant results in terms of FAAM [CI: 3.171, 2.08] ( $p=0.001$ ) after 6 weeks follow up. The group I also showed clinically significant improvement in terms of NPRS [CI: 0.861, 2.07], ( $p=0.001$ ) after 6 weeks follow up.

**CONCLUSION:** The result of our study showed that manual physical therapy (MPT) is an effective treatment approach in treatment of plantar fasciopathy.

**KEY WORDS:** Plantar fasciopathy, Manual physical therapy, Foot ankle ability measure, Numeric pain rating scale.

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## BACKGROUND

Plantar fasciitis (PF) is now known as plantar fasciosis or fasciopathy, is a common foot pain disorder in athletes and non-athletes. There is a pain in plantar side of the foot especially in heel and insertion of the fascia.<sup>1</sup>

Almost 15% of the all foot complaints is of plantar fascia origin. This is a multi factorial disorder, none a single factor responsible for its causes. The common etiological factors are biomechanical foot problems like high arch foot low arch foot, subtalar eversion and pronated foot, adopted shortening in the hamstring and gastrocnemius muscle.<sup>2</sup> Woman and obese people are at high risk of incidence of PF. The symbol of PF is morning pain at first step on ground.<sup>3</sup> Pain increased in prolong standing. Pain is insidious not radiating.<sup>4</sup> The prevalence is common in old age especially the 40-65 year of age.<sup>5</sup> A number of treatment technique are used in physical therapy, the commonly used is the manual therapy. Cleland et al 2009 noted that manual therapy is a best option in treatment of plantar fasciitis.<sup>6</sup> Imran et al suggest in his study that

manual therapy in addition with conventional techniques give better result in treatment.<sup>7</sup> The rational of our study is to determine the effectiveness of manual physical therapy in treatment of plantar fasciopathy.

## MATERIAL AND METHODS

Referred patients of plantar fasciopathy were enrolled from Shalamar Hospital Lahore from August 2015 to December 2015. The study design was observational descriptive. Convenient sampling technique was used for patient selection. The inclusion criteria for our study were numeric pain rating scale (NPRS) greater than or equal to 4. The patients age in between 20-70 years. Both gender were included. The exclusion criteria were red flag to manual therapy (tumor, fracture, rheumatoid arthritis, and osteoporosis). Patients who had prior surgery of lower extremity and diabetic neuropathy were excluded. The study was approved by institutional review board. Thirty (30) patients who met the eligibility criteria were included in our study. All the patients of plantar fasciopathy had assessed by orthopedic surgeon and referred to physical therapy

department. All patients completed self-reported Performa which contained numeric pain rating scale (NPRS), Foot and Ankle Ability Measure (FAAM). An informed consent was obtained from them to join this study. Outcome measures were taken at baseline and after 6 weeks. All the patients signed and reviewed consent form that was approved by Institutional Review Board of Shalamar Institute of Health Sciences Lahore (SIHS) earlier to participation. All the Patients treated twice a week up to 6 weeks.

### Methodology.

Simple odd and even number technique used to allocate patients to two different treatment modalities, giving equal groups of 15 each. In group I, manual physical therapy (MPT), Soft tissue technique, manual joint mobilization and strengthening exercise were given for 6 weeks. Patients were treated for 5 minutes with vigorous soft tissue technique (deep friction) directed at plantar fascia insertion and belly of calf muscle. Joint mobilization and traction were given to treat the relative lower limb mobility of joints and to improve function. For this purpose 10-20 oscillations of grade I-IV Maitland mobilization were given at ankle and subtalar joint. Keltenborn grade I-III traction mobilization of 10-20 repetitions was given at ankle and subtalar joint. Strengthening exercise of intrinsic foot muscle and calf muscle to control the foot pronation were given with 30-30 repetitions. For this purpose thera bands were used.

In group II, therapeutic ultrasound (3 MHz, 1.5 W/cm<sup>2</sup>, 100-Hz frequency, 20% duty cycle for 6 minutes) & thera band was used to strengthen the intrinsic foot muscle which controls the foot pronation.

### Outcome measure

Outcome measures were taken at start of the treatment and after 6 weeks. Foot ankle ability measure (FAAM) was used for activities of daily living (ADL). There are 21 questions in FAAM. The maximum

possible score was 84. In order to get percentage, total score was divided by maximum possible score and multiplied by 100. Greater scores showed greater functional level.<sup>8</sup> To measure pain intensity level 11-point NPRS (0, no pain; 10, worst thinkable pain) was used which is reliable and valid.<sup>9</sup>

### Data Analysis

SPSS 20.0 version was used for analysis. Descriptive statistics, including frequency counts for categorical variables and quantities of central tendency and dissemination for continuous variables were calculated to summarize the information. Paired sample T test was used to detect the effects of treatment for pain and disability. An alpha level of significance 0.05 was set.

## RESULTS

Thirty (30) patients were evaluated for eligibility. Thirty patients (mean age 45.63 ±SD10.81 years; 73.3% female) were eligible and divided into two groups of 15 patients each (Table I). The group I, shows

**TABLE I: BASELINE VARIABLES, DEMOGRAPHICS, OUTCOME MEASURE**

| Table I                       | Baseline Variables, Demographics, Outcomes Measures |                 |
|-------------------------------|---|-----------------|
| Variable                      | Group I (n=15)                                      | Group II (n=15) |
| Age (y)                       | 45.63 ±10.81  | 47.14 ±8.41     |
| Gender (f)                    | 11(73.3%)   | 10 (66.6%)      |
| NPRS (0-10 lower is better)   | 6.40±1.07   | 6.76±1.25       |
| FAAM (0-84, higher is better) | 54.36±2.95  | 51.46±2.56      |
| BMI (kg/m <sup>2</sup> )      | 29.76±2.20  | 32.10±1.74      |
| Taking medicine (n)           | 4(26.7%)  | 5(33%)          |

**TABLE II: PRE AND POST TREATMENT COMPARISON IN TERMS OF PAIN (NPRS) AND FUNCTION (FAAM)**

| PAIRWISE COMPARISONS AT EACH PERIOD |                 |           |                 |           |                           |
|-------------------------------------|-----------------|-----------|-----------------|-----------|---------------------------|
| Variable                            | Group I         |           | Group II        |           | Between Group Differences |
|                                     | Mean difference | (P value) | Mean difference | (P value) | Mean difference           |
| FAAM (0-84, higher is better)       |                 |           |                 |           |                           |
| Baseline                            | 54.36±2.95      | 0.001     | 51.46±2.56      | 0.231     | [CI: 3.171, 2.08]         |
| After 6 weeks                       | 56.96±2.68      |           | 49.23±3.24      |           |                           |
| NPRS (0-10, lower is better)        |                 |           |                 |           |                           |
| Baseline                            | 6.40±1.07       | 0.001     | 6.76±1.25       | 0.169     | [CI: 0.861, 2.07]         |
| After 6 weeks                       | 4.93±0.120      |           | 6.92± 1.15      |           |                           |

clinically significant and sensitive in term of pain and function over group II. The group I also showed clinically significant and sensitive in terms of FAAM after 6 weeks follow up ( $p=0.001$ ). The manual physical therapy treatment had showed larger NPRS improvement than group II (ultrasound) at 6 weeks follow up ( $p=0.001$ ). (Table II). Most of the patients showed the highest BMI  $29.76 \pm 2.20$ .

## DISCUSSION

The results demonstrate that the manual physical therapy (MPT) is an effective treatment technique for plantar fasciopathy. The results were statistically and clinically significant. Patients with plantar fasciopathy showed improvement in term of function on (FAAM) and in term of pain intensity on (NPRS). The present study showed that the soft tissue technique, joint mobilization and traction and strengthening exercise of intrinsic foot muscle have good impact to improve function and decrease of pain level. One recent study by Imran et al showed that manual therapy along with routine physical therapy is a better treatment option than routine physical therapy.<sup>7</sup>

Cleland et al, demonstrated that manual therapy with exercise is a superior approach than electro physical agents on pain and function for treatment of plantar fasciitis.<sup>6</sup>

Our results are also with the accordance of previous study accompanied by Prakash et al who showed that manual therapy is more beneficial than conventional physical therapy in terms of pain in plantar fasciitis.<sup>10</sup> In our study results showed that female have higher incidence of plantar fasciopathy and it also showed that increased BMI have an effect on plantar fasciopathy.

Strengthening exercise is helpful in lower extremity injuries, the intrinsic foot muscle strengthening exercise strengthen the muscle to support the foot arches. It would also help to control the foot pronation which is a major risk factor for plantar fasciopathy. It further supports the joints in gait cycle and good body mechanics. Likewise, Taunton in his study demonstrated that strengthening exercise is an effective technique in plantar fasciitis.<sup>11</sup>

Future studies are required to evaluate the other manual therapy regimens and effect of foot orthotics in plantar fasciopathy. The effects of hip and knee dysfunctions also have an impact on foot condition as a part of kinematic chain.

We suggest that manual physical therapy with strengthening exercise shows better outcomes in plantar fasciopathy as compared to therapeutic ultrasound. The clinical practice guidelines 2014 (CPGs) also states about manual therapy effect in plantar heel pain.<sup>12</sup>

In Pakistan some studies exhibited evidences of orthotics and foot night splints in plantar fasciitis treatment.

In our study we did not use myofascial release and taping in plantar fasciitis. Future researcher would work on these interventions in plantar fasciopathy.

## CONCLUSION

We found that manual physical therapy which shows better result in plantar fasciopathy treatment. The manual therapy shows better results in terms of function and pain factor.

## RECOMMENDATION AND LIMITATIONS

Larger scale studies are recommended to identify definitive role of manual therapy. This study was done on a small sample at single center. Assessment tools used in the study were subjective, future research may be directed using objective scales like ROM and MMT.

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