

EFFECTIVENESS OF PHONOPHORESIS WITH MUSCLE ENERGY TECHNIQUE IN PLANTAR FASCIITIS: A QUASI-EXPERIMENTAL STUDY

Physiotherapy

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ABSTRACT

Plantar fasciitis is an inflammatory condition which causes pain and stiffness in the heel and medial arch of the plantar surface of the foot. There is hardly any study that has investigated the effectiveness of Muscle Energy technique with phonophoresis in Plantar Fasciitis along with physiotherapy intervention. The study aimed to find the effectiveness of the phonophoresis with the MET in participants with plantar fasciitis to determine the benefit of participants. So, a Quasi-Experimental study was conducted with 30 participants featured of plantar fasciitis. They were studied for a 4-weeks intervention. They were divided into 2 groups by convenience sampling: - Group A: MET and Group B: phonophoresis with the MET. Pre- and post-treatment data were collected and analysed using SPSS 22.0. Paired and unpaired t-test was used to find out the significance of the treatment. A significant improvement in pain and functions ($p < 0.05$) after the treatment was found in both groups. Greater statistically significant improvement was seen in Group B as compared to Group A. Thus, the study concluded that phonophoresis with the MET was more effective in Plantar Fasciitis.

KEYWORDS

Phonophoresis, Muscle Energy Technique, Foot Function Index, Planter Fasciitis.

1. INTRODUCTION

Plantar Fasciitis is one of ten commonest cause of heel pain. It involves inflammation of a thick band of tissue that runs across the bottom of the foot and connects the heel bone to the toes. The overall incidence rate of plantar fasciitis was 10.5 per 1000 population. Compared with men, women had a significantly increased adjusted incidence rate ratio for plantar fasciitis of 1.96. The adjusted incidence age between 30 to 70 years old. Increased body weight and body mass index have been shown to be significant risk factors for plantar fasciitis with a BMI more than 30kg/m^2 .⁽¹⁾ The plantar fascia is a thick fibrous sheet of connective tissue that originates from the medial tubercle of the calcaneus and attaches distally to the metatarsophalangeal joints, forming the medial longitudinal arch. Its stabilizers the medial longitudinal arch dynamically, it restores the arch and aids in reconfiguring the foot for efficient toe-off and it provides static support of the longitudinal arch and dynamic shock absorption.⁽²⁾

Phonophoresis is the technique of movement of the drugs through the skin in to the subcutaneous tissues under the influence of ultrasound. It acts as a fast, painless, non-invasive alteration to local injection.⁽³⁾ Phonophoresis with lidocaine can be used for local anaesthetic effect. Phonophoresis with salicylate ointment can be used for pain relief in various musculoskeletal conditions.⁽⁴⁾

MET commonly utilizes the isometric contraction of muscle for a brief period, which influences the Golgi tendon organs and causes post-isometric relaxation.⁽⁵⁾ MET is a method of treatment that controlled direction against a counterforce the operator. MET may be used to decrease pain. Stretch tight muscle and fascia, reduce muscle tone, improve local circulation, strengthen weak musculature and mobilize joint restrictions.⁽⁶⁾

2. METHODOLOGY

The participants of plantar fasciitis were identified from Orthopaedic Physiotherapy OPD of Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar. Participants of both genders, with the age between 20 to 40 years, who had the symptoms of plantar fasciitis since last 4 weeks and NPRS rating 5 or more than 5 and those who were willing to be a part of the study were included in the study. These participants were informed about the study and the procedure was clearly explained to all. An informed and written consent was obtained from the participants who agreed to be a part of the study that was to be conducted. Participants with Heel pain attributed to any specific pathology like Rheumatoid Arthritis, Ankle or foot surgery, Malignant disease, Diabetes Mellitus, Osteoarthritis Infections of foot and ankle were excluded from the study.⁽⁷⁾

The participants were selected by convenience method in A and B groups. A total of 30 participants became part of the study. The pre-evaluation included an Orthopaedic assessment which obtained

information about demographic details, medical history, personal history, pain assessment, foot functional scale of the participants. The pain was assessed by the Numerical Pain Rating Scale (NPRS) and functional disability was scored by Foot Function Index (FFI). The study was approved by the Institutional Ethics Committee of Nootan College of Physiotherapy.

The participants of Group A were treated with MET and Group B treated with Phonophoresis with MET. The treatment protocol consisted of 5 sessions of MET/week, and 5 sessions of Phonophoresis with MET/week for 4 weeks. After 4 weeks of treatment, the participants of both groups underwent post-evaluation, and the pre-and post-treatment data were evaluated further.

Table No.1: Treatment protocol for Group A

WEEK 1	WEEK 2	WEEK 3	WEEK 4
Muscle Energy Technique Hold for 5 sec/3times rep	Muscle Energy Technique Hold for 5 sec/5 times rep	Muscle Energy Technique Hold for 10 sec/5times rep	Muscle Energy Technique Hold for 10 sec/3times rep

Table No. 2: Treatment protocol for Group B

WEEK 1	WEEK 2	WEEK 3	WEEK 4
Phonophoresis Frequency: -1mHz Intensity: - 8 watt/m2 Duration: - 5min	Phonophoresis Frequency: -1mHz Intensity: -8 watt/m2 Duration: - 5min MET: - [hold for 5 sec/3 repetitions]	Phonophoresis Frequency: -1mHz Intensity: -8 watt/m2 Duration: - 3min MET: - [hold for 5 sec/5 repetitions]	Phonophoresis Frequency: -1mHz Intensity: -8 watt/m2 Duration: - 3min MET: - [hold for 5 sec/10 repetitions]

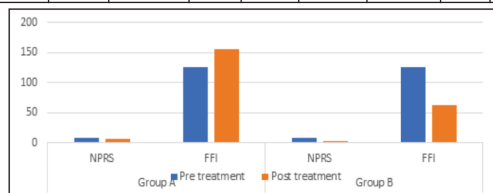
3. Result

Pre- and post-treatment data of the participants of both groups were noted. All statistical analysis was done using SPSS 22.0 software for windows. Descriptive analysis was obtained by using mean & standard deviation. The intragroup comparison between Group A and B of pre-treatment and post-treatment of NPRS and FFI was done by paired t-test. The intergroup comparison of pre-treatment and post-treatment of NPRS and FFI within Group A and Group B was done by unpaired t-test.

The results found in this study disclosed that after a 4 weeks treatment program, both groups, Group A, received MET, and Group B received Phonophoresis with MET attained a significant improvement in the reduced pain and disability but statistically greater significant improvement was seen in Group B as compared to Group A ($p\text{-value} < 0.05$).

	GROUP A	GROUP B
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Outcome	Pre-treatment Mean $\pm$ SD	Post-treatment Mean $\pm$ SD	t-value	p-value	Pre-treatment Mean $\pm$ SD	Post-treatment Mean $\pm$ SD	t-value	p-value
NPRS	7.33 $\pm$.8997	5.533 $\pm$.7432	16.837	0.00	7.133 $\pm$.9904	2.533 $\pm$.6399	19.572	0.00
FFI	126.13 $\pm$ 5.4362	115.800 $\pm$ 7.7201	6.377	0.00	125.40 $\pm$ 4.9685	63.267 $\pm$ 3.8073	38.685	0.00



4. DISCUSSION

The results of this study disclosed that after a four-week treatment program, both groups, Group A, who received muscle energy technique only and Group B who received Phonophoresis along with muscle energy technique attained a significant reduce pain and disability.

Plantar fasciitis (PF) is the most usual foot condition diagnosed by the clinicians while surgical and nonsurgical treatments recommended to the targeted populations according to the severity of conditions.⁽⁶⁾ Bomana et. al described that phonophoresis cause an increase in local temperature which causes an increase in the cell membrane permeability.⁽⁹⁾

MET commonly utilizes isometric contraction of muscle for a brief period, an increased tension maintained for a few seconds is sensed within the Golgi tendon organs, which transmit impulses to the posterior horn cell and has an inhibitory effect on the increased motor stimulus at the anterior horn cell.^(10,11)

This study was conducted on thirty participants. The participants were divided into 2 groups; Group A received MET and Group B received Phonophoresis with MET for 1 session/day and 5 days/week for 4 weeks. In this study Foot Function Index (FFI) and NPRS were used as outcome measures. The results showed a significant improvement in the outcome measures in the post-treatment stage as compared to the pre-treatment stage.

Though a significant improvement was found after treatment in both the groups, Group B showed greater improvement in the FFI Score and NPRS Score (p-value < 0.05).

Thus, the Alternate Hypothesis [H11] and [H12] failed to reject.

5. CONCLUSION

The study concluded that Phonophoresis with MET shows greater improvement in reducing pain and disability compared to MET alone.

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