

Efficacy of Instrument Assisted Soft-Tissue Mobilization in patients with heel pain: An Experimental study.

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Method Article

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Abstract

Background: 'Heel pain' is one of the commonest ailments of foot affecting 10% of population and having visible effects on lifestyle of these patients , affecting both younger and elder population. This study's purpose is to determine the efficacy of Instrument Assisted Soft Tissue Mobilization in people affected with heel pain and the resultant effect on their lifestyle.

Method: Seventy participants(n=70) with heel pain (lasting from 6 weeks to 1 year) will be selected and divided in 2 groups . Each group receiving 8 treatment sessions. Group A will receive IASTM + Home exercise program and Group B will receive Therapeutic Ultrasound + Home exercise program . Outcome measures will be recorded i.e. Pre-test and Post-test , by using Numerical Pain Rating Scale and Foot & Ankle Ability Measure scale.

The study's purpose is to assess the impact (i.e. immediate and long term effects) of IASTM on heel pain.

The Central Trial Registry of India (CTRI) registration number for this trial is CTRI/2021/06/044018.

Introduction

Heel is the prominent posterior end of the foot , based on the projection of calcaneus (heel bone) lying behind the articulation of bones of lower leg. The sole of foot is covered with a layer called subcutaneous connective tissues which are up-to 2 cm thick under the heel and distribute the compressive forces which are exerted on heel during gait (specially during the phase of stance). This tissue absorbs shock and also stabilizes the sole by having a system of pressure chambers.¹

Heel pain is the most often caused conditions. Various other names are given to conditions occurring in heel pain, like runner's heel, heel spur, calcaneodynia , calcaneal periostitis etc.

Plantar fasciitis is one of such conditions which can be painful as well as exhausting and frustrating, both for the patient and Physiotherapist.^{2,3}

Plantar fascia preserve's the integrity of foot (prominently medial longitudinal arch and lateral longitudinal arch) during weight bearing actions. The Plantar fascia's attachment is: Proximal to medial tubercle of calcaneal tuberosity which gets thickened at central region of mid-foot and then extend distally as 5 long bands which blend with tendinous sheaths.

Plantar fasciitis is a result of inflammation of plantar aponeurosis as it is attached on the tuberosity of calcaneum , also referred as plantar heel pain, which is known to affect the 10% of population at-least once in their life span. It is not only common in athletes, active individuals and military personnel but also is diagnosed in individuals with sedentary lifestyle.

The commonest sites for identifying this condition are: 1) Experiencing tenderness and pain in medial tubercle of heel bone 2) painful first step in morning and 3) Pain due to prolonged standing or weight bearing.⁴

Treatment for Plantar Fasciitis include various conservative options i.e. 1) joint and STM i.e. soft tissue manipulations 2) TENS 3) taping 4) night splinting 5) ice 6) heat 7) muscle strengthening and 8) insoles.⁵

Therapeutic Ultrasound is among the most commonly used therapeutic modality worldwide by physical therapist. It works by raising the tissue temperature and improve metabolic process. It softens the tissue, increases the circulation of blood and chemical activities of tissue. It also improves the permeability of cell membrane. All of these affect potentially for speedy recovery of tissue.⁶

Still there are high-quality scientific evidences which are insufficient in treating various musculoskeletal problems, supporting the clinical use of therapeutic ultrasound.⁷

Martin et al reported that in plan of care for individuals with plantar fasciitis, soft-tissue mobilization should also be considered. Various techniques like muscle trigger point release therapy, Instrument Assisted Soft-tissue Mobilization (IASTM) and aggressive manual soft-tissue mobilization (AMSTM) are reported in improving the mobility of soft-tissue in individuals having plantar fasciitis.^{2,8-10}

Specialized techniques like IASTM i.e., Instrument assisted soft-tissue mobilization, utilize instruments by applying longitudinal pressure along muscle fibres. IASTM used in treating tendinopathies, has given results i.e. pain resolution and improvement in range of motion (ROM) and helps in returning to normal function (lifestyle) faster compared to other therapeutic interventions and also natural healing.¹¹

Various instruments (stainless) have been developed of varying material, size and shape with each instrument is designed in a way to enable the clinician to enhance soft tissue mobilization.

One of such instruments consist of the edge mobility tool. The tool is stainless having multiple sharp end and dull edges which help in contouring the body by acting on deep and superficial tissue work.¹²

Reagents

Equipment

1. Couch and pillow
2. IASTM tool (Edge mobility tool)
3. Cotton swab

4. Lubricant/gel/cream
5. Therapeutic Ultrasound machine
6. Informed consent form
7. FAAM (Foot and Ankle Ability Measure) scale chart
8. NPRS (Numerical Pain Rating Scale) chart
9. Pen, pencil and paper.

Procedure

1) PATIENT'S POSITION:

Lying prone on couch with the head rested on pillow with the hands by their side.

Both the ankles out of bed i.e. lying outside the edge of bed and affected ankle supported by therapist's hand .

2) THERAPIST POSITION: Therapist standing near the affected side of the leg near to the couch.

3) GROUP A: IASTM (edge mobility tool) + Home Exercise Program

-The patient will do a 5-minute bicycle exercise with minimum resistance to warm-up the tissues (Prior to IASTM).¹³

Instrument Assisted Soft Tissue Mobilization:

-Each participant will then receive 2 minutes of IASTM (Instrument assisted soft tissue mobilization) using Edge mobility tool.

-Cream/lubricant will be applied on posterior calf and plantar region of foot as it will assist in reducing friction on skin and then the Edge mobility tool will be used in mobilizing the tissues on triceps surae (gastrocnemius and soleus) and plantar region of foot by pressing the tool along the leg and the foot.

-The application of tool will be in proximal and distal (alternating) directions which will

be parallel to muscle fibre.¹⁴

-Additionally, the participants will be given a Home Exercise Program. They will be asked to do the program twice a day which will consist of the following exercises:

a) Calf muscle stretching (3 repetitions for 30 sec hold each)

b) Plantar fascia stretching (3 repetitions for 30 sec hold each).¹³

Ice will be offered after each session for pain management (as needed).¹³

4) GROUP B: Therapeutic Ultrasound + Home Exercise Program

The patient will first do a 5-minute bicycle exercise with minimum resistance to warm-up the tissues followed by application of ultrasound.

5) PATIENT'S POSITION:

Lying prone on couch with the head rested on pillow with the hands by their side.

Both the ankles out of bed i.e. lying outside the edge of bed and affected ankle supported by therapist's hand .

6) THERAPIST'S POSITION:

Standing near the affected side of the leg , near couch.

7) Ultrasound application technique:

-Time and intensity of Ultrasound machine will be kept at '0' before switching on power. -Patients will be instructed that they should report immediately about any excess heat or pain.

-Therapist will apply gel to skin and transducer surface and move the Ultrasound (US) head in overlapping circles. The rate of transducer movement will be slow and the frequency will be 1 MHz with continuous current whose intensity will be 1.8.

W/cm². Time period of 8 minutes will be followed.^{7,15,16}

-Additionally, the participants will be given Home Exercise Program. They will be asked to do the program twice a day, which will consist of the same exercises as Group A participants i.e.

- a) Calf muscle stretching (3 repetitions for 30 sec hold, each)
- b) Plantar fascia stretching (3 repetitions for 30 sec hold, each).¹³

8) 8 sessions of treatment will be carried out for both the groups to see the effects.

For Group A (IASTM + HEP) 2 sessions per week i.e., 8 sessions in 4 weeks will be carried out.¹³

For Group B (US + HEP) 2 sessions per week i.e., 8 sessions in 4 weeks will be carried out.¹⁶

Pre-treatment (1st session) and Post-treatment (8th session) score for FAAM scale and NPRS scale will be recorded.

9) Follow up will be taken after 90 days of final visit.¹³

Troubleshooting

Time Taken

8 sessions of treatment will be carried out for both the groups to see the effects.

For Group A (IASTM + HEP) 2 sessions per week i.e., 8 sessions in 4 weeks will be carried out.¹³

For Group B (US + HEP) 2 sessions per week i.e., 8 sessions in 4 weeks will be carried out.¹⁶

Pre-treatment (1st session) and Post-treatment (8th session) score for FAAM scale and NPRS scale will be recorded.

Follow up will be taken after 90 days of final visit.¹³

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