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Effectiveness of Graston on chronic plantar fasciitis

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Abstract
Background: The aim of the current study was to check the effectiveness of Graston technique on chronic plantar fasciitis patient using instrument assisted soft tissue mobilization tool (IASTM). This was an experimental study using foot and ankle disability index scale as outcome measure. The FADI scale was used as pre and post intervention for 3 weeks with two session per week.
Methodology: A simple random sample of 30 people consists of watchmen, nurses, cleaners including 11 males and 19 females from Dr. A. P. J. Abdul Kalam College of physiotherapy, PIMS, Loni. The participants included were between age group of 40-60 years and having knowledge about both in English and Marathi. Illiterate individuals were excluded.
Results: Accuracy FADI scale among 30 participants showed result as highly significant with post 20%-30% of difference within 3 weeks.
Conclusion: The study concluded that Foot and ankle disability index in pre-post testing of was highly significant (13.5).

Keywords: FADI, ISTM, Physical activity, chronic plantar fasciitis

Introduction

Plantar fasciitis is assumed to correlate with inflammation of plantar fascia. The suffix "-itis" is indicates inflammatory disease. In 1965, article entitled as "painful heel" by Lapidus and guidotti stated that painful heel is deliberately used in preference more precise etiological diagnosis as the cause of such definite clinical entity still is unknown. Plantar fasciitis definition varies in literature. There are other terms for plantar fasciitis such as "heel spur syndrome" and "painful heel syndromes" [1]. Plantar fasciitis usually affects adults leading to heel pain. It affects athletic and sedentary population [2]. The incidence of plantar fasciitis is seen in age group of 40 to 60 years and in younger people who are into physical sports activity [3].

Plantar fasciitis initially involves inflammation that is characterized by pain and swelling. In chronic stage inflammation disappears and plantar fascia begins to deteriorate, and this condition is termed as plantar fasciosis [4]1.

Initially the pain is diffuse or migratory in nature, later with time it localizes over the medial tuberosity. Plantar fasciitis is bilateral in upto 15% of patients and is seen unilateral in most of the cases [5]. Patients often complain of pain after rising from bed in morning. This discomfort gradually reduces within 30-45 minutes [6]. The pain felt at the medial heel during weight bearing is usually burning, aching and stabbing in nature. At the end of the day throbbing pain, constant dull aching pain which develops may radiate into the foot of arch [7, 8].

In chronic musculoskeletal pain, patients are seen depression and anxiety which is associated with increased pain severity, poorer treatment outcomes, greater disability and poorer health-related quality of life [9].

Myofascial technique is effective for soft tissue release work. This technique helps in relieving pain, improving nerve function, releasing spasm as well as in improving movement potential [10].

Myofascial release technique focuses on soft tissues either being tight or in spasm. Tightness present can be due to soft tissue adhesions, muscle spasm or excessive release of acetyl-cholin. Myofascial trigger point is palpable taut band or nodule of muscle tissue. Direct application of pressure technique helps to break up adhesions and relieve pain and spasm. Pressure is applied for 60 – 90 seconds or up to 5 minutes and pressure is gradually released. It relieves soft tissue adhesion or muscle spasm often related to trigger point release. Slow sweeping pressure helps to break up adhesions and promotes soft tissue extensibility [11].

Graston technique -A specific approach to soft tissue manipulation uses Graston technique. Instrument assisted soft tissue mobilization results in breakdown of collagen cross-linkages, release of fascial restrictions, increase in regenerative cellular activity and increased blood flow. Graston technique of instrument -assisted soft tissue manipulation has been used. During treatment Patients may experience discomfort and bruising might occur during and after treatment [12].

This instrument is applied in multidirectional stroking fashion on skin with about 30^0 to 60^0 angles on affected side. This helps the clinician to detect irregularities in soft tissue texture. This technique helps in enhancing proliferation of extracellular matrix fibroblast, decreases cell matrix adhesions and improves ion transport [13]. IASTM is effective to ease the pain and recover from damaged fibers by increasing ROM [14].

To assess the functional limitations, Foot and ankle disability index was designed to asses foot and ankle related conditions. There are 23 items which measure disability, pain and

restriction. The scores are based upon Visual analogue scale [15]. To asses' variations in intensity of pain a simple and frequently used method is visual analogue scale [16].

Methodology

Source of Data

The source of data will be collected from patients with chronic plantar fasciitis from A.P.J Abdul Kalam, college of physiotherapy, loni, Taluka-Rahata, district-Ahemadnagar-413736, and Maharashtra.

Method of collection of data

- **Type of Data**: The data collected will be primary which will be collected from principal investigator.
- **Study Design:** The study is an experimental study design based on pre and post Test analysis.
- **Sample size:** 30 participants.
- **Participants:** Male or female of age group 40-60 years
- **Sampling Method:** Simple random convenient sampling.
- **Study Duration:** 4 months
- **Equipments to be used:** Instrument assisted soft tissue mobilization (IASMT).

Materials to be used: Consent form
Recording sheet
Treatment couch
Pillow
Towel
Pen and paper
Petroleum gel
IASTM tool

Selection Criteria

Inclusion criteria: subjects willing to participate, both male and female with age group of 40-6- years subjects with chronic plantar fasciitis.

Exclusion criteria: Subjects who can't tolerate close physical contact, skin infection, foot deformities, diabetes, recent fracture, recent fracture and wound, Individuals on medications that may increase blood clotting

Procedure

The ethical clearance form registration no. BPT/INT/2018/19
The participants were screened before and after finding suitability according to the inclusion and exclusion criteria, they were requested to participate in the study. They will be explained about the study. The participants will be briefed about the intervention. An informed written consent form approved by ethical committee will be given to the participants. The demographic data will be obtained, and assessment will be done. The sample size of the study will be 30 participants.

There will be one group consisting of 30 participants. The participants will be assessed on the first day for severity of pain, site of pain, duration of walking. Before the treatment scale will be given to patient to assess the pain before the treatment.

The patient is asked to lie down prone on treatment couch. The patient will be positioned in neutral position. The patient's heel should be out of treatment couch. A pillow should be kept underneath the ankle for comfort and support. The therapist will stand at the foot end of the patient and will be seated on the stool. Any lubricating gel will be used before the treatment.

Scanning strokes- This technique is performed by light pressure and applied in slow manner. The direction will be both parallel, diagonal and cross fibers.

Warming strokes- This technique is performed by light to medium long pressure strokes about 3 to 8 inches. Strokes are specific and quicker. The direction is parallel to fibers.

The tool will be placed at 90^0 in order to detect irregularities in the skin. The pressure applied with the help of the tool will be minimal at first. The direction of strokes will be given as per the formation of plantar fascia fiber. Wherever there is inflammation that part of the fascia is tight. The therapist will then place the tool at the area of adhesions. The clinician will then place the instrument surface at about 30^0-$60^{0.}$ The clinician will apply multidirectional stroking fashion at the treatment site. Deep pressure is applied, and tool surface is moved according to the muscle fibers. The strokes will be applied for 90 seconds with 2 to 5 seconds interval. The procedure will be repeated. The strokes applied here will be moderate enough. This will help to break the adhesions After the technique has been applied, hot water fermentation was given for 5-10 mins to maintain the blood supply in that region. The patient will be informed about the after effects of the treatment. The treatment protocol will be for 3 weeks and twice treatment will be given per week.

At the end of 3 weeks procedure, individual patient will be re-assessed using the scale. This information will be recorded and pre and post treatment will be noted accordingly.

Fig 1: Instrument assisted soft tissue mobilization tool (IASTM)

Result

The objective of study was to find the effect and reliability of Graston technique on chronic plantar fasciitis patients which was analysed on basis of results obtained from foot and ankle disability index. (FADI)

The statistical analysis was done using Microsoft excel. Various statistical measures such as mean, standard deviation (S.D) and test of significance such as student's paired 't' test were analyzing the data. The result was concluded to be highly significant with the p value is <0.0001.

The mean age of participants of male is 47.36±6.57 and of female is 45.58±5.76.

The gender ratio is 11:19

Foot and Pain Disability Index (FADI)

The FADI item contains 4 pain related items and 22 activity related items.

The pre-intervention mean average score and standard deviation for FADI was 62.73±9.75. The post intervention after 3 weeks, the mean average score and standard deviation for these participants was 84.6±8.34.

Table 2: Comparison of average values of Pain and activity using outcome measures FADI for chronic plantar fasciitis

FADI	Pre-Intervention	Post-Intervention
Mean	62.73	84.6
SD	9.75	8.34

Table 3: Showing values of 'p'

	Pre-post intervention
't' value	13.5
P value	<0.01
Result	Highly Significant

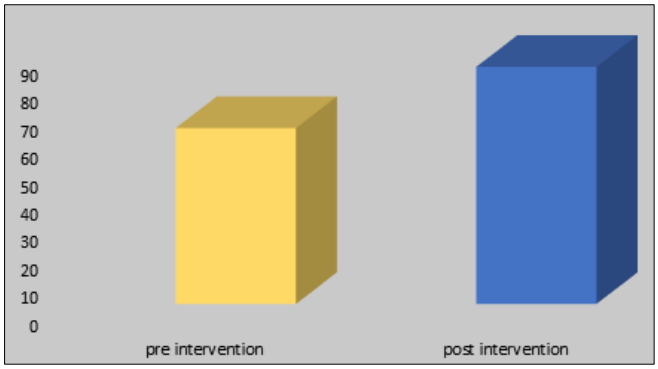

Fig 1: Fig of pre-post FADI index

Discussion

The study evaluated the effectiveness of Graston technique with chronic plantar fasciitis individuals. This study is an experimental intervention which were selected on basis of simple random sampling. The participants were assessed on first day for severity of pain. This technique is similar to Myofascial release technique using instrument assisted soft tissue mobilization tool (ISTM). The outcome measure for this study is Foot and ankle disability index (FADI). Foot and ankle disability pre-readings and post reading were recorded after the assessment. The scale includes 22 activity items and visual analogue scale. The intervention was done for 3 weeks. The result of this study showed significant changes in plantar heel pain. The plantar heel pain was decreased by 20% to 30% within period of 3 weeks when Graston technique was applied on patient. There was significant amount of pain decreased after end of treatment session. The pre-post mean was 62.73%±84.6%. The result of the study was highly significant.

Plantar heel pain can lead to decrease in activity, unbearable heel pain, morning pain and even depression. It can affect posture with strain on back and neck. In chronic musculoskeletal conditions it can lead to depression and anxiety due to unbearable pain. It can affect athletes, nurses and office workers. The pain and restrict individuals to performed activities of daily living as well as recreational activities. The tool used for Graston technique provides an enhanced manipulation of soft tissue.

The goal of this therapy is to provide healing by modifying physiologic responses to injury. The tool used for this technique is made up of stainless steel in which tissue resonates well when steel runs on it. It comes in different sizes depending upon area to be treated. Most clinicians believe that there is no single technique, modality or tool to completely resolve musculoskeletal function. Instrument soft tissue mobilization is designed ergonomically to detect and treat fascial restrictions. Other modalities such as joint mobilization, exercises and stretching can be used in conjugation with ISTM. The benefit of ISTM is release of fascial restrictions, breakdown of collagen, increased blood flow and increase in regenerative cellular activity. Additional ISTM sessions have decreased symptoms of patients.

Soft tissue injury can lead to proliferation and inflammation of new cells in which fibrosis and formation of scar tissue may occur. It reduces adhesions and tissue elasticity which may stop soft tissue functioning. After applying IASTM it creates shearing force and pressure to soft tissue. This in turn will removes scar tissue by capillary haemorrhage and micro vascularization along localized inflammation. Inflammation restarts healing process by breaking adhesions and removing scar. This promotes nutrient and blood supply to injured area and in turn leads to migration of fibroblast

Robert stow, PhD, ATC, CSCS. University of Wisconsin-Eau Claire conducted study on Instrument-Assisted soft tissue mobilization. A case study was done on 59-year-old man with intense low back pain since one year (subacute lumbar compartment syndrome). Due to pain, he missed his two to three days of work every two to three months. Initially the treatment protocol was analgesia and bed rest. The patient received ISTM treatment to sacrum, hamstring, right hip lateral rotators and low back region. The treatment session was given for twice per week for three weeks. In addition, two sets of three stretches to affected area after administration of ISTM was given. The patient was instructed to perform stretches at home. After the treatment was given for six sessions the patient was asymptomatic and able to complete task and return back to work [17].

M.P.T, Asst. professor, physiotherapy school and centre, Seth G.S. medical college and KEM hospital, parel, Mumbai conducted study on comparison of effects of therapeutic ultrasound v/s myofascial release technique in treatment of plantar fasciitis. In this study 60 subjects were allocated into two groups. MFR technique included 30 subjects and U.S group included 30 subjects. Outcome measures using Visual analog scale for pain intensity and foot function index on first and tenth day. VAS on first day was non-significant for both groups p=0.981 and on tenth day there was reduction in pain VAS p=0.023. Analysis showed that group B is significant. Myofascial release causes change in viscosity of ground substance to fluid state. This tends to eliminate pressure on pain structure and there is proper alignment of fibers. Myofascial release improves circulation and nervous system transmission. The study concludes that among both the techniques MFR technique was proved to be more effective than Ultra sound in patients with plantar fasciitis [18].

Conclusion

The Study concluded that Graston technique is effective in chronic plantar fasciitis (p<0.0001)

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Reference

1. Author Lemont H, Ammirati KM, Usen N. Plantar fasciitis: a degenerative process (fasciosis) without inflammation. Journal of the American Podiatric Medical Association. 2003; 93(3):234-7.
2. Author Crawford R. Diagnosis and treatment of plantar fasciitis. Am Fam Physician. 2011; 84(6):676-82.
3. Author Buchbinder R. Plantar fasciitis. New England Journal of Medicine. 2004; 350(21):2159-66.
4. Young Ian, Cleland, Joshua, Michener, Lori & Brown, Chris. Reliability, Construct Validity, and Responsiveness of the Neck Disability Index, Patient-Specific Functional Scale, and Numeric Pain Rating Scale in Patients with Cervical Radiculopathy. American journal of physical medicine & rehabilitation. Association of Academic Physiatrists. 2010; 89831-9. 10.1097/PHM.0b013e3181ec98e6.
5. Singh D, Angel J, Bentley G, Trevino SG. Fortnightly review. Plantar fasciitis. BMJ: British Medical Journal. 1997; 315(7101):172.
6. Cornwall MW, McPoil TG. Plantar fasciitis: etiology and treatment. Journal of Orthopaedic & Sports Physical Therapy. 1999; 29(12):756-60.
7. Author League AC. Current concepts review: plantar fasciitis. Foot & ankle international. 2008; 29(3):358-66.
8. Kosmahl EM, Kosmahl HE. Painful plantar heel, plantar fasciitis, and calcaneal spur: etiology and treatment. Journal of Orthopaedic & Sports Physical Therapy. 1987; 9(1):17-24.
9. Author Cotchett MP, Whittaker G, Erbas B. Psychological variables associated with foot function and foot pain in patients with plantar heel pain. Clinical rheumatology. 2015; 34(5):957-64.
10. Author CH Prasad Rao. Rajiv Gandhi University of health sciences of Karnataka, "effectiveness of muscle energy technique versus my ofascial release technique among patients with upper trapezitis. A comparative study, 2012.
11. Author Paolini J. Review of my ofascial release as an effective massage therapy technique". Athletic Therapy Today. 2009; 14(5):30-4.
12. Author. Stow R. "Instrument-assisted soft tissue mobilization". International journal of athletic therapy and training. 2011; 16(3):5-8.