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"EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT RELEASE WITH SELF-STRETCHING IN IMPROVING PHYSICAL PERFORMANCE FOR PLANTAR HEEL PAIN IN ATHLETES"

A DISSERTATION SUBMITTED TO THE TAMILNADU

Dr. M.G.R MEDICAL UNIVERSITY, CHENNAI,

AS PARTIAL FULFILLMENT OF THE

MASTER OF PHYSIOTHERAPY DEGREE

APRIL 2012

CERTIFICATE

Certified that this is the bonafide work of **Mr.K.Mugil** of K.G. College of Physiotherapy, Coimbatore submitted in partial fulfillment of the requirements for the Master of Physiotherapy Degree course from the Tamil Nadu Dr.M.G.R. Medical University under the **Registration No: 27102218** for the April 2012 Examination.

Date: **Principal**

A Dissertation on

"EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT RELEASE WITH SELF-STRETCHING IN IMPROVING PHYSICAL PERFORMANCE FOR PLANTAR HEEL PAIN IN ATHLETES"

has been submitted in partial fulfillment for the requirement of the Master of Physiotherapy degree,

April 2012

Internal Examiner **External Examiner**

"EFFECTIVENESS OF MYOFASCIAL TRIGGER POINT RELEASE WITH SELF-STRETCHING IN IMPROVING PHYSICAL PERFORMANCE FOR PLANTAR HEEL PAIN IN ATHLETES"

Under the guidance of,

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I would like to record my special thanks to our **Librarian** for his kindness, support and help toward the study.

Last but not least my sincere thanks to all **My friends** for their support and encouragement throughout this study.

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I. INTRODUCTION

The heel bone is the largest of the 26 bones in the human foot, which has 33 joints, more than 100 tendons, muscles, and ligaments. Like all bones, it is also subjected to outside influences that can affect its integrity and its ability to keep us on our feet.

Plantar heel pain is a common orthopaedic problem that can cause discomfort and a limp because of the difficulty in bearing weight.

The etiology of this condition is multiple and therefore, a careful clinical evaluation is necessary for its proper management. Nonsurgical or conservative care is successful in most cases McPoil et al, (2008)

Significant history was isolated plantar heel pain, pain with initial weight-bearing after periods of rest, Morning pain and barefoot walking or ill-fitting shoes.

A common problem for athletes is calf muscle tightness, especially during training periods. The symptom is a gradual tightness of the calf muscle during training or running. A player's calf muscle may have gradually tightened up over a period of time through poor flexibility and stretching, or biomechanical problem in their running style.

The heel can absorb 110% of body weight during walking and 200% of body weight during running. Dorsiflexion of the toes applies traction stress at the origin of the plantar fascia. A contracture in the triceps surae can increase the traction load at the origin of plantar fascia during weight-bearing activities.

Plantar heel pain among athletes is usually due to overuse and poor biomechanics. However, muscle strength imbalance and muscle tightness have also been indicated as causes of plantar heel pain. Other possible contributing factors to plantar heel pain include loss of plantar fat pad with advancing age, increased body-weight.

According to Romulo Renan, et al (2011) soft tissue manual therapy can further improvement for management for heel pain.

Trigger point or muscle knots, are described as hyperirritable spots in skeletal muscle that are associate with palpable nodules in taut bands of muscle fibers. Trigger points believe that palpable nodules are small contraction knot and common cause of pain.

Pain in the arch of the foot is frequently diagnosed as plantar fasciitis. Like heel pain, trigger points in the calf muscles are frequently responsible for this type of foot pain, though trigger points in the small muscles of the foot may also contribute to this pain.

Though the calf muscles are very strong, they are easily overloaded by everyday activities. The trigger points that develop in these muscles refer pain to the foot for one reason: to get you off your feet and allow the overloaded calf muscles to recover.

There are Six muscles group that contain trigger points that refer pain to the foot.

- The gastrocnemius
- The soleus
- The tibialis anterior are the commonly involved muscles.

The calf muscle attaches into the foot by the achilles tendon into the back of the heel. When the calf muscle is tight it limits the movement of the ankle joint. When ankle joint motion is limited by the tightness of the calf muscle it forces the subtalar joint to pronate excessively.

Excessive subtalar joint pronation can cause several different problems to occur in the foot. Therefore it makes sense that reduction of the tightness of the Achilles tendon and calf muscles will have a positive effective on heel pain

Foot and ankle ability is self-reported outcome instrument developed to assess physical function and performance for individuals with foot and ankle related impairments.

.Myofascial release is a soft tissue mobilization technique. If the condition is treated in the acute stage, then symptoms will be aggravated. If treated in the chronic stage, the symptoms will alleviate. Myofascial release techniques stem from the foundation that fascia, a connective tissue found throughout the body, reorganizes itself in response to physical stress and thickness along the lines of tension. By myofascial release there is a change in the viscosity of the ground substance to a more fluid state which eliminates the fascia's excessive pressure on the pain sensitive structure and restores proper alignment. Hence this technique is proposed to act as a catalyst in the resolution of plantar fasciitis.

The present study was undertaken with the intention to find out the effectiveness of myofascial trigger point release in plantar heel pain, in conjunction with self-stretching treatment and to compare the effectiveness of myofascial trigger point release with self-stretching treatment. So I we divided the patients into two groups that is group A (Control group), group B (Experimental group).

NEED FOR THE STUDY

Plantar heel pain not only cause pain and discomfort but also affects the physical performance of the players and their results in deconditioning.

Previous studies have reported that stretching of the calf musculature and the plantar fascia are effective management strategies for plantar heel pain.

Few studies are available to analyse the effect of soft tissue therapy for plantar heel pain in athletic population.

So this study was conducted in order to compare the Myofascial trigger point release combined with self-stretching to improve physical performance for plantar heel pain in athletes.

STATEMENT OF THE PROBLEM

A study to assess the effectiveness of myofascial trigger point release with self-stretching in improving physical performance for plantar heel pain in athletes

KEY WORDS

Plantar heel pain

Myofascial trigger point release

Self-stretching

AIM

To compare the effect of myofascial trigger point release with self-stretching in improving physical performance for plantar heel pain in athletes

OBJECTIVE OF THE STUDY

- To study the effect of myofascial trigger point release in improving physical performance for plantar heel pain in athletes.
- To study the effect of self-stretching in improving physical performance for plantar heel pain in athletes.
- To study the combined effect of myofascial trigger point release with self-stretching in improving physical performance for plantar heel pain in athletes.

HYPOTHESIS

NULL HYPOTHESIS

There is no significant difference between the myofascial trigger point releases with self-stretching in improving physical performance for plantar heel pain in athletes.

ALTERNATE HYPOTHESIS

There is a significant difference between the myofascial trigger point releases with self-stretching in improving physical performance for plantar heel pain in athletes.

II.REVIEW OF LITERATURE

Anne Margee Kelly, et al., (1998)

A prospective descriptive study to determine the minimum clinically significant in VAS pain scores for acute pain. 152 adult patients at 20-minute intervals to a maximum of three measurements and data were composed based on gender, age more than or less than 50 years. The results shows significant difference in VAS pain and No significant difference in minimum significant VAS score was found between gender, age and cause of pain groups.

Benedict, et al., (2003)

A prospective, Randomized study to find-out tissue-specific Plantar fascia-stretching exercise enhance outcomes in patients with chronic heel pain. 101 patients who diagnosis of chronic proximal plantar fasciitis for a duration of at least 10 months and divided into 2 groups, all patients received plantar fascia tissue-stretching program and Achilles tendon-stretching respectively. The results shows a program of non-weight-bearing stretching exercise specific to plantar heel fascia is superior to the Achilles tendon-stretching exercise for the treatment of plantar fasciitis.

Becker, et al.,(2000)

Stated that, if a slow stretch force applied to muscle, the Golgi tendon organ fire and inhibits the tension in the muscle, allowing the parallel elastic component (the sarcomere) of the muscle to lengthen.

Brain young et al, (2004)

A case study to describe an impairment based physical therapy treatment approach for 4 patients with plantar heel pain. 4 patients completed a course of physical therapy based on the impairment-based model. All 4 patients received Myofascial trigger point and stretching. 2 Patients were treted with custom orthosis, 1 patients received on strengthening exercise program additionally ans they concluded that based on the above treatment program, complete pain relief and full return to activities.

Christoper et al, (2008).

The Foot and Ankle Ability Measure (FAAM) is a region-specific, non-disease-specific outcome instrument that possesses many of the clinometric qualities recommended for an outcome instruments. Evidence of validity it support the use of FAAM is available in individuals with a wide array of ankle an foot disorder. However, addition evidence to support the use of the FAAM for those with chronic ankle inability is needed.

Chang-Zern et al, (1993)

To study the immediate effectiveness of treatment on an active myofascial trigger point with physical medicine modalities, including spray and stretch, hydrocollator superficial heat, ultrasound deep heat, and deep pressure soft tissue massage. 84 patients with myofascial pain syndrome and 24 normal subjects were studied. Pain threshold of the active pressure algometer before and after the treatment with each one of the above mentioned modalities and placebo sham ultrasound. The results shows that all 4 therapeutic modalities can be effectively applied for the treatment of myofascial pain syndrome to obtain an immediate increase of pain threshold of an active myofascial trigger point, although the stretch therapy is more effective than the thermotherapy.

Christian lemburg, et al., (2008)

The trigger points that athletes are likely to experience differ according to their sports, since different muscle are involved in the movement pattern and requirements of different activities. For example foot pain, referred from the calves.

David Liddle, et al., (1994)

Plantar heel pain is common in both athletic and non-athletic population. In athletic population excessive plantar heel force and pressure are intrinsic risk factors that may play a contributory role in plantar heel pain in athletes.

Davies Clairet, et al., (2004)

Most of the common everyday pain is caused by myofascial trigger point and that ignore basic concept could invariably leads to false diagnosis and failure to deal effectively with pain.

Elizabath et al, (2007):

This study us to investigate the criteria adopted by experts to diagnose myofascial trigger point (MTrP) pain syndrome. We conclude that there is as limited consensus to definition in respect of myofascial trigger point pain syndrome. Further research is needed to test the reliability and validity of diagnostic criteria. Until reliable diagnostic criteria have been established, there is a need for greater transparency in research papers on how a case of MTrP pain syndrome is defined, and claims for effective interventions in treating the condition should be viewed.

Guyton, et al., (2000)

When tension develop in a muscle the Golgi tendon organ fires, inhibits alpha motor neuron activity and increases tension in the muscle tendon.

Gary Fryer, et al., (2005):

They conducted the study about the effect of manual pressure release on the pressure sensitivity of latent MTrP in the upper trapezius muscle.

Gordon M. Wyant, et al., (1979)

Trigger point are distinct area of focal hyperirritability which give rise to areas of referred pain in well-defined areas of the musculoskeletal system, sometimes remote from the pain itself and not related to it by anatomically definable pathway.

Gerwin, et al., (1997)

Found that independent examines were generally able to identify myofascial trigger points, but only with sufficient training and agreement on the definition and features of myofascial trigger points.

Hugh Gemmell, et al., (1988)

They conducted the study about Ischemic compression is superior to sham ultrasound in immediately reducing pain in patient with non specific neck pain and upper trapezius trigger points.

Hunter G et al., (2002)

Following injury, the ability of soft tissue to tolerate the demands of functional loading decreases. A major part of the management of soft tissue dysfunction lies in promoting soft tissue adaptation to restore the tissue's ability to cope with functional loading. Specific soft tissue mobilization (SSTM) uses specific, graded and progressive application of force by the use of physiological, accessory or combined techniques either to promote collagen synthesis, orientation and bonding in the early stages of the healing process, or to promote changes in the viscoelastic response of the tissue in the later stages of healing.

Hing CZ, et al., (1996)

Myofascial pain syndrome is a common painful muscle disorder caused by myofascial trigger points. Trigger points are discrete, focal, hyperirritable spots located in a taut band of skeletal muscle. The spots are painful on compression and can produce referred pain, referred tenderness, motor dysfunction, and autonomic phenomena. Active trigger point causes pain at rest. It is tender to palpation with a referred pain pattern that is similar to the patient's pain complaint.

Mazaheri M, et al., (2010):

FAAM scores were greater in individuals who rated their function as normal or nearly normal compared with those who rated as abnormal or severely abnormal for SPORTS but not for ADL (P=0.15).The Persian version of FAAM is a reliable and valid measure to quantify physical functioning in patients with foot and ankle disorders.

Martin RL, et al., (1998):

There is no universally accepted instrument that can be used to evaluate changes in self-reported physical function for individuals with leg, ankle, and foot musculoskeletal disorders. this study was designed to provide validity evidence for interpretation of FAAM scores, they concluded that FAAM is a reliable, responsive, and valid measure of physical function for individuals with

broad range of musculoskeletal disorders of the lower leg, foot, and ankle.

Luke D. Rickards, et al., (2006):

Few of the numerous non-invasive physical treatment proposed for the pain from active myofascial trigger point may be effective,

Lucas, et al., (2009)

A 2009 review of nine studies examining the reliability of trigger point diagnosis found that physical examination could not be recommended as reliable for the diagnosis of trigger point.

John Gallagher, et al., (2001)

A prospective, observational cohort study, a clinical important change in pain severity measures on visual analog scale. At 30-minute intervals during a 2-hour period, patients marked a VAS. The results shows Ninety-six patients were used in this study, providing 332 paired pain measurements and 141 paired measurements were noted, this data are proved minimum changes in acute pain that is clinical significant.

Jan Dommerholt, et al., (2006)

Ischemic compression therapy provides alternative treatment using either low pressure and a long duration (9os) or high pressure and short duration (3os) for immediate pain relief and MTrP sensitivity suppression.

Joel A Radford (2007):

They conducted the study, When used for the short-term treatment of plantar heel pain, a two-week stretching program provides no statistically significant benefit in 'first-step' pain, foot pain, foot function or general foot health compared to not stretching.

Kisner and Colby, et al., (2007)

Stated that, if a slow stretch force applied to muscle, the golgi tendon organ fire and inhibits the tension in the muscle, allowing the parallel elastic component (the sarcomere) of the muscle to lengthen.

Kishner and Colby et al (2002):

Stated that adequate mobility of soft tissues and joints is thought to be an important factor in prevention of injury (or) reinjure to soft tissues.

Romulo Renum, et al., (2009).

The sarcomeres by direct pressure combined with active stretching of the involved muscle may equalise the length of sarcomeres and consequently decrease the pain and increase the physical performance

Polly, et al., (2008)

prospective study; reliability of the visual analog scale for measurement if Acute pain in emergency department (ED). Intra-class correlation coefficients and Bland-Altman analysis were used to assess reliability of paired VAS measurement was obtained. The results shows reliability of the VAS for acute pain measurement is sufficient to assess acute pain.

Stephanie, et al., (1997)

Myofascial pain syndrome is a common condition after resulting in referral to a pain clinic. The incidence of Myofascial pain syndrome with associated trigger points appear to vary between 30 and 85 % of people presenting to pain clinics, patients complains of regional persistent pain, ronging in intensity and most frequently found in the extremities.

Perry H Jedian, et al., (1996)

One of the most common causes of plantar fasciitis is tightness of the calf muscle and Achilles tendon. More importantly muscle tightness is usually traced to trigger points.

Pawlak, et al., (1998)

Stated that Muscle tightness is a limiting factor for optimal physical performance and an important intrinsic factor for sports injury.

Pearson K, et al., (2000)

Stated that, when tension develops in a muscle the golgi tendon organ fires, inhibits alpha motor neuron activity, and decreases tension in the muscle tendon unit being stretched. If a low intensity, slow stretch force is applied to muscle, the stretch reflex is less likely to be activated as the golgi tendon organ fires and inhibits tension in muscle, allowing the parallel elastic component (the sarcomeres) of the muscle to remain relaxed and lengthen.

Perry et al., (2006)

Pain in the arch of the foot is frequently diagnosed as plantar fasciitis. Like heel pain, trigger points in the calf muscles are frequently responsible for this type of foot pain, though trigger points in the small muscles of the foot may also contribute to this pain. Though the calf muscles are very strong, they are easily overloaded by everyday activities. The trigger points that develop in these

muscles refer pain to the foot for one reason: to get you off your feet and allow the overloaded calf muscles to recover.

Winer JH et al., (2001)

Trigger point muscle therapy, or myotherapy, can be a very effective method of decreasing pain and increasing mobility and flexibility. The muscles are most frequently the major source of musculoskeletal pain and dysfunction, often mistakenly presumed to be solely the effect of arthritis.

Travel and simons ., (1999)

They found that many cases of heel pain were mistakenly believed to be plantar fasciitis are actually due to a trigger point in the calf muscle. If heel pain is due to a trigger point in the calf, no treatment of the plantar fasciitis will stop the pain. The trigger point that causes heel pain is in the soleus muscle, a part of the calf muscle group. There are a couple more trigger points in the soleus that can become activated, but the one that refers pain to the heel is the most distal, located furthest down leg.

Sarhmann.S et al (1997)

Stated that muscle tightness and hyper tonicity has a significant impact on the neuromuscular control. Muscle tightness affects the normal length tension relationship.

Richard et al, (2005)

Calf muscle stretching programs are used to increase dorsiflexion range of motion at the ankle. On this study 19 women age group between 65 to 89 was selected and grouped into two. The stretching group showed increased maximal dorsiflexion range of motion. Eight week stretching program most likely increased the maximal length, length extensibility and passive resistive force of calf muscles.

III.METHODOLOGY

3.1 STUDY DESIGN:

A randomised experimental pre-test, post-test control group design.

3.2 STUDY SETTING:

Study was conducted at OPD Dept Maruthi College of Physical Education, Coimbatore.

3.3 STUDY DURATION:

Total duration was six months. Individuals received the treatment for duration of one week.

3.4 POPULATION STUDIED

30 athletic individuals with clinical diagnosis of plantar heel pain, who fulfill the predetermined inclusive and exclusive criteria were selected and divided into 2 groups by simple random sampling method. Each group consists of 15 patients. Groups are named as group A, and B.

3.5 CRITERIA FOR SELECTION

3.5.1 INCLUSIVE CRITERIA:

- Male athletes
- Age group between 18 to 25 years
- Clinical diagnosis of unilateral plantar heel pain
- Specific controls for subjects included the time of testing, activities of daily living, nutritional factors, and psychological status could be controlled during the study.

3.5.2 EXCLUSIVE CRITERIA:

- Subjects with
    - Neurological problems.
    - Any recent injuries to lower limbs.
    - Any recent surgery.
    - Psychologically unstable players.
- Red flags to manual therapies
    - Tumour
    - Fractures
    - Rheumatoid arthritis
    - Osteoporosis
    - Severe vascular disease.

- Diagnosis of fibromyalgia
- Previous manual therapy interventions for the foot region.

3.6 VARIABLES:

3.6.1 INDEPENDENT VARIABLES:

- Myofascial trigger point.
- Self-Stretching.

3.6.2 DEPENDENT VARIABLES:

- Pain
- Physical performance.

3.7 PARAMETERS:

- Visual analog scale
- Foot and ankle ability measures

3.8 PROCEDURE

A total of 30 athletes with a clinical diagnosis of plantar heel pain were randomly divided into 2 groups of 15 each using random sampling method

GROUP A

Group A Control Group receives self-stretching protocol only

SELF-STRETCHING

All participants were instructed to do self-stretching protocol; these include calf muscles and plantar fascia-specific exercise.

- Standing gastrocnemius stretch: In standing, with the affected foot away from the wall, patient leaned forward, while keeping the heel on the floor; the affected knee was kept in full extension.
- Standing Soleus stretch: In standing, with the affected foot away from the wall, patient leaned forward, while keeping the heel on the floor; the affected knee was bent.
- Plantar fascia stretch: in sitting, affected foot over the contra lateral thigh, the person places the fingers over the base of the toes, and pulls the toes up towards the shin.

Holding time – 20 seconds

Resting time – 20 seconds

Intensity – 6 times / 3 Mins

GROUP B

Group B- Experimental group receives Myofascial trigger point release followed by self-stretching protocol.

MYOFASCIAL TRIGGER POINT THERAPY

Athletes were examined for the presence of active Trigger points in the gastrocnemius and Soleus muscle.

- Ischemic compression over the trigger point until an increase in muscle resistance was predicted by therapist.
- The pressure was maintained until the therapist perceived release of the taut band.
- Trigger point tension and the process was repeated for 90 seconds, 3 repetitions and followed by massage (longitudinal stroke).

All participants were instructed to do self-stretching protocol; these include calf muscles and plantar fascia-specific exercise.

POSITION OF THE PATIENTS FOR TRIGGER POINT OF GASTROCNEMIUS

TRIGGER POINT RELEASE ON GASTROCNEMIUS

POSITION OF THE PATIENTS FOR TRIGGER POINT OF SOLEUS

TRIGGER POINT RELEASE ON SOLEUS

SELF- STRETCHING FOR CALF MUSCULATURE

SELF-STRETCHING FOR PLANTAR FASCIA

3.9 STATISTICAL TOOL

Paired 't' test

The following statistical tool is used to compare pre test and post test values within the groups.

Formula: Paired t-test

$$S = \sqrt{\frac{\sum d^2 - \frac{(\sum d)^2}{n}}{n-1}}$$

$$t = \frac{\bar{d}\sqrt{n}}{s}$$

Where,

d = difference between the pre test versus post test

$\bar{d}$ = mean difference

n = total number of subjects

S = standard deviation

Unpaired 't' test:

The unpaired't' test was used to compare post test values between the two groups.

Formula: Unpaired t-test

$$S = \sqrt{\frac{\sum\left(X_1 - \overline{X_2}\right)^2 + \sum\left(X_2 - \overline{X_2}\right)^2}{n_1 + n_2 - 2}}$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{S}\sqrt{\frac{n_1 n_2}{n_1 + n_2}}$$

Where,

$\overline{x_1}$ = mean of Group A

$\overline{x_2}$ = mean of Group B

$\sum$ = sum of the values

n_1 = number of subjects in Group A

n_1 = number of subjects in Group B

S = standard deviation

Level of significance: 5%

IV. DATA ANALYSIS AND INTERPRETATION

TABLE - I

PAIRED 't' TEST

PRE TEST AND POST TEST VALUES OF GROUP A

GROUP A - SELF-STRETCHING PROTOCOL ONLY

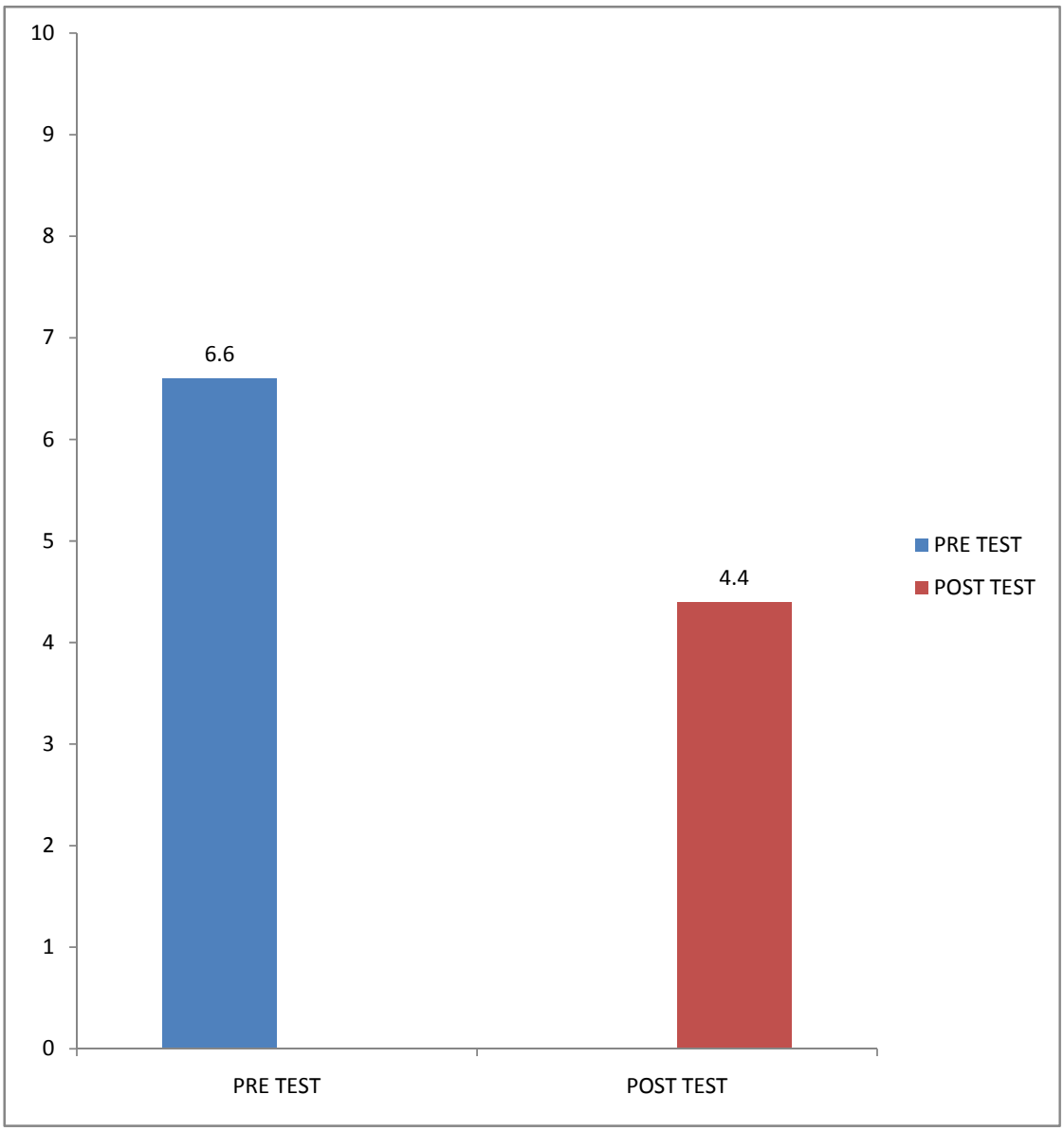
PAIN – VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Paired 't' test values of Group A , who were treated with Self-stretching protocol only.

TEST	N	MEAN	STANDARD DEVIATION	t-VALUE
PRE TEST	15	6.60	1.12	5.7822
POST TEST	15	4.40	1.40	

GRAPH-I

GRAPHICAL REPRESENTATION OF PRE AND POST TEST VALUES OF GROUP A (VAS)



ANALYSIS OF RESULTS

30 athletes with plantar heel pain were divided into two groups. Group A was treated with self-stretching only. Group B was treated with Myofasical trigger point release with self-stretching. Pain was measured by visual analogue scale and physical performance measured by Foot and Ankle Ability measures.

Statistical analysis was done by using Paired and Unpaired't' test. Paired't' test was used to find out the improvement within the group. Unpaired't' test was used to find out the difference between two groups.

Paired't' test (VAS)

Group A – SELF-STRETCHING ONLY

Using Paired 't' test with 19 degrees of freedom and 5% at level of significance, the calculated 't' value is 5.78 which is greater than table 't' value 1.7613.

TABLE - II

PAIRED 't' TEST

PRE TEST AND POST TEST VALUES OF GROUP B

GROUP B – MYOFASCIAL TRIGGER POINT RELEASE WITH SELF-STRETCHING PROTOCOL ONLY

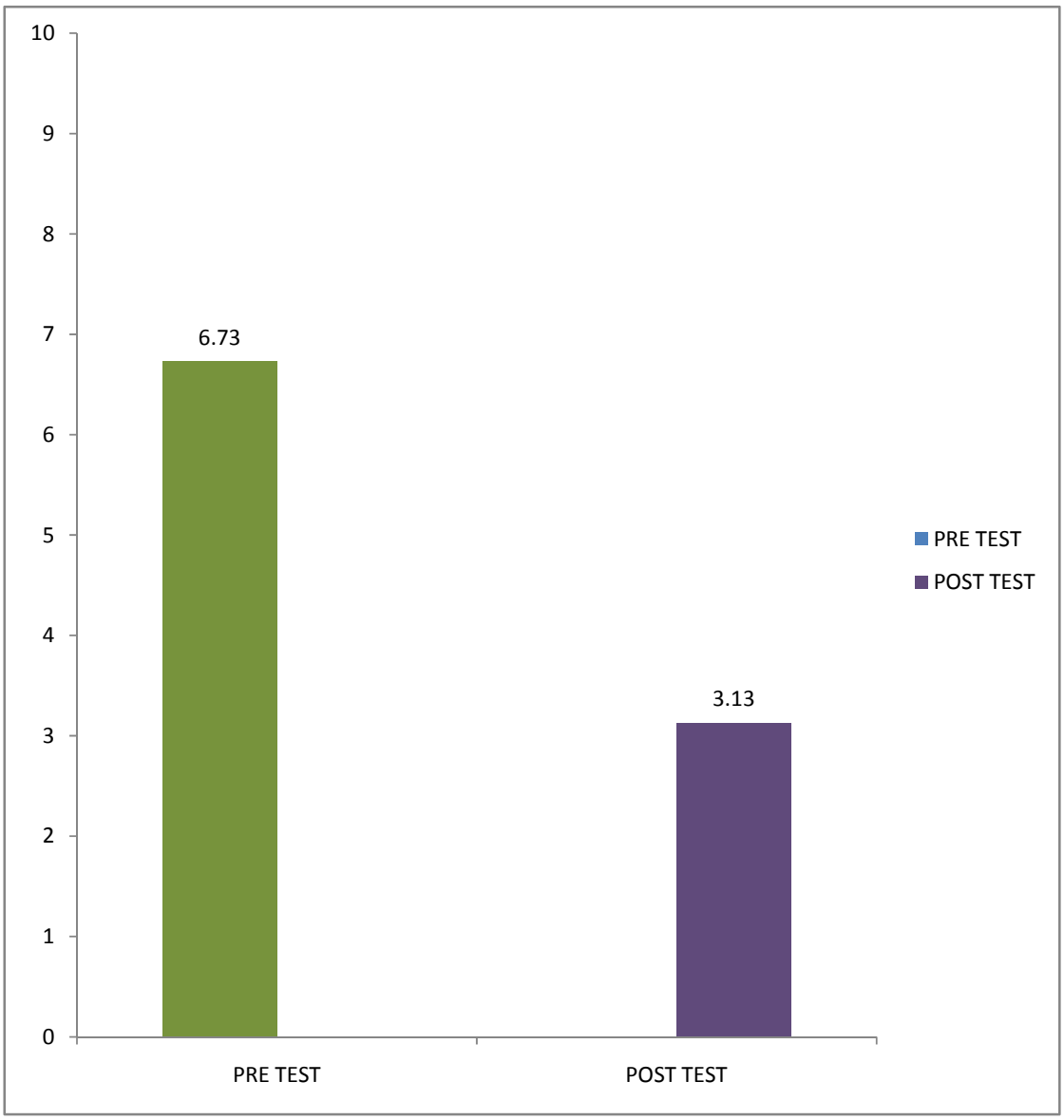
PAIN – VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Paired 't' test values of Group B , who were treated Myofascial trigger point release with Self-stretching protocol only

TEST	N	MEAN	STANDARD DEVIATION	t-VALUE
PRE TEST	15	6.73	1.10	18.9237
POST TEST	15	3.13	0.74	

GRAPH-II

GRAPHICAL REPRESENTATION OF PRE AND POST TEST VALUES OF GROUP B (VAS)



ANALYSIS OF RESULTS

GROUP B–MYOFASCIAL TRIGGER POINT RELEASE WITH SELF STRETCHING

Using Paired ‘t’ test with 19 degrees of freedom and 5% at level of significance, the calculated ‘t’ value is 18.9237 which is greater than table ‘t’ value 1.7613.This test showed that there is a significant effect of Myofascial trigger point with self-stretching in improving the physical performance for plantar heel pain in athletes.

TABLE - III

UNPAIRED 't' TEST

POST TEST VALUES OF GROUP A AND GROUP B

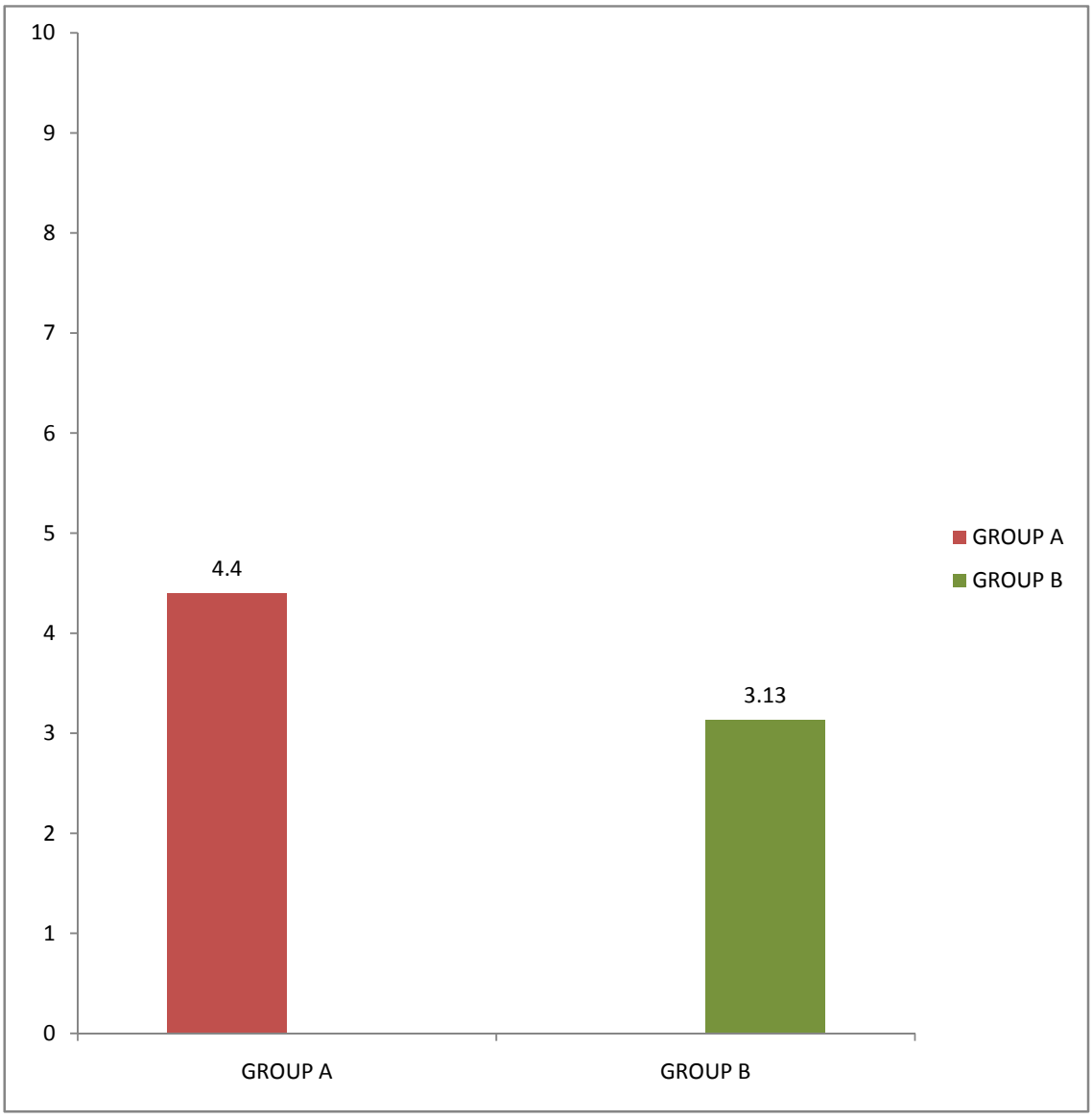
PAIN – VISUAL ANALOGUE SCALE

The comparative mean values, mean differences, standard deviation and Unpaired't' test values of Group A and Group B

GROUPS	N	MEAN	STANDARD DEVIATION	t-VALUE
GROUP A	15	4.40	1.40	3.0880
GROUP B	15	3.13	0.14	

GRAPH-III

GRAPHICAL REPRESENTATION OF POST TEST VALUES OF GROUP A AND GROUP B (VAS)



ANALYSIS OF RESULTS

Unpaired‘t’ test

(a) Comparing post test values of VAS measurements between Group A and Group B:

Post test values of Group A and Group B is analysed by Unpaired ‘t’ test. The calculated‘t’ value is 3.0880 which is greater than table ‘t’ value 1.7011 at 5% level of significance. This test showed that there is significant difference between the effects of myofascial trigger point release with self-stretching in improving the physical performance for plantar heel pain in athletes.

TABLE - IV

PAIRED 't' TEST

PRE TEST AND POST TEST VALUES OF GROUP A

GROUP A - SELF-STRETCHING PROTOCOL ONLY

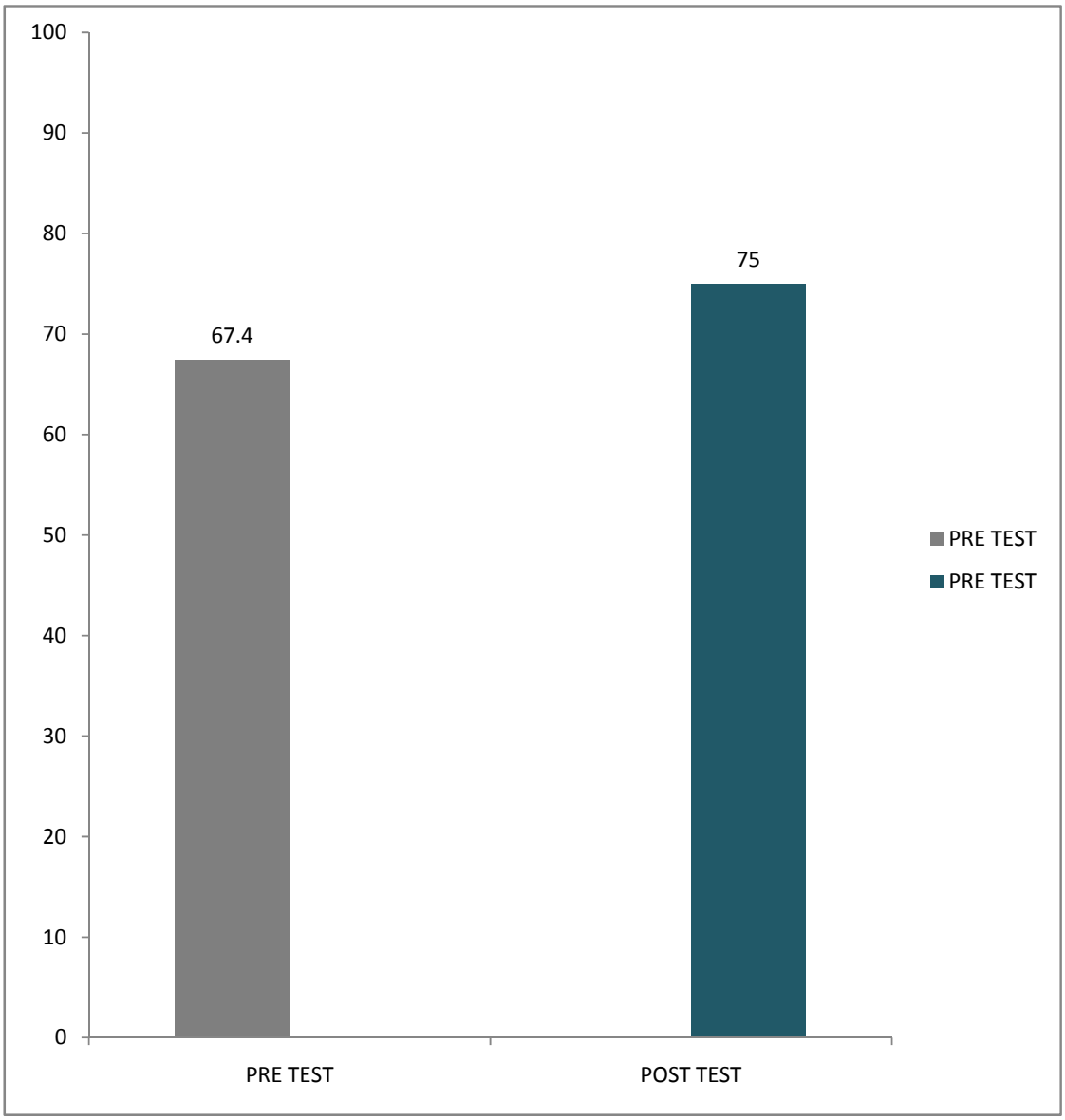
PHYSICAL PERFORMANCE – FAAM

The comparative mean values, mean differences, standard deviation and Paired 't' test values of Group A , who were treated with Self-stretching protocol only

TEST	N	MEAN	STANDARD DEVIATION	t-VALUE
PRE TEST	15	67.40	6.73	11.7671
POST TEST	15	75.00	1.75	

GRAPH-IV

GRAPHICAL REPRESENTATION OF PRE AND POST TEST VALUES OF GROUP A (FAAM)



ANALYSIS OF RESULTS

Paired‘t’ test (FAAM)

Group A – SELF-STRETCHING ONLY

Using Paired ‘t’ test with 19 degrees of freedom and 5% at level of significance, the calculated ‘t’ value is 11.76 which is greater than table ‘t’ value 1.7613.

TABLE - V

PAIRED 't' TEST

PRE TEST AND POST TEST VALUES OF GROUPB

GROUP B – MYOFASCIAL TRIGGER POINT RELEASE WITH SELF-STRETCHING PROTOCOL ONLY

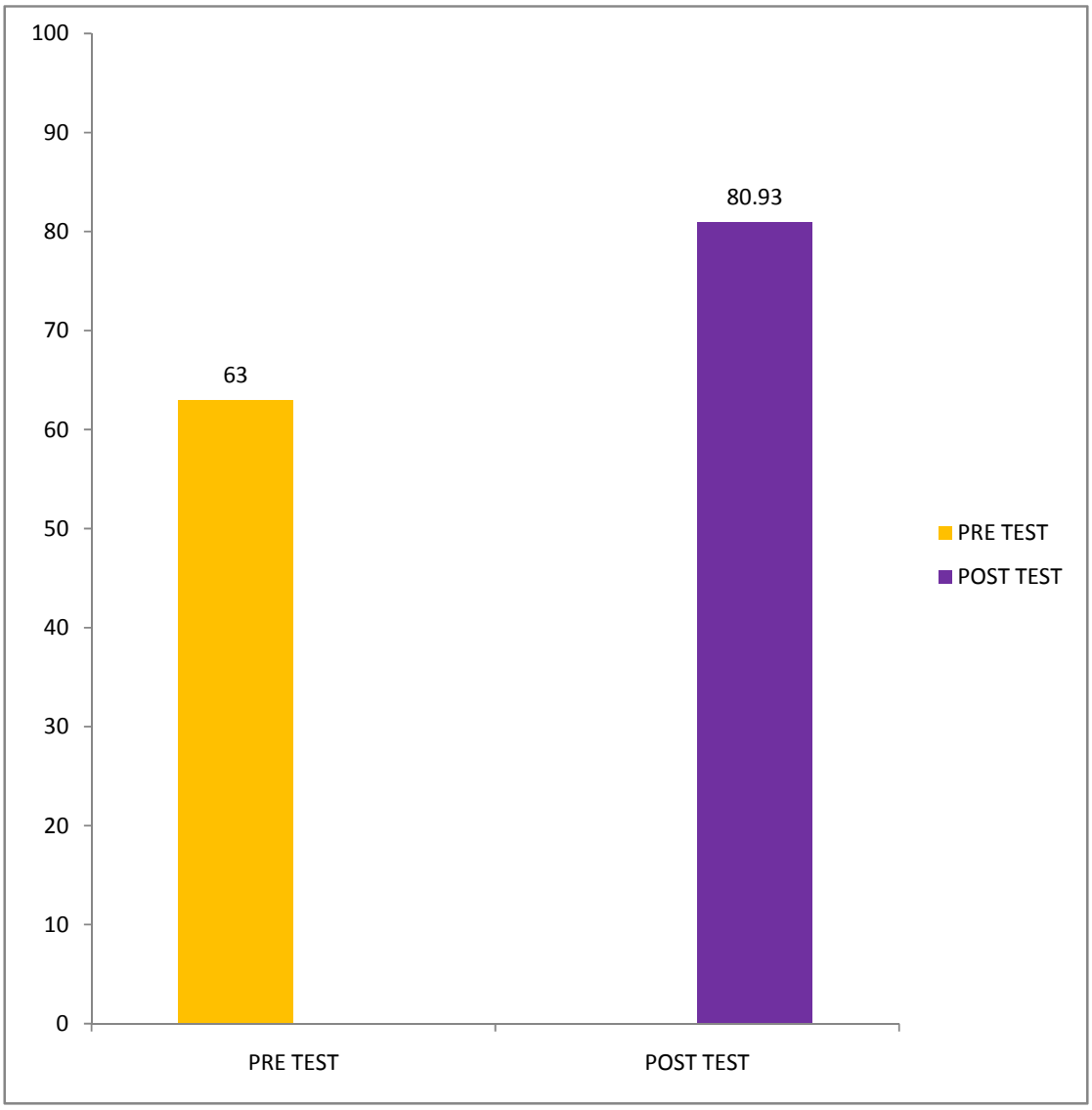
PHYSICAL PERFORMANCE – FAAM

The comparative mean values, mean differences, standard deviation and Paired 't' test values of Group B , who were treated with Myofascial Trigger Point Release with Self-stretching protocol only

TEST	N	MEAN	STANDARD DEVIATION	t-VALUE
PRE TEST	15	63.00	4.64	12.4043
POST TEST	15	80.93	6.33	

GRAPH-V

GRAPHICAL REPRESENTATION OF PRE AND POST TEST VALUES OF GROUP B (FAAM)



ANALYSIS OF RESULTS

GROUP B –MYOFASCIAL TRIGGER POINT RELEASE WITH SELF STRETCHING

Using Paired ‘t’ test with 19 degrees of freedom and 5% at level of significance, the calculated ‘t’ value is 12.4043 which is greater than table ‘t’ value 1.7613.This test showed that there is a significant effect of Myofascial trigger point with self-stretching in improving the physical performance for plantar heel pain in athletes.

TABLE - VI

UNPAIRED 't' TEST

POST TEST VALUES OF GROUP A AND GROUP B

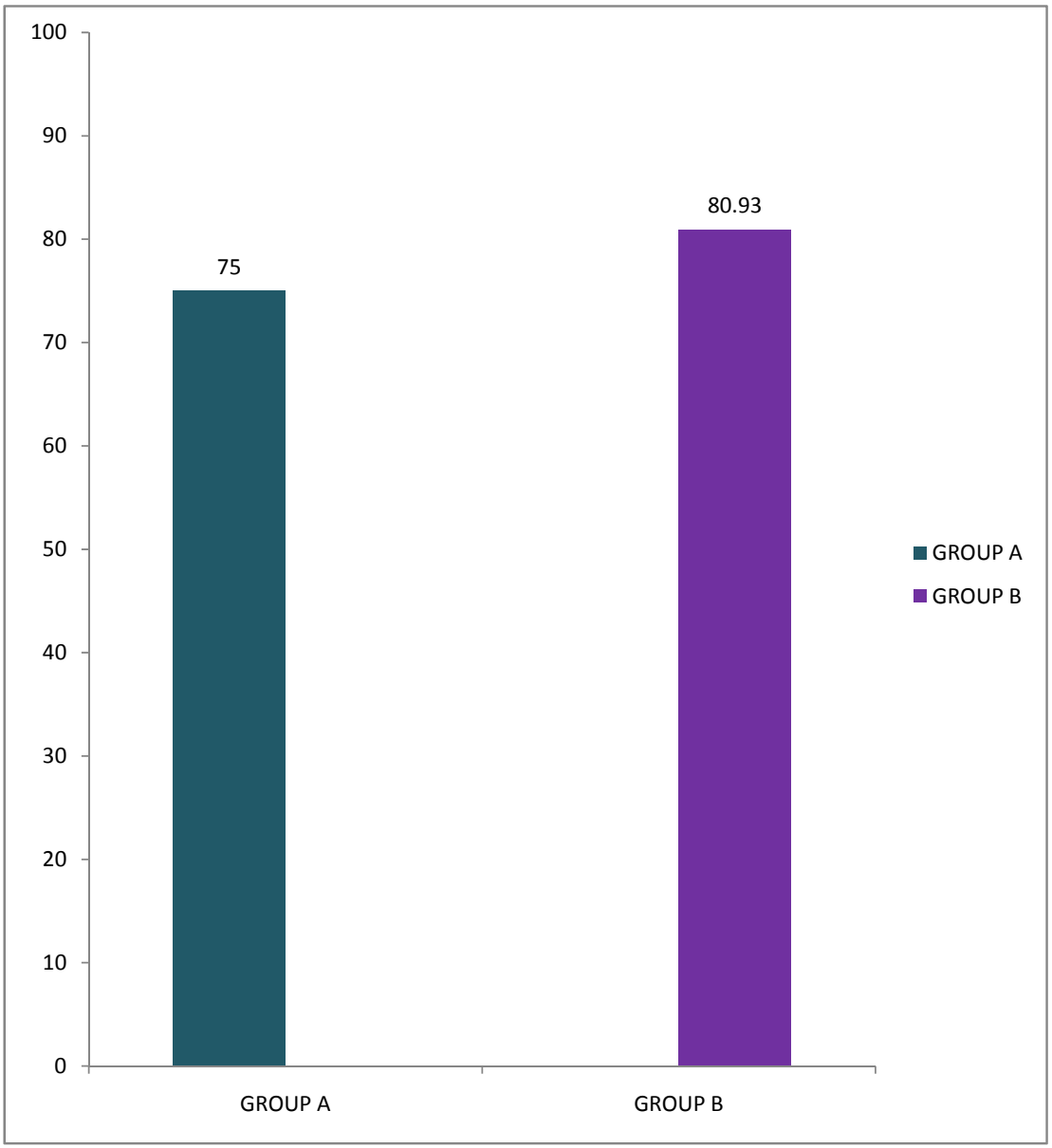
PHYSICAL PERFORMANCE-FAAM

The comparative mean values, mean differences, standard deviation and unpaired 't' test values of Group A and Group B

GROUPS	N	MEAN	STANDARD DEVIATION	t-VALUE
GROUP A	15	75.00	5.67	2.7043
GROUP B	15	80.93	6.33	

GRAPH-VI

GRAPHICAL REPRESENTATION OF POST TEST VALUES OF GROUP A AND GROUP B (FAAM)



Unpaired‘t’ test:

(b) Comparing post test values of FAAM measurements between Group A and Group B:

Post test values of Group A and Group B is analysed by Unpaired‘t’ test. The calculated‘t’ value is 2.7043 which is greater than table‘t’ value 1.7011 at 5% level of significance. This test showed that there is significant difference between the effects of myofascial trigger point release with self-stretching in improving the physical performance for plantar heel pain in athletes.

V. DISCUSSION

This project is the documentation of the effect of myofascial trigger point release combined with self-stretching to increase the physical performance for plantar heel pain in athletes.

In this study the subject in all the two groups were identical in their performance level before they entered into this study.

Statistical tool such as paired t test and unpaired t test were used in this study. Paired‘t’ test showed that both control group and experimental group had significant effect on physical performance and pain for plantar heel pain in athletes. In the unpaired‘t’ test results showed that there was a significant difference between the control and experiment group in physical performance and pain for plantar heel pain in athletes.

Plantar heel pain is common in both athletic and non-athletic population. In athletic population excessive plantar heel force and pressure are intrinsic risk factors that may play a contributory role in plantar heel pain in athletes David Liddle, (1994)

When tension develop in a muscle the Golgi tendon organ fires, inhibits alpha motor neuron activity and increases tension in the muscle tendon Guyton et al, (2000)

In the short term treatment of plantar heel pain there is no significant benefit in foot function and foot health compared to stretching (Joel Radford). This statement says that the stretching alone may reduce the pain but there is not significant improvement in the foot function.

Muscle tightness is a limiting factor for optimal physical performance and important intrinsic factors for plantar heel pain in athletes Pawlak, (1998)

So the exact mechanism of reduction of physical performance is by the development of the muscle tension and muscle tightness. Therefore the muscle tightness will be reduced by the trigger point release to the gastrocnemius and soleus muscle, hence increasing the effectiveness of stretching.

In fact, it has been proposed that compressing the sarcomeres by direct pressure combined with active stretching of the involved muscle may equalise the length of sarcomeres and consequently decrease the pain and increase the physical performance Romulo Renum (2009).

Along with the support of these studies, pre test and post test documentation with the help of Visual Analog Scale for pain and Foot and Ankle Ability Measures for physical performance is done.

Foot And Ankle Ability measure is a reliable; responsive and valid tool for measuring the physical performance with a broad range of musculo-skeletal disorders of lower leg, Foot and Ankle Martin (2001)

In the table I & IV the pre test and post value of Visual Analog Scale and Foot and Ankle Ability Measures were assessed for the stretching group. The results show that there was significant decrease in reduction of pain and increase in the physical performance for plantar heel pain athletes.

In the table II & V the pre test and post value of Visual Analog Scale and Foot and Ankle Ability Measures were assessed for the myofascial trigger point release with self-stretching group. The results showed that there was significant decrease in reduction of pain and increase in the physical performance for plantar heel pain athletes.

In the table III & VI the post test value of both Visual Analog Scale and Foot and Ankle Ability Measures show that there is significant difference in between the self-stretching and myofascial trigger point release with self-stretching. The analysis of the post test values shows that there is decrease in reduction of pain and increase in the physical performance between the groups for plantar heel pain in athletes.

So, the study shows that myofascial trigger point release with self-stretching decreased the pain and increase the physical performance for plantar heel pain in athletes.

VI. SUMMARY AND CONCLUSION

The aim of the study is to assess the effect of myofascial trigger point release with self-stretching for plantar heel pain in athletes.

30 athletes were selected in the age group between 18 to 25 years and the subjects were allotted into two groups, according to inclusion criteria.

Group A received self-stretching only; Group B received Myofascial trigger point release with self-stretching. The pre-test and post-test were taken before and at the end of the treatment.

Statistical analysis was done by using paired and unpaired't' test. Paired't' test was used to find out the improvement within the group. Unpaired't' test was used to find out the difference between two groups.

The results showed that there is a reduction of pain and increasing physical performance for plantar heel pain in athletes, in group B

Thus study conclude that myofascial trigger point release with self-stretching improve physical performance in plantar heel pain in athletes.

VII. LIMITATIONS AND RECOMMENDATIONS

- Absences of true control/sham or placebo group.
- These study only a short-term effects and further recommendation is to maintain at a long-term follow-up.
- Additionally, we did not successfully collect enough data on home exercise compliance to allow for analysis.
- Strengths of this study include an adequate sample size to detect between group differences and a very low dropout rate.

FURTHER RECOMMENDATION

- Other musculoskeletal conditions in athletic population should be focused in future studies
- Comparison of modality with exercises is recommended
- Hand's on approached like manipulations can be compared with therapeutic exercises.
- Plantar heel pain in female athletes can also be studied.

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IX.APPENDIX

APPENDIX -I

ASSESSMENT FORMAT

I) **Subjective Examination:-**

a) Name :

b) Age : Yrs

c) Sex : □ M □ F

d) Occupation :

e) Chief complaints :

Dislocation of Ankle Joint	Yes /No
Hyper mobility	Yes/ No
Recent fracture around the feet	Yes/ No
Neurological disorders	Yes/ No
Hypomobility	Yes/ No

f) Weight : kgs

g) Height : cms

(ii) History collection:-

a) Present Medical history

Any fracture or dislocation of Ankle or foot - Yes/No

b) Past Medical history:-

Fracture complication of the Ankle and foot -

Yes/No

(iii) OBJECTIVE EXAMINATION:

(a) on observation:

- General body built -
- Musculature -
- Deformity -
- Tropic changes -
- External appliances -

(b) on palpation:

- Temperature -
- Swelling -
- Bony prominence -
- Local tenderness -
- Oedema or effusion -

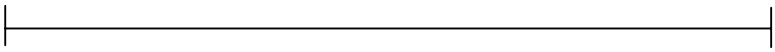
- Nodules -
- Scar tissue -
- Muscle spasm -

(h) on examination:

PAIN ASSESSMENT (USING VAS)

- On set -
- Duration -
- Site of pain -
- Type of pain -
- Nature of pain -
- Aggrevating factors -
- Relieving factors -

USING VAS



0 **10**

No Pain Maximum

SENSORY EXAMINATION:

- ❖ Temperature
- ❖ Pressure

MOTOR EXAMINATION:

Muscle power assessment – Calf Muscles, Intrinsic Muscles -

Joint range of motion - Ankle dorsiflexion -

- Ist MTP Joint extension

(vi) DIAGNOSIS

- X – Ray
- Medical Imaging
- **Special Tests**

a) Point tenderness □ + ve □ - ve

b) Self stretch Test □ + ve □ - ve

c) Haglund syndrome □ + ve □ - ve

(v) AIMS :

(vi) Means :

(vii) Home Program :

APPENDIX -II

Foot and Ankle Ability Measure (FAAM)

Activity of daily living

S.No		NO DIFFICULTY	MODERATE DIFFICULTY	EXTREME DIFFICULTY	UNABLE TO DO	N/A
1	Standing					
2	Walking on even Ground					
3	Walking on even ground without shoes					
4	Walking up hills					
5	Walking down hills					
6	Going down stairs					
7	Walking on uneven ground					
8	Steeping up and down curbs					
9	Stepping up and down curbs					
10	Squatting					
11	Coming up on your toes					
12	Walking initially					
13	Walking 5 minutes or less					
14	Walking approximately 10 minutes					
15	Walking 15 minutes or greater					
16	Home responsibility					
17	Activities of daily living					
18	Personal care					
19	Light to moderate work (standing, walking)					
20	Heavy work (push/pulling, climbing, carrying)					
21	Recreational activities					

Foot and Ankle Ability Measure (FAAM)

Sports Subscale

S.No		NO DIFFICULTY	MODERATE DIFFICULTY	EXTREME DIFFICULTY	UNABLE TO DO	N/A
1	Running					
2	Jumping					
3	Landing					
4	Starting and stopping quickly					
5	Cutting/ Lateral Movement					
6	Ability to perform Activities with Your Normal technique					
7	Ability to participate In your desired sport As long as you like					

APPENDIX-III

VISUAL ANALOG SCALE

VAS is to measure the severity of pain response that patient experience before and immediately after the completion of treatment. It consists of 10cm horizontal line with 2 ends enabled as no pain (o) and severe pain (10) The patient mark the point on the line corresponds to the severity of pain the patient experiences. The distance in centimetre from the O level in VAS to the level to the level marked by the patient was measured as a numerical index of severity of pain.

0 1 2 3 4 5 6 7 8 9 10

No pain **Maximum**

APPENDIX-IV

DATA CHART

VISUAL ANALOG SCALE				
Group A			Group B	
S.No	PRE-TEST	POST-TEST	PRE-TEST	POST-TEST
1	5	3	8	4
2	8	5	7	3
3	6	3	5	2
4	6	5	5	3
5	7	4	6	2
6	8	6	8	3
7	7	2	8	4
8	5	4	7	3
9	5	4	5	2
10	6	6	7	3
11	8	6	7	4
12	8	5	6	3
13	7	6	8	4
14	7	2	7	4
15	6	5	7	3

DATA CHART

FOOT AND ANKLE ABILITY MEASURE				
	Group A		Group B	
S.No	PRE-TEST	POST-TEST	PRE-TEST	POST-TEST
1	68	72	59	77
2	60	68	58	82
3	70	74	69	79
4	62	73	68	89
5	65	74	65	77
6	61	70	55	75
7	69	74	63	85
8	60	72	62	83
9	62	73	59	86
10	73	81	61	76
11	74	80	57	74
12	81	87	70	84
13	75	81	71	95
14	59	66	64	81
15	72	80	66	71

APPENDIX-V

I. CONSENT FORM

Mr/ Mrs, Ms…… has injured with following ailment…….. and has present in the clinic for the treatment & I give my consent in full consciousness for carrying out a project on me. The researcher has explained me in detail about his project and after understanding clearly about it and its effects and other consequences. I give my consent for carrying out the same.

Signature of the observer: **Signature of the patient:**

Place:

Date: