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Research Article

A Comparative Study To Find Out The Effectiveness Of Myofascial Release Technique Along With Stretching Versus Myofascial Release Technique In Patients With Plantar Fasciitis

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Abstract: Plantar Fasciitis (PF) is a common cause of heel pain which occurs mostly due to weight-bearing, standing occupation, injury to the heel of foot. It is often characterized by progressive pain with weight-bearing, especially the first few steps in the morning often persisting for months. Present literatures provides management strategies for this musculoskeletal issue, where different protocols were studied for their effectiveness. Myofascial release technique, plantar fascia stretching, ultrasound therapy, etc were all proven to be effective in the management of PF, but there exists very little evidence that studied the combined effects of the different physical interventions. Therefore the main objective of the study was to determine the effects of the MFR technique in combination with stretching for patients with plantar fasciitis and to find out whether this combination of interventions proved better than MFR alone. 30 subjects participated and were randomly divided into 2 groups (n=15). Group- A (control) received Myofascial Release Technique and Group B (experimental) received Myofascial Release Technique with stretching technique. Both the groups received Ultrasound therapy as a common modality. All the subjects of both groups were assessed by the Visual Analog Scale and Foot Function Index of ankle joints before and after receiving treatment. The data was analyzed statistically by using paired t-test and independent t-test. In the comparison of both groups, it was found out that the mean values of VAS (t= 4.25) and FFI (t= 4.53) of the experimental group (Group B) was highly significant (p=0.00) which concluded that Myofascial Release Technique with stretching technique is more effective in Plantar fasciitis management than only Myofascial Release Technique. From this study, conclusions could be made that in the management of Plantar fasciitis the Myofascial Release Technique with stretching technique was more precise and beneficial than only MFR technique in relieving pain and increasing functional ability.

Keywords: Plantar fasciitis, Stretching, Ultrasound, Myofascial Release Technique, Visual Analogue Scale, Foot Function Index

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1. INTRODUCTION

Plantar fasciitis (PF) is classified as a syndrome that results from repeated trauma to the plantar fascia at its origin on the calcaneus.[1] The most common theory is repetitive partial tearing and chronic inflammation of the plantar fascia at its insertion on the medial tubercle of the calcaneus.[2,3] Studies report that, faulty biomechanics is a major cause of plantar fasciitis. Subjects having either a lower or higher arched foot can experience plantar fasciitis. Patients with lower arches have too much motion, whereas patients with higher arches have too little motion, both leading to the pathology of PF.[4] Plantar fasciitis has been experienced by 10% of the population.[5] Approximately 2 million people in the US are treated annually for plantar fasciitis.[6-9] The chief initial complaint is typically a sharp pain in the inner aspect of the heel and arch of the foot or a fatigue-like sensation in the medial arch of the foot after prolonged periods of standing, especially on unyielding cement surfaces.[10-13] The plantar fascia supports the medial longitudinal arch by transmitting forces between the heel and forefoot during the late stance to toe-off phases of gait. Degenerative changes can cause acute and chronic inflammation and calcification at the origin of the plantar fascia and bony traction spur formation.[14] In the presence of aggravating factors, the repetitive movement of walking or running can cause micro-tears in the plantar fascia. The affected site is frequently near the origin of the plantar fascia at the medial tuberosity of the calcaneus.[5] Histologic analysis demonstrates marked thickening and fibrosis of the plantar fascia along with collagen necrosis, chondroid metaplasia, and calcification.[15,16] Although plantar fasciitis has historically been assumed to be primarily an inflammatory process, these findings suggest a principally degenerative mechanism, leading some authors to suggest that "plantar fasciosis" may be a more histologically accurate term.[15,17] Plantar fasciitis usually develops due to the coexistence of many etiologic factors. Although the etiology is not clear,[18] identifying the risk factors playing a role in the occurrence of plantar fasciitis is crucial for both the identification of etiology and the successful management of preventable risk factors.[19] Myofascial therapy can be defined as "the facilitation of mechanical, neural and psycho physiological adaptive potential as interfaced by the myofascial system".[20] Fascia is located between the skin and the underlying structure of muscle and bone, it is a seamless web of connective tissue that covers and connects the muscles, organs, and skeletal structures in our body. Muscle and fascia are united forming the myofascial system. The purpose of deep myofascial release is to release restrictions (barriers) within the deeper layers of the fascia. This is accomplished by stretching the muscular elastic components of the fascia, along with the crosslinks, and changing the viscosity of the ground substance of the fascia.[21] Direct MFR seeks for changes in the myofascial structures by stretching, elongation of the fascia, or mobilizing adhesive tissues. There can be a misconception that the direct method is violent and painful. It is not essentially aggressive and painful, as the practitioner moves slowly through the layers of the fascia until the deep tissues are reached. The intention of indirect myofascial release is to allow the body's inherent ability for self-correction to return, thus eliminating pain and restoring the optimum performance of the body. Self-myofascial release is when the individual uses a soft object to provide MFR under their power. Usually, an individual uses a soft roll, or ball (tennis ball, soccer ball) on which to rest one's body weight, then, by using gravity to induce pressure along the length of the specific muscle or muscle groups, rolls their body on the object, slowly (1-2 seconds an inch), allowing for the fascia to be massaged. Upon any sharp pain, individuals must back up and hold the position, to not force undue stress upon the fascia and muscle. Stretching is defined as the behavior a person adopts to recover, reducing stiffness or soreness, increasing or maintaining their range of movement. This behavior includes passive and active stretching, which can be in the form of exercise or with the assistance of another person (therapist/trainer). Stretching therefore is the means by which the ROM can be increased, but it is not the only one. There are several ways to achieve ROM improvements depending on the processes associated with the loss of ROM.[22] However, the discomfort level of stretching often has been prescribed as tension remaining below a pain threshold,[22,23] without considering that an optimal discomfort and tension level may be obtained in a different position that results in the more effective achievement of a new ROM. Considering the present works of literature for the management of this musculoskeletal issue, different protocols were studied for their effectiveness. Physical interventions like the Myofascial release technique[32] , stretching to the plantar fascia[33], ultrasound therapy[34] all were proved to be effective in the management of PF but there was very less evidence that studied the combined effects of the different physical interventions. So the main objective of the study was to determine the effects of the Myofascial release technique in combination with stretching for patients with plantar fasciitis and to find out whether this combination of interventions proved better than Myofascial release technique alone.

2. MATERIALS AND METHODS

This is an experimental study design, conducted for 12 months, where pre and post-study design was used. 30 subjects were included in this study which was distributed in two groups Group A-15 subjects (Control Group), Group B-15 subjects (Experimental Group). These subjects were referred by the consultant physician/orthopedic surgeons or physiotherapist. The samples were collected from Assam down town university OPD and physiotherapy department, Down Town Hospital. To avoid the consequences of dropping out of subjects from this study and any further difficulty in carrying out the research; a convenient sampling method was taken. All the subjects were required to sign a consent form before participation in the study. The study proposal has been accepted by the Ethics Committee, Assam down town University (Memo No: adtu/Ethics/stdnt-lett/2019/038).

2.1 Inclusion criteria

The samples included in the study were prolonged standing patients, both genders were included in the study, aged between 25-50 years, having sharp pain on the first step in the morning, chronic Pain (>90 days) from previously diagnosed Plantar Fasciitis, no history of surgery to the affected anatomy, No alternative treatment procedures within the last 90 days, both unilateral and bilateral diagnosis and clinical presentation are included.

2.2 Exclusion criteria

Samples excluded from this study were patients, who had undergone prior orthopedic surgery, serial casting in the past

6 months, taking oral drugs, having severe limitations in passive range of motion at lower extremities, cognitive and perceptual disorders, contracture, any deformity on hip, back, knee, ankle; have any metallic implants in the ankle joint, subjects not having any sensory problem, subjects diagnosed with diabetes neuropathy, subjects having chronic venous insufficiency, patients currently enrolled in any other non-conservative, device, or Investigational New Drug clinical trial, or who have participated in a clinical study involving the Plantar Fascia.

3. Outcome Measure

Visual Analog Scale and Foot Function Index-Revised are used to measure the pain and functional ability of the affected foot respectively. Subjects fulfilling the criteria were allocated in two different treatment groups, Group-A (Myofascial Release technique to the planter fascia, calf muscle-Soleus/Gastrocnemius and Achilles tendon) and Group-B (Myofascial Release technique to the planter fascia, calf muscle and Achilles tendon with Stretching to the Soleus and Gastrocnemius) by random sampling, consisting of 15 subjects in each. There were 14 males and 16 females that took part in the study. Ultrasound therapy for 5 mins using continuous mode with frequency 1MHz was given to both the groups A and B, 4 times in a week for 6 weeks as a common treatment intervention. The interventions were given for a total of 24 sessions in 6 weeks. The demographic data, pre-intervention and post-intervention data of the outcome measures were recorded.

4. INTERVENTIONS

4.1 GROUP A

Myofascial Release techniques were performed for 20 repetitions with Ultrasound therapy

4.2 GROUP B

Myofascial Release techniques for 20 repetitions with Stretching and Ultrasound therapy. Stretching was performed for 2 sets of 10 repetitions, with 10 seconds hold.

4.3 Myofascial Release Techniques[35]

Fig 1: MFR application on superficial layer

Stage 1:The patient was in supine lying and the therapist sat in front of the patient's leg. The ankle was dorsiflexed during the application of MFR. The therapist used her hand in a concave position and dorsum of the hand. MFR was applied with the dorsal part of the hand and pressure was given over the superficial layer by sliding towards the calcaneus from the affected area.(Fig:1)

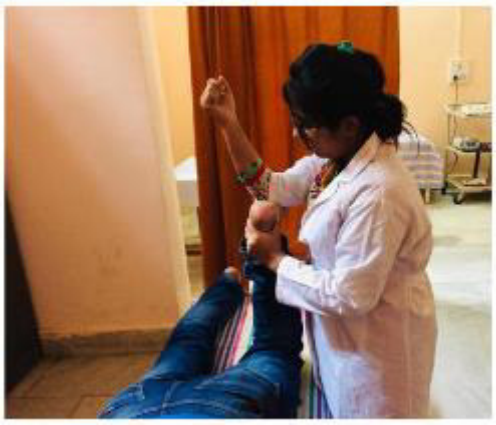

Fig 2: MFR apply for plantar aponeurosis

Stage 2 is done for deep tissue release. The patient was prone in lying with the knee flexed position and the therapist was in a standing position beside the bed (Fig 2). The ankle was in a normal position. The therapist holds the anterior part of the ankle by hand and with another forearm applied the myofascial technique and gives pressure towards the affected side for plantar aponeurosis. Stage 3 was for the Achillis tendon where a small roll was placed under the

ankle, or the foot is off the edge of the bed so that the foot and the ankle were in forced plantar flexion (Fig 3). The index finger or index finger plus the third finger pad of the distal phalanx of the caudal hand was placed over the place insertion of the Achilles tendon at the calcaneus. The index finger (or index finger plus the third finger) pad of the distal phalanx of the superior hand was placed over the musculotendinous interface of the gastrocnemius muscle with the Achilles tendon, at the superior aspect of the tendon. Then the tissue was pushed with a 1 lb. force perpendicular into the tibia. Then the superior aspect and inferior aspect of the tendon is compressed together with about 1 lb. force, bringing the two ends of the tendon closed together and the compressive force was maintained

Fig 3: MFR application for Achilles tendon

Stage 4 was done for the gastrocnemius muscle where the patient was lying prone and the therapist stood at the side of the patient's leg. The therapist used both hands in a cross-hand pattern and apply MFR over the gastrocnemius muscle (Fig 4a) and (Fig 4b)

Fig 4a: MFR to gastrocnemius muscle

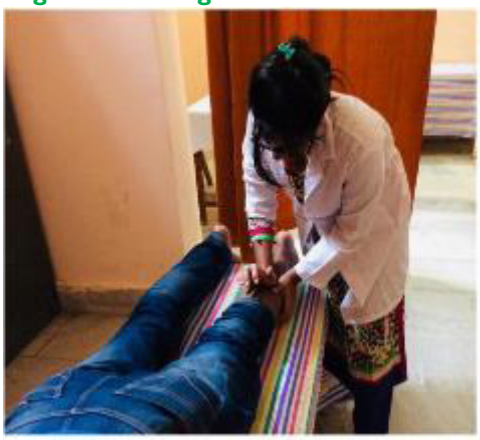

Fig 4b: MFR to gastrocnemius muscle

Stage 5 was MFR with lacrosse ball to the planter fascia .The patient was in sitting position. The therapist placed a lacrosse ball under the foot. The patient moved the ball anteriorly and posteriorly with the footpad(**Fig 5**)

Fig 5: MFR with lacrosse ball

4.4 Stretching Techniques[27,36,37]

4.4.1 The Soleus muscle

The patient took a half step forward keeping weight evenly distributed on both feet, slowly bending the knees and sinks down toward the ground (Fig 6a). Keeping the heel on the ground and the patient tried to feel a stretch in the back leg, just above the heel and continued to sink down slowly to deepen the stretch. The stretch was hold for about 30s and then the side was hanged By bending the knee, this stretch targets the Soleus and Achilles tendon, rather than the gastrocnemius (calf) muscle. The patient took a half step forward keeping weight evenly distributed on both feet, slowly bent the knees and sinked down toward the ground (Fig 6a). Keeping the heel on the ground and the patient tried to feel a stretch in the back leg, just above the heel and continued to sink down slowly to deepen the stretch. The stretch was hold for about 30s and then the side was changed by bending the knee, this stretch targets the Soleus and Achilles tendon, rather than the gastrocnemius (calf) muscle.

4.4.2 Another Technique for the Soleus

Patient in supine position & the knee 15° flexed (Fig 6b). One hand of the therapist was place under the heel and held the calcaneus. Another hand was placed over the knee and then the stretch was applied.

Fig 6a: Soleus muscle Stretching

Fig 6b: Stretching for Soleus muscle

Fig 7a: Stretching for Gastrocnemius muscle

4.4.2 The Gastrocnemius

The patients/subject were made to stand one arm length from the wall and made to lean forward with both hands on the wall about shoulder width apart (Fig 7a). The foot of the side to be stretched was kept in dorsiflexed position against the wall with the knee bent and heel on the ground and the other foot was kept closer to the wall. The patient leaned into the wall slightly and bent the knee of the leg of which the heel was to be stretched (keeping the heel down) till he/she felt a stretch in the back of the lower leg (just above the heel). The patient sinked down slowly to deepen the stretch and held this stretch for about 10s & changed the sides.

Another Technique for the Gastrocnemius

Patient in supine position (Fig 7b). The therapist placed one hand under the heel & held the calcaneous bone and another hand was placed over the knee. The patient was asked to do ankle dorsi-flexion & then the stretch was applied.

Fig 7b: Stretching for Gastrocnemius muscle

5 STATISTICAL ANALYSIS

All analysis was carried out in the statistical software namely SPSS16.0 for the analysis of the data and Microsoft Word 2007 and Excel 2007 have been used to generate the graph, table. An alpha level of 0.05 was used to determine statistical significance. Statistical techniques used for the analysis of the study were paired t-test and independent sample "t" test. Paired "t" test was performed to find out the effectiveness of myofascial release with ultrasound with stretching and myofascial release with ultrasound in plantar fasciitis management. On the other hand, an independent sample "t" test was carried out to compare both groups i.e. between the control group and experimental group.

5.4 demographic study of the population has been outlined in the table below

Table5.1. Distribution of demographic variables (Age)		
Group A	Age (Mean ± SD)	44.47 ± 3.79
Group B	Age (Mean ± SD)	45.40 ± 3.22

The table 5.1 shows that the average age of the patients. The average age of the patients under Group A was 44.47±3.79 and of Group B is 45.40±3.222

5.2 Analysis And Interpretation

Intra-Group analysis of Group A and Group B of VAS outlined in the table below:

Table 5.2: Group A 'N' value -15 'P' value – 0.00, both before and after treatment,

Group	VAS	Mean ± SD	N	t	df	p
B	Before Treatment	3.47 ± 0.74	15	7.41	14	0.00
	After Treatment	1.67 ± 0.62	15			
A	Before Treatment	3.47 ± 0.83	15	11.25	14	0.00
	After Treatment	2.47 ± 0.52	15			

The above Table-5.2 is constructed to see whether MFR & US or MFR with Stretching & US technique is effective for patients with plantar fasciitis.(Fig 8a.8b)

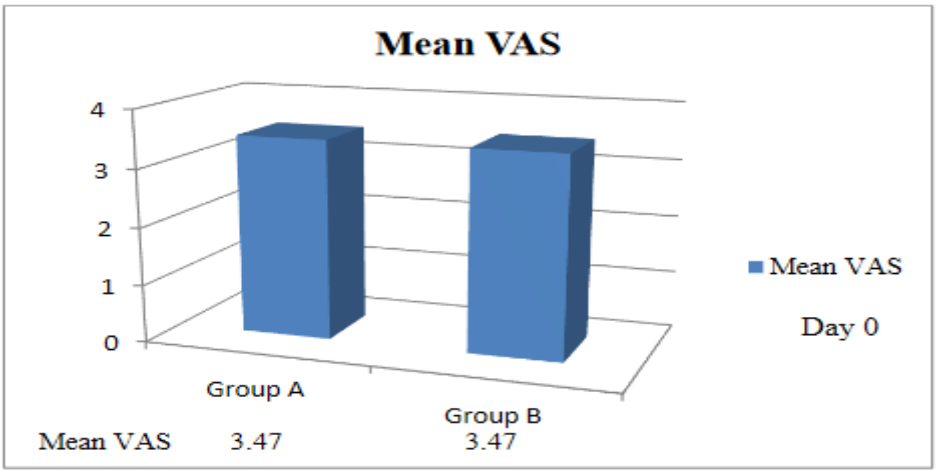

Fig 8a: Mean VAS at "Day 0"

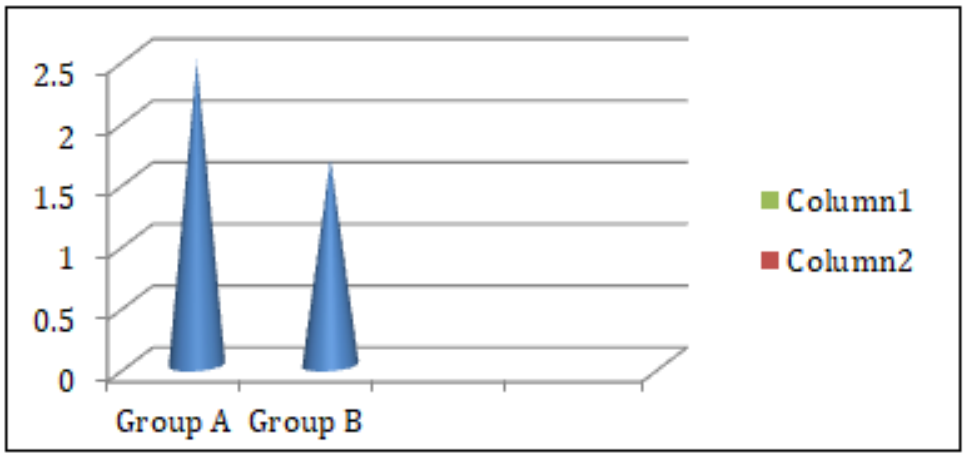

Fig 8b: Mean VAS at "Day 36"

In Group-B, VAS decreased after applying MFR & US therapy. Paired t-test was performed to see the significance difference in VAS score before and after treatment. It has been found that in Group-B, t=7.41 which is highly significant (p=0.00). The value of "t" to find the difference in VAS score before & after treatment in Group A, t=11.25. This value is highly significant p=0.00. It has been found that VAS decreased significantly after applying MFR with Stretching & US to the patients. In another words MFR with Stretching & US therapy is highly effective for pain management in patience with PF. Thus, we can say that there has been a remarkable decrease in VAS score after applying MFR & US but considering and analyzing the result of both of Group A & Group B, the VAS score of Group B is more highly significant then Group A. VAS score of Group B is 11.25, thus we can interpret that MFR with Stretching & US technique is more effective than only applying MFR & US therapy for pain management and increasing ROM for patience with plantar fasciitis

5.3 Intra-Group analysis of Group-A & Group-B of FFI is outlined in table below

Table 5.3: Group analysis within Group-A and Group-B of FFI

Group	FFI	Mean ± SD	N	t	df	p
A	Before Treatment	43.02% ± 0.023	15	13.56	14	0.00
	After Treatment	26.96% ± 3.97	15			
B	Before Treatment	43.69% ± 0.026	15	21.14	14	0.00
	After Treatment	20.81% ± 3.17	15			

Group A 'N' value -15 'P' value – 0.00, both before and after treatment,

To see the difference in FFI score before & after the application of MFR with Stretching & US and the MFR & US, paired "t" test was performed. In Group-A, the value of "t" has come out to 13.56 and it is highly significant (p=0.00). On the other hand, in Group B value of "t" has come out of 21.14 and it is also highly significant (p=0.00).

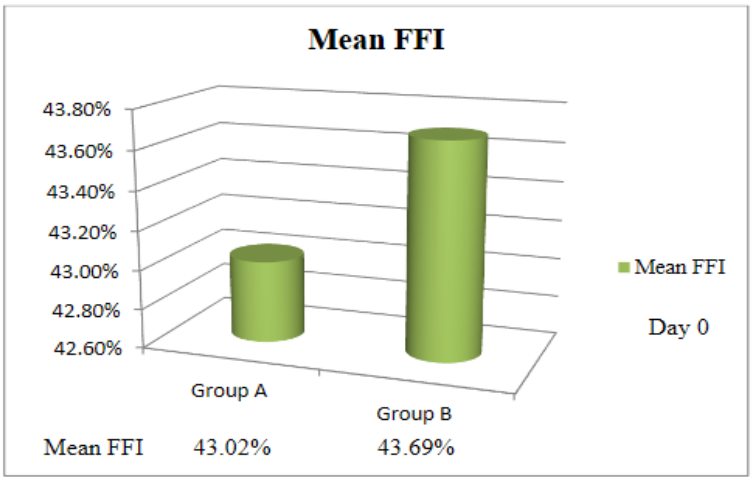

Fig 9a: Mean FFI at "Day 0"

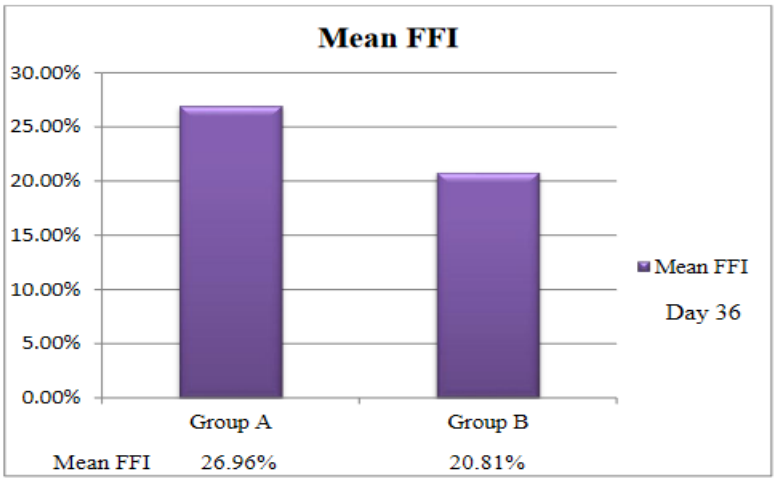

Fig 9b: Mean FFI at "Day 36"

Analyzing the result of FFI of both groups, it is determined that application of MFR with Stretching & US technique is more effective than the MFR & US technique application to the patient's with plantar fasciitis.(Fig 9a, 9b)

5.4 Inter-group analysis between Group A and Group B to compare the effectiveness of interventions for patients with plantar fasciitis are listed below

Table 5.4: Inter-group analysis of effectiveness of interventions Group A 'n' value -15 'P' value – 0.00, both before and after treatment,

Scale	Treatment	N	Mean ± SD	t	df	p
VAS	Group A	15	1.67 ± 0.62	4.25	29	0.00
	Group B	15	2.47 ± 0.52			
FFI	Group A	15	26.96% ± 3.97	4.53	29	0.00
	Group B	15	20.81% ± 3.17			

Independent "t" test was performed to compare the effectiveness between MFR with ultrasound with stretching and MFR with ultrasound therapy which is effective for patients with plantar fasciitis. The tests were carried out separately for VAS and FFI. For VAS, t=4.25 which is highly significant (p=0.00). It has been inferred that VAS decreases more when MFR with ultrasound with stretching technique has been applied. To see the difference of means of FFI, t=4.53 which is highest significant (p=0.00) implying that FFI decreases more when MFR with ultrasound with stretching therapy was applied as compared to only MFR with ultrasound therapy has been applied. All the result of the study demonstrated that MFR with ultrasound with stretching therapy and MFR with ultrasound therapy both are effective for patients with plantar fasciitis. But when the subjects were treated with MFR with ultrasound with stretching technique showed an additional benefit in case of reduction of pain on VAS, functional ability in terms of FFI and significantly increased ROM in ankle dorsiflexion. However, there a significant difference between pre and post physiotherapy treatment among the subjects of Group-A and Group-B but the mean value shows that interventions have better effects in Group-B.

6 DISCUSSION

Plantar fasciitis (PF) is a classical disorder of the foot that results from repeated micro trauma to the plantar fascia at its origin on the calcaneus.[1] Many theories proposed that repetitive partial tearing and chronic inflammation of the plantar fascia at its insertion on the medial tubercle of the calcaneus is the basic cause for the disease.[2,3] Studies report that faulty biomechanics is a major cause of plantar fasciitis. Subjects having either a lower or higher arched foot can experience plantar fasciitis. One of the common causes of plantar fasciitis is prolonged standing and some studies revealed that plantar fasciitis is the second most common in weight bearing and prolonged standing occupation other than athletic population.[24,25] Plantar fasciitis is a disease condition which can be treated with a wide variety of physiotherapy methods alone or sometimes along with some medical intervention. Various methods of physiotherapy exist with their own claims of success without any attempts of comparing the maximal effective methods. M S Ajimsha , D Binsu , S Chithra did a study on effectiveness of myofascial release in the management of plantar heel pain: a randomized controlled trial. Sixty-six patients, 17 men and 49 women with a clinical diagnosis of plantar heel pain were randomly assigned into MFR or a control group and given 12 sessions of treatment per client over 4 weeks. The Foot Function Index (FFI) scale was used to assess pain severity and functional disability. The primary outcome measure was the difference in FFI scale scores between week 1 (pretest score), week 4 (posttest score), and follow-up at week 12 after randomization. The study provided evidence that MFR is more effective than a control intervention for PHP[26] Satish C pant et al conducted a comparative study on the effect of Myofascial Release And Stretching Exercises on plantar fasciitis and found that both myofascial release and stretching exercises are effective in treating patients with plantar fasciitis[27]. Another study was done by P Sivasankar to find out effect of ultrasound therapy and Myofascial Release on pain and function in patients with plantar fasciitis and concluded that both ultrasound therapy and myofascial release is effective on pain and function in patients with plantar fasciitis[28]. Heni Ishwarlal Tandel and Yagna Unmesh Shukla did a evidenced based study to find out effect of Myofascial Release Technique in plantar fasciitis on pain and function. A search for relevant articles was carried out using keywords plantar fasciitis, myofascial release technique, pain and functions and search engines- Google Scholar, PubMed, PEDro, ScienceDirect, ResearchGate and CINAHL. Studies were selected from 2010-2019. Ten studies were included in which there were 7 RCT, 1 Prospective experimental study, 1 Quasi Experimental study and 1 Prepost interventional study. 10 studies were reviewed from which 7 studies concluded that MFR is more effective than a control group receiving sham treatment or conventional treatment and 3 studies highlighted MFR to be equally effective to alternative treatments. They concluded that MFR is found to be effective in reducing pain and improving functions in individuals with plantar fasciitis[29]. Benedict F DiGiovanni et al did a prospective randomized study on Tissue-specific plantar fascia-stretching exercise enhances outcomes in patients with chronic heel pain and concluded that a program of non-weight-bearing stretching exercises specific to the plantar fascia is superior to the standard program of weight-bearing Achilles tendon-stretching exercises for the treatment of symptoms of proximal plantar fasciitis[30]. Adelaida María Castro-Sánchez et al conducted a randomised controlled trial on Effects of myofascial release techniques on pain, physical function, and postural stability in patients with fibromyalgia and found that myofascial release techniques can be a complementary therapy for pain symptoms, physical function and clinical severity but do not improve postural stability in patients with fibromyalgia syndrome[31] Myofascial release with ultrasound with stretching technique showed better results in decreasing pain, improving functional ability and also increasing ROM of ankle dorsiflexion. After receiving myofascial release with ultrasound with stretching therapy the independent-"t" value of the particular group was 4.25 in VAS and 4.53 in FFI. The aim of the study was to determine the effectiveness of Myofascial Release techniques and US with Stretching therapy for pain management in patients with PF. For this study interventions in two groups were given, where Group-A was treated only with MFR with US therapy and Group-B treated with MFR with US with stretching therapy. For comparing the effects of the interventions were measured by the outcome measuring system of VAS scale and FFI scale. Both groups showed significant improvement but in the case of Group-B, the amount of interventions was higher with decrease in pain and increasing functional ability and increasing range of motion (ROM) compared to Group-A. For this study analysis, paired-t test and independent "t" test was carried out. In the present study, both male and female patients from various locations ages between 25 to 50 years have participated after taking their consent in written format. The pre treatment and post treatment data once collected were analysed statistically and it was found that that MFR with ultrasound with stretching therapy and MFR with ultrasound therapy both are effective for patients with plantar fasciitis. But when the subjects were treated with MFR with ultrasound with stretching techniques, showed an additional benefit in case of reduction of pain on VAS, functional ability in terms of FFI and significantly increased ROM in ankle dorsiflexion.

7 CONCLUSION

The aim of the present study was to evaluate the combined effects of two different interventions and can conclude that there are significant differences in the effectiveness of the

interventions. The results provided evidence to support the use of physical therapy regimen in the form of myofascial release with ultrasound with stretching therapy over the myofascial release with ultrasound therapy in management of plantar fasciitis.

8 LIMITATIONS

The results only show the short term effects of the intervention and did not include long term follow up. The study tells us about the effectiveness of both the interventions in the long term but was no follow up for the interventions. Also, the strength of ankle joint musculature was not measured and patients from a limited number of places have been included into this study.

9 AUTHOR CONTRIBUTION STATEMENT

Dr. Laizu Yeasmin Lipa PT and Dr Abhijit Kalita PT conceptualized the data. Dr. Laizu Yeasmin Lipa PT gathered the data with regard to this work. Dr. Abhijit Kalita PT and Dr. Abhijit Dutta analyzed these data and necessary inputs were given towards the designing of the manuscript. All authors discussed the methodology, results and contributed to the final manuscript.

10 ACKNOWLEDGEMENT

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11 CONFLICT OF INTEREST

Conflict of interest declared none

12. REFERENCES

1. Cornwall MW, Mcpoil TG. Plantar fasciitis: etiology and treatment. J Orthop Sports Phys Ther. 1999;29(12):756-60. doi: 10.2519/jospt.1999.29.12.756.
2. Henricson AS, Larsson A, Olsson E, Westlin NE. The effect of stretching on the range of motion of the ankle joint in badminton players*. J Orthop Sports Phys Ther. 1983;5(2):74-7. doi: 10.2519/jospt.1983.5.2.74, PMID 18806426.
3. Benedict F, Digiovanni et al. Tissue specific plantar fascia stretching exercise enhances outcomes in patients with chronic heel pain. A prospective, randomized study. J Bone Joint Surg. 2003;85-A(7).
4. Bolga LA, Malone TR. Plantar fasciitis and the windlass Mechanism: A Biomechanical link to Clinical Practice. J Athl Train. 2004;39(1).
5. Young. B, walker M, A combined treatment approach emphasizing impairment- based manual physical therapy for plantar heel pain: A case series. J Orthop Sports Phys Ther. 2004;34(11):725-33.6) May TJ, Judy TA, Conti M, Cowan JE. Current treatment of plantar fasciitis. Curr Sports Med Rep. 2002;1(5):278-84. doi: 10.1249/00149619-200210000-00005, PMID 12831690.
6. Dyck DD, Boyajian-O'Neill LA"Neill L. Plantar fasciitis. Clin J Sport Med. 2004;14(5):305-9. doi: 10.1097/00042752-200409000-00010, PMID 15377971.
7. Cole C, Seto C, Gazewood J. Plantar fasciitis: evidence-based review of diagnosis and therapy. Am Fam Physician. 2005;72(11):2237-42. PMID 16342847.
8. Roxas M. Plantar fasciitis: diagnosis and therapeutic considerations. Altern Med Rev. 2005;10(2):83-93. PMID 15989378.
9. Martin JE, Hosch JC, Goforth WP, Murff RT, Lynch DM, Odom RD. Mechanical treatment of plantar fasciitis. A prospective study. J Am Podiatr Med Assoc. 2001;91(2):55-62. doi: 10.7547/87507315-91-2-55, PMID 11266478.
10. Wearing SC, Smeathers JE, Urry SR. The effect of plantar fasciitis on vertical foot- ground reaction force. Clin Orthop Relat Res. 2003;409(409):175-85. doi: 10.1097/01.blo.0000057989.41099.d8, PMID 12671500.
11. Travell JG, Simons DG. Myofascial pain and dysfunction the trigger point manual, volume Z. Baltimore. Williams & Wilkins; 1999.
12. Banks AS, Downey MS, Martin DE, Miller SJ. Foot Ankle Surg. 2001.
13. Puttaswamaiah R, Chandran P. Degenerative plantar fasciitis: a review of current concepts. Foot. 2007;17(1, march):3-9. doi: 10.1016/j.foot.2006.07.005.
14. Schepsis AA, Leach RE, Gorzyca J. Plantar fasciitis: etiology, treatment, surgical results, and review of the literature. Clin Orthop Relat Res. 1991;266(266):185-96. doi: 10.1097/00003086-199105000-00029, PMID 2019049.
15. Snider MP, Clancy WG, McBeath AA. Plantar fascia release for chronic plantar fasciitis in runners. Am J Sports Med. 1983;11(4):215-9. doi: 10.1177/036354658301100406, PMID 6614290.
16. Lemont H, Ammirati KM, Usen N. Plantar fasciitis: a degenerative process (fasciosis) without inflammation. J Am Podiatr Med Assoc. 2003;93(3):234-7. doi: 10.7547/87507315-93-3-234, PMID 12756315.
17. Attar SM. Plantar fasciitis: a review article. Saudi J Intern Med. 2012;2 No:1.
18. Buchbinder R. Clinical practice. Plantar fasciitis. N Engl J Med. 2004;350(21):2159-66. doi: 10.1056/NEJMcp032745, PMID 15152061.
19. Manheim CJ. The myofascial release manual. 3rd ed; 2001, pg no.2.
20. Barnes JF. Pediatric myofascial release, physical therapy forum – MFR. Techniques; 1991.
21. Katalinic OM, Harvey LA, Herbert RD, Moseley AM, Lannin NA, Schurr K. Stretch for the treatment & prevention of contractures. Cochrane Database Syst Rev. 2010;8(9):CD007455. doi: 10.1002/14651858.CD007455.pub2, PMID 20824861.
22. McGill S. Low back disorders. Champaign, IL: Human Kinetics Publishers; 2007.

23. Dubain J. CCSP, CSCS, sports therapy. Evid Based Treat Plantar Fasciitis", review of literature, March2007.
24. Siman J, Bartold et al. The plantar fasciitis as A source of pain- biomechanics presentation and treatment". J Bodyw Mov Ther. 8th ed. 2004:214-26.
25. M S Ajimsha , D Binsu , S Chithra. Effectiveness of myofascial release in the management of plantar heel pain: a randomized controlled trial. Randomized Controlled Trial Foot (Edinb) 2014 Jun;24(2):66-71. doi: 10.1016/j.foot.2014.03.005. Epub 2014 Mar 21
26. Satish C. Pant, Dr. Dheeraj Lamba, Ritambhara K. Upadhyay and Dejene Kassahun. Effect of Myofascial Release and Stretching Exercises On Plantar Fasciitis A Randomized, Comparative Study. International Journal of Current Research Vol. 10, Issue, 05, pp.69745-69747, May, 2018
27. P. Sivasankar Effect of Ultrasound Therapy and Myofascial Release on Pain and Function in Patients With Plantar Fascitis IJSR - INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH Volume : 3 | Issue : 8 |page no 387-388 Aug 2014 • ISSN No 2277 – 8179
28. Heni Ishwarlal Tandel Yagna Unmesh Shukla Effect of Myofascial Release Technique in Plantar Fasciitis on Pain and Function- An Evidence Based
29. Study International Journal of Science and Healthcare Research DOI: https://doi.org/10.52403/ijshr.20210459 Vol.6; Issue: 2; page no 332-337 April-June 2021
30. Benedict F DiGiovanni , Deborah A Nawoczenski, Marc E Lintal, Elizabeth A Moore, Joseph C Murray, Gregory E Wilding, Judith F Baumhauer . Tissue-specific plantar fascia-stretching exercise enhances outcomes in patients with chronic heel pain. A prospective, randomized study, J Bone Joint Surg Am . 2003 Jul;85(7):1270-7. doi: 10.2106/00004623-200307000-00013.
31. Adelaida María Castro-Sánchez 1, Guillermo A Matarán-Peñarrocha, Manuel Arroyo-Morales, Manuel Saavedra-Hernández, Cayetano Fernández-Sola, Carmen Moreno-Lorenzo. Effects of myofascial release techniques on pain, physical function, and postural stability in patients with fibromyalgia: a randomized controlled trial. Clin Rehabil 2011 Sep;25(9):800-13. doi: 10.1177/0269215511399476. Epub 2011 Jun 14.
32. M.S. Ajimsha, Noora R. Al-Mudahka, J.A. Al-Madzhar,Effectiveness of myofascial release: Systematic review of randomized controlled trials,
33. Journal of Bodywork and Movement Therapies,Volume 19, Issue 1,2015,Pages 102-112,ISSN 1360-8592
34. Boonchum H, Bovonsunthonchai S, Sinsurin K, Kunanusornchai W. Effect of a home-based stretching exercise on multi-segmental foot motion and clinical outcomes in patients with plantar fasciitis. *J Musculoskelet Neuronal Interact*. 2020;20(3):411-420.
35. Li X, Zhang L, Gu S, et al. Comparative effectiveness of extracorporeal shock wave, ultrasound, low-level laser therapy, noninvasive interactive neurostimulation, and pulsed radiofrequency treatment for treating plantar fasciitis: A systematic review and network meta-analysis. *Medicine (Baltimore)*. 2018;97(43):e12819. doi:10.1097/MD.0000000000012819
36. The Myofascial Release Manual 4th edition by Carol Menheim36) Joel A Radford, Karl B Landorf, Rachelle Buchbinder, Catherine Cook: Effectiveness of calf muscle stretching for the short-term treatment of plantar heel pain: a randomized trial. BMC Musculoskeletal Disorders 2007,8:36;19 April 2007.
37. Barry L D, Barry A N, Chen Y. A retrospective study between two protocols such as Gastrocnemius-Soleus stretching versus night splinting in the treatment of plantar fasciitis. J Foot Ankle Surg 2002.41221-227