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Effectiveness of self myofascial release on pain and functional ability in recreational runners with medial tibial stress syndrome

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Abstract
The purpose of this study was to see the effect of self myofascial release on pain and functional ability in patients with medial tibial stress syndrome at the end of 4 weeks. Also commonly known as shin splints. 30 participants were taken including both male as well as female ranging from 18 to 30 year of age, they were selected on the basis of inclusion and exclusion criteria. The subjects were evaluated before and after 4 weeks. Statistical analysis of the data was done using paired-T test. There was statistically significant difference in pre and post evaluation of pain (on VAS) (p value <0.0001) and functional ability (on MTSS score) (p value <0.0001). These findings of this study suggest that 4 weeks of self myofascial release in runners with medial tibial stress syndrome with in age of 18-30 years shows significant effect on pain and functional ability.

Keywords: medial tibial stress syndrome, MTSS, Shin splints, self-myofascial release, athletes, paired-T test

1. Introduction
Medial Tibial Stress Syndrome (MTSS)is one of the most common leg injuries in athlete and also commonly known as 'Shin Splint' [1, 2, 3]. Recreational runners have higher incidences of Medial tibial stress syndrome. 4%-35% incidence was found in athletes [1, 4]. It accounts for between 13.2%and 17.3% of all running injuries [5].
The name given to this condition refers to pain on the posteromedial tibial border during exercise, with pain on palpation of a tibia over a length of at least 5cm [1, 6, 7]. Though tibial stress syndromes are commonly considered in ERLP, it also consists of other conditions such as tendinopathies, stress fractures, periostitis; at rare instances nerve entrapment and vascular insufficiencies [8].
Recent studies have said that MTSS is not an inflammatory process of the periosteum but instead a bone stress reaction that becomes painful. When a person begins an exercise program, the bone undergoes metabolic changes. These changes tibia are characterized by initial bone porosity due to osteoclastic channeling on the compressed concave posteromedial border. This is followed by the lying down of new bone to resist these compressive forces and strengthens the bone. The result of that the tibia becomes stronger than pre-exercise state on posteromedial border [9].
MTSS commonly presents as diffuse, palpable pain, localized to the posteromedial border. It can occur anywhere along the posteromedial border but most commonly affects the middle to distal thirds. The pain is usually described as a dull aching following exercise, which may last for several hours or days. In severe cases, pain may persist during normal activities of daily living [7, 9].
Self-myofascial release (SMFR)is a type of myofascial release (MFR) that is performed by the individual themselves rather than by a therapist, often using a tool.
There are various potential mechanisms of SMFR or MFR, mainly 2 types mechanical and neurophysiological. A mechanical mechanism includes thixotropy, piezoelectricity, fascial adhesions, cellular responses, fluid flow, fascial inflammation, and myofascial trigger points. Neurophysiological mechanisms have two main branches, one involving Golgi reflex arc and another involving other mechanoreceptors [10, 13].
Self-myofascial release (SMR) has been studied to improve range of motion, flexibility and decrease the effects of fatigue if given prior to the activity, also has been utilized to reduce delayed onset muscle soreness [11, 13]. Inability of the muscles to adapt to ground reaction force and muscle imbalance have also been known to cause MTSS [12]. Thus, SMR could be helpful preparing muscle for activity without affecting performance in recreational runners to reduce MTSS [14].

2. Material and Method
2.1 Material
Pen, Paper, Consent form, Tennis ball, Visual analogue scale, Medial tibial stress syndrome score.

2.2 Purpose
The purpose of the study was to check effectiveness of self myofascial release on pain and functional ability in patients with medial tibial stress syndrome.

2.3 Selection of subjects
30 subjects including both male and female ranging from 18 to 30 years of age having pain on posteromedial border of tibia, aggravated due to and/or during running were included. Subjects with any recent history of lower limb trauma or fracture were excluded from the study.

2.4 Procedure
Participants will be assessed for eligibility and included after fulfilling criteria. They will be asked for informed consent letter. Those who signed consent letter will then be checked for VAS score at the baseline and medial tibial

stress syndrome score by assessor.
Then they will be demonstrated and/or shown the video instructions of the interventions and informed about training protocol. SMFR will be done for 6-8 mins with light to moderate pressure. Immediately ice should be applied after SMFR for 3-5 mins when performed after exercise.
Follow-up sessions will be planed after 1,2and 4 weeks and same assessor will again check for VAS and Medial tibial stress syndrome score at all intervals.
All participants will be instructed to apply the respective treatment before training.
They will be asked to follow 3 times a week running program.
The program includes 35 mins of running at own pace for 3 non-consecutive days in a week initially and participant can increase the intensity up to 66 minutes according to convenience.
Following SMFR techniques are taught to all subjects:

Fig 1

Fig 2

2.5 Findings

(a) Interpretation for pain using visual Analogue Scale. Pre -treatment and post treatment score analyzed by Paired 't' test.

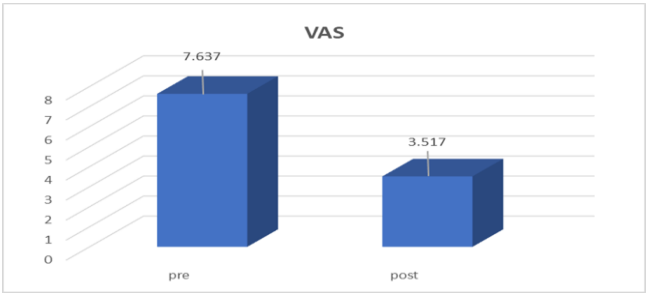

Fig 3: Mean pre and post values of vas scale.

Table 1

	Pre	Post
Mean	7.637	3.517
P Value	<0.0001	
T Value	15.579	
Significance	Extremely significant	

Extremely Significant P-Value <0.0001. This shows treatment is effective on reducing pain in patients with medial tibial stress syndrome.

(b) Interpretation for functional ability using Medial Tibial Stress Syndrome score. pre-treatment and post treatment score analyzed by Paired 't' test.

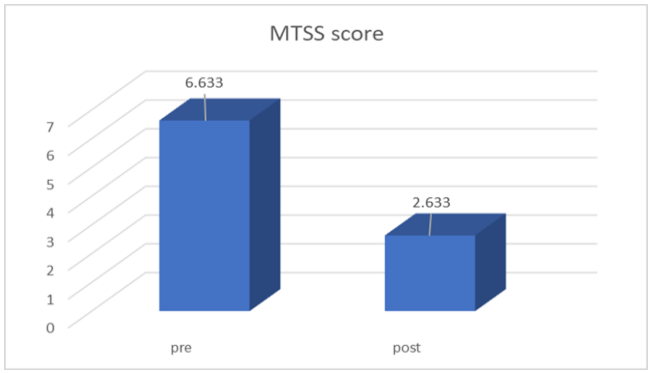

Fig 4: Pre and post values for MTSS score

Table 2

	Pre	Post
Mean	6.633	2.633
P-Value	<0.0001	
T-Value	22.297	
Significance	Extremely Significant	

Extremely significant p-value <0.0001. This shows treatment given is significant in improving functional ability of patients with medial tibial stress syndrome.

(c) Results by pre-treatment and post treatment mean value of VAS and MTSS score scale

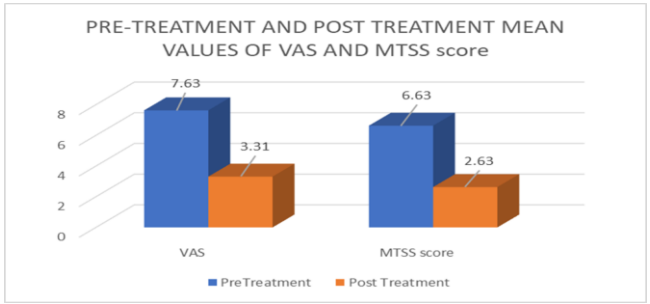

Fig 5: Comparison of pre and post treatment values of vas and MTSS score.

Table 3

	Pre	Post
VAS	7.63	3.31
MTSS	6.63	2.63

Both the outcome measures showing significant effect of given treatment in patients with medial tibial stress syndrome.

3. Result

After the analysis of data, we see that self-myofascial release shows statistically significant reduction in pain and improvement in functional ability in runners with medial tibial stress syndrome.

4. Discussion

The present study was done to check the effectiveness of self myofascial release on pain and functional ability assessed by using VAS and MTSS score respectively in runners with medial tibial stress syndrome. In this study total 30 runners both male and female were included within age 18-30 years. We found that SMFR is effective in reducing pain and improving functional mobility of runners with MTSS.

In our study SMFR is significantly effective in reducing pain in runners with MTSS. Our study includes myofascial release of lower leg muscles using a tennis ball as tool, both before and after training session of runners. By rolling tennis ball over all 3 compartments of lower leg with medium pressure, we start with our pre-training session of runners. By doing this we prepare the muscle for high intensity stress due to running. This increases the flexibility of the muscles allowing improved functional ability. Also, by keeping tennis ball on already existing most tender point in the lower limb and giving pressure directly over the tender area, we attempt to break the trigger point. We asked runners to do self-calf stretching in standing position, it improves muscle flexibility hence avoids restricted dorsiflexion of the ankle. Restricted dorsiflexion of the ankle causes more loading on shin leading to pain due to stress overloading. Also avoids early fatigability of the muscle. Hence by preparing muscle for loading and improving flexibility we reduce the chances of painful shin while or after running. Also reduces existing pain by trigger point release. SMFR after running session does cooling down of the muscle and avoids DOMS (delayed onset muscle soreness). Fulfills the increased vascular need of the muscle due to intense training by improving blood supply of the muscle with SMFR. Hence SMFR helps in reducing pain in runners with MTSS.

In this study we have seen that, SMFR is also significantly effective on functional ability of the runners with MTSS. We assessed this by using Medial Tibial Stress Syndrome Score scale which has 4 different components questioning runners about their daily functions and sports training, and variations due to the MTSS. We asked runners to do alternate day running activity for minimum 25-30 min. By doing this we are allowing athlete to maintain his/her fitness rather that stopping all sport activities. SMFR helped athletes in improving functional ability, most by reducing pain. Also helped them in continuing their daily training without hampering the performance. We asked runners to do icing with an ice pack for 5 mins after applying SMFR in order to reduce superficial tissue inflammation if any.

We have done this study for 4 weeks duration. Hence to check the long-term effects of SMFR is the future scope for our study with larger sample size. With such few limitations we have completed our study. Thus, overall findings of this study suggest that 4 weeks of self myofascial release in runners with medial tibial stress syndrome with in age of 18-30 years shows significant effect on pain and functional ability.

5. Conclusion

Self-myofascial release shows significant effects on pain and functional ability in the runners with medial tibial stress syndrome.

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