

Effect of Instrument Assisted Soft Tissue Mobilisation for the Management of Acute Shin Splints: A Case Report

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ABSTRACT

Shin Splints is characterized by lower leg pain and tenderness in the middle or lower third of the medial edge of the shinbone.

Objective: The purpose of this case report is to evaluate the effect of Instrument Assisted Soft tissue Mobilisation (IASTM) along with conventional rehabilitation programme for the management of Acute Shin Splints.

Clinical Features: A 63 year old male patient complains of pain in his left lower leg since one week. On palpation, tenderness was present on anterior, medial and posterior side of tibia. Initially symptoms were mild during walking but later his pain gets severe even with weight bearing. The patient underwent treatment of Instrument Assisted Soft tissue Mobilisation and conventional rehabilitation for one week.

Intervention and Outcome: The recovery of pain was monitored by visual analogue scale and muscle strength by manual muscle testing. On Visual Analog Scale (VAS), Pain on rest was 3 while on weight bearing it was 8 out of 10. Left lower extremity muscle strength was grade 4 measured by manual muscle testing. After one week, a significant reduction of pain in his left lower leg, VAS gets reduced to 1 on weight bearing and 0 at rest. Lower extremity muscle strength also increased to grade 5. After one week follow up, his symptoms completely resolve.

Conclusion: The study concluded that IASTM showed a promising result in managing the Acute Shin Splints. It should be used as an addition to conventional rehabilitation program.

Keywords: Medial Tibial Stress Syndrome; Soft tissue mobilization; Acute pain; Rehabilitation; Lower leg pain.

INTRODUCTION

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Shin Splints or Medial Tibial Stress Syndrome (MTSS) is an activity induced lower leg pain. It is described as diffuse tenderness over the posterior medial aspect of distal third of tibia.¹ Overall, prevalence of shin splints reported to be 10-15% of running injuries and up to 60% of all leg pain syndromes. Women are more frequently affected than men. In mild to moderate cases, pain is present only with activity while in severe cases pain persists even on rest.² The mechanism of pain generation may include musculo-tendinous strains, tendinitis, interosseous membrane pain, periostitis or fascial inflammation.¹

The biomechanical factors associated with shin splints may

include Foot over pronation, excessively tight gastro-soleus, tibialis anterior and tibialis posterior muscle.³ The extrinsic factors responsible for shin splints involve duration, frequency and type of activity, improper footwear, increase loading over foot for long duration. With the alteration of these extrinsic factors, the risk of shin splints may be reduced, while the alteration of intrinsic factors may be difficult. The intrinsic risk factors may include increased Navicular drop, increased foot pronation during the loading response of the gait cycle, higher BMI, lean calf girth and increased plantar-flexion range of motion.⁴ Previous studies reported that over foot pronation may lead to increase in eccentric load on deep plantar flexors and invertors that causes overstrain on the medial aspect of tibia.^{4,5}

To the best of author's knowledge, there are no clinical studies till date, have examined the effect of Instrument Assisted Soft tissue Mobilisation (IASTM) on shin splints. The purpose of this case report is to evaluate the enhancing effect of IASTM along with conventional rehabilitation programme for the management of Acute Shin Splints.

CASE REPORT

A 63 year old male patient visited our physiotherapy centre due to pain in his left lower leg since one week. He stated no previous history of similar pain. The patient is a manufacturer of furniture goods. His daily job includes a long period of standing and kneeling which increases the rate of loading in his medial tibia, ankle and foot. The weight, height and BMI of patient was 70 kg, 170 cm and 24.2 kg/m² respectively. Due to extensive furniture making work for one week, pain provokes in his left lower

leg. Initially symptoms were mild during walking but later his pain gets severe even with weight bearing.

A comprehensive subjective and objective examination was performed on the patient. There was no atrophy in his left lower leg when compared with right leg. Knee and Ankle range of motion were within normal limits. Left lower extremity muscle strength was measured by manual muscle testing. On Visual Analog Scale (VAS), Pain on rest was 3 while on weight bearing it was 8 out of 10. On palpation, tenderness was present on anterior, medial and posterior side of tibia. Soft tissue evaluation shows adhesion formation in the medial gastro-soleus, tibialis anterior muscles as well as there was tightness of these muscles. Dorsalis Pedis and Posterior tibial pulses were normal. The sensory evaluation and deep tendon reflexes were normal. Shin Palpation test was performed to confirm the shin splint diagnosis. Patient's low-third of lower leg and surrounding musculature was squeezed with enough pressure and if there is any pain present, then the test is positive. Several laboratory findings such as biochemical parameters, erythrocyte sedimentation rate, Creactive protein and Rheumatoid factor were also normal.

In weight bearing position, patient had bilateral pronated feet as well as loss of longitudinal arch leading to Pes Planus. The MRI of left tibia was done which indicated that bone shows presence of normal bone marrow signal with well defined cortical margins. No Periosteal reactions seen. Surrounding soft tissues of both anterior and posterior compartment were also normal. There was mild edema seen in subcutaneous adipose tissue of medial aspect of tibia. (Fig. 1)

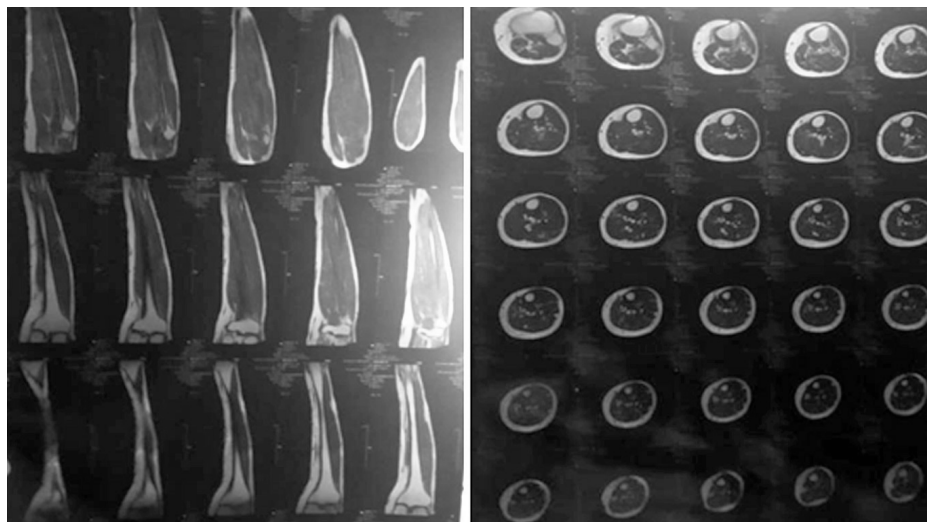


Fig. 1: Plane MRI Findings of Left lower Leg, Axial and Coronal images.

Active Plantarflexion and toe weight bearing on one foot aggravates severe pain which supports the diagnostic manoeuvre for Shin Splints. These clinical findings represent the diagnosis of Acute Shin Splints with associated Myofascitis.

The written informed consent was taken from the patient and procedure was explained. Before starting the intervention baseline assessment was performed, Left lower extremity muscle strength was measured by manual muscle testing. Muscle Strength of Gastrocnemius and soleus was assessed in supine lying with strength of grade 3+ and grade 4 respectively. Muscle strength of Tibialis anterior and Tibialis posterior was assessed in supine was grade 3 and grade 4 respectively. On Visual Analog Scale (VAS), Pain on rest was 3 while on weight bearing it was 8 out of 10. The Physiotherapy rehabilitation aims to reduce pain, tenderness and increase muscle strength as well as maintaining that strength and improving his job specific daily activity skills in his long term goals. Rehabilitation includes Ankle toe pumps and Advance technique of Instrument Assisted Soft tissue mobilization (IASTM) was applied to break the soft tissue adhesions. The Patient lies supine in a comfortable position. A lubricant in the form of Vaseline Petroleum jelly was applied on the antero-medial aspect of tibia.

The Polar-IASTM tool was used for the treatment (Figure 2).



Fig. 2: Polar-IASTM tool.

First, with the help of tool exact areas of adhesions were located. Then, at 45° angle slow strokes were applied along the muscle length, from muscle origin to insertion for approximately 3 minutes.⁶ This procedure was performed thrice a week for one week on alternate days (Figure 3). During the intervention, no adverse effects were reported. After the completion of this session, conventional physiotherapy was provided that includes passive stretching of gastro-soleus and tibialis anterior muscle, stretching of these muscles was performed

with hold position of 30 seconds with 3 repetitions. After the intervention, Left lower extremity muscle strength was again measured by manual muscle testing.



Fig. 3: Application of IASTM Over Media Aspect of Tibia.

Muscle Strength of Gastrocnemius and soleus was grade 4 and grade 4+ respectively. Muscle strength of Tibialis anterior and Tibialis posterior was grade 4 and grade 4+ respectively. On Visual Analog Scale (VAS), Pain on rest was reduced 1 while on weight bearing it was 3 out of 10. Patient was advised to perform self stretches at home daily for next one week as a follow-up. After one week of follow-up, again the assessment was performed there was significant reduction of pain in his left lower leg. VAS gets reduced to 1 on weight bearing and 0 at rest. His lower extremity muscle strength also increased. Muscle Strength of Gastrocnemius and soleus was grade 4+ and grade 5 respectively. Muscle strength of Tibialis anterior and Tibialis posterior was grade 4+ and grade 4+ respectively. After the follow-up of one week, his symptoms completely disappear and he resumed his job and work activities.

RESULTS

The purpose of this case report is to evaluate the enhancing effect of IASTM along with conventional rehabilitation programme for the management of Acute Shin Splints. There was reduction in pain and lower extremity muscle strength was also improved in outcomes such as Visual Analog scale and Manual muscle testing which are discussed in Table 1. After the follow-up of one week, patient symptoms completely disappear and he resumed his job and work activities.

Table1: Improvement in Pain and lower extremity muscle strength in post intervention and after one week follow-up in the following outcomes.

Outcomes	Pre-intervention	Post-intervention	After one week Follow-up
Visual Analog Scale (on rest)	3	1	0
Visual Analog Scale (on weight bearing)	8	3	1
Gastronemius Muscle strength	3+	4	4+
Soleus Muscle strength	4	4+	5
Tibialis anterior Muscle strength	3	4	4+
Tibialis Posterior Muscle strength	4	4+	4+

DISCUSSION

The purpose of this study was to evaluate the effect of IASTM along with conventional rehabilitation program for the management of Acute Shin Splints. The patient got complete relief after the one week intervention period. After the follow up of one week, there was no re-occurrence of symptoms. The lower leg pain may results in different clinical conditions. In extreme cases, this condition can also lead to stress fracture of tibia and Acute Compartmental Condition (ACS). In ACS, a localized and sharp pain is felt in some acute cases, whereas in Shin Splints the pain is poorly localized. Thus, exact diagnosis should be made in an appropriate time.^{7,8} IASTM break up the soft tissue adhesions and cause micro-trauma. This inflammatory process increases the fibroblast formation. The more recruitment of fibroblast causes increase in collagen synthesis and soft tissue remodeling which leads to faster healing. IASTM helps in improving tissue oxygenation and removal of local waste metabolites.⁹ The limitation of this case study is that the effect of IASTM is seen in only one case, thus the effects of this technique cannot be generalized to whole shin splints population.

CONCLUSION

The study concluded that IASTM showed a promising result in managing the Acute Shin Splints. IASTM should be used as an addition to conventional rehabilitation program for the enhancing effects, to maintain the proper biomechanics of muscles and to prevent the reoccurrence of symptoms. Future experimental studies should examine the effects of IASTM in Shin Splints with a larger sample size to strengthen the evidence.

Conflicts of Interest: The authors have no conflict of interest to declare.

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