

## Investigating Medial Tibial Stress Syndrome in Athletes: A Dual Case Report with Radiological Insights

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### Abstract

### Case Report

Medial Tibial Stress Syndrome (MTSS) is a common overuse injury in athletes. This report describes two cases of male athletes with medial tibial pain. MRI revealed periosteal and bone marrow edema, confirming MTSS. No evidence of stress fracture or compartment syndrome was found. MRI proved essential for accurate diagnosis and guiding conservative treatment.

**Keywords:** Medial Tibial Stress Syndrome (MTSS), Shin Splints, MRI, Overuse Injury, Athletes.

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## INTRODUCTION

Medial Tibial Stress Syndrome (MTSS), also known as shin splints, is one of the most common overuse injuries in athletes, particularly those involved in high-impact sports such as running. Characterized by pain along the medial tibial border, MTSS can severely impact an athlete's training schedule. Early and accurate diagnosis is vital to avoid complications such as stress fractures or chronic exertional compartment syndrome (CECS). In this case report, a 28-year-old male athlete is presented with clinical features of MTSS, and the importance of MRI in the diagnostic process is highlighted.

## CLINICAL CASE

### • Case 2: A 28-Year-Old Long-Distance Runner

A 28-year-old male, a long-distance runner, presented to our clinic with bilateral tibial pain that occurred exclusively during physical activity. The pain had progressively worsened over the past month, initially beginning as mild discomfort but now requiring cessation of running. There was no trauma history, systemic illness, or lower limb injury. On examination, tenderness was palpated along the medial tibial border without any obvious swelling or hematoma. Radiographs of both tibiae were normal, as was ultrasound imaging, which did not show any significant findings. The

diagnosis of MTSS was suspected, and therefore an MRI of both legs was conducted to confirm the condition.

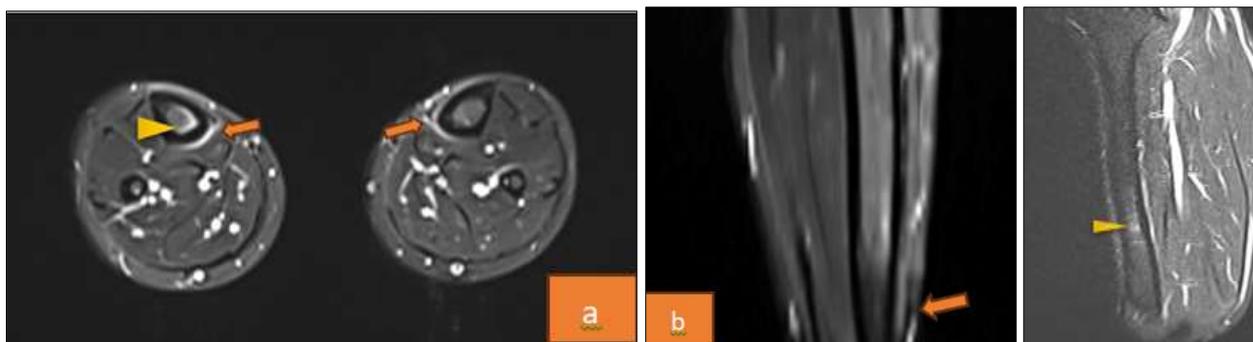
### • Case 2: A 26-Year-Old Male Soccer Player

A 26-year-old male soccer player presented with anterior shin pain that had progressively worsened after intense training sessions. The pain was localized to the medial tibial border and became more severe with activity, especially during soccer drills. Similar to Case 1, she had recently increased her training intensity.

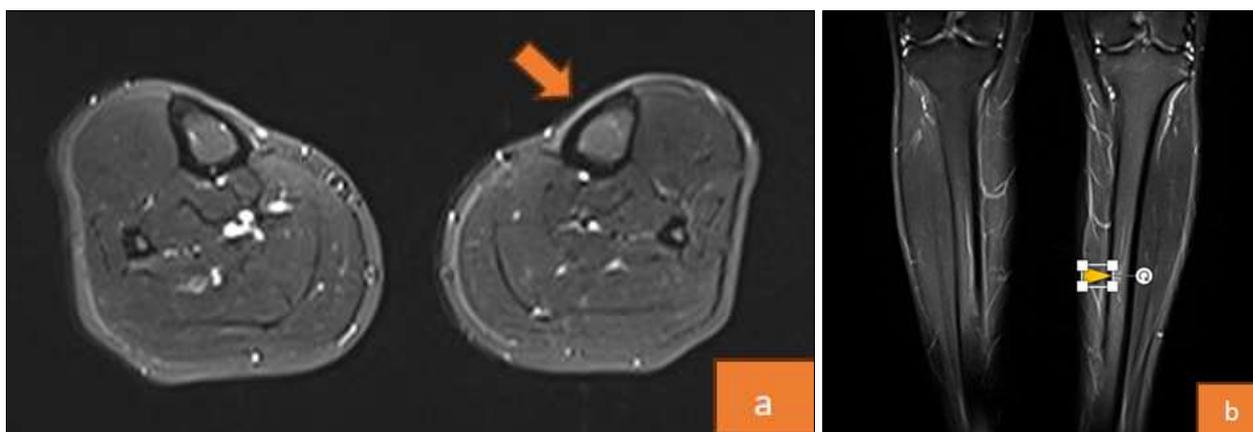
Upon examination, there was tenderness along the tibia without swelling or significant bruising. She was unable to continue running due to the discomfort, prompting an MRI for further investigation.

### Radiological Findings:

The MRI revealed typical features of MTSS, showing hyperintensity on T2-weighted images along the medial tibial border, indicative of periosteal edema [1]. Mild edema was also noted in the posterior tibialis and soleus muscles, suggesting muscle irritation caused by repetitive overuse. Additionally, there were no signs of chronic exertional compartment syndrome (CECS), which might present as muscle compartment edema or signs of increased intra-compartmental pressure [3]. These findings confirmed the diagnosis of MTSS and excluded other differential diagnoses, such as posterior tibial tendinopathy [4].



**Case 1: (a) Axial (b) coronal (c) corresponding sagittal fat-suppressed T2-weighted fast spin-echo image of calf shows mild periosteal edema (arrow) on medial cortex and mild bone marrow edema (arrowhead) within intramedullary canal of mid tibial diaphysis**



**Case 2: (a) Axial (b) coronal corresponding sagittal fat-suppressed T2-weighted fast spin-echo image of calf shows mild periosteal edema (arrow) on medial cortex and mild bone marrow edema (arrowhead) within intramedullary canal of mid tibial diaphysis**

## DISCUSSION

Medial Tibial Stress Syndrome (MTSS) results from repetitive mechanical stress on the tibia, leading to inflammation of the periosteum along the medial tibial border. It is commonly seen in athletes, particularly runners, due to repeated high-impact activities that cause microtrauma to the bone and periosteum, resulting in pain. The primary radiological feature of MTSS is periosteal edema, visible on T2-weighted MRI images as hyperintense areas [1-5].

Differential diagnoses for MTSS include tibial stress fractures, chronic exertional compartment syndrome (CECS), and posterior tibial tendinopathy. Stress fractures typically show bone marrow edema and cortical fractures on MRI, which were not observed in this case (2). CECS, characterized by increased compartment pressure, often presents with muscle edema on MRI after exercise, but this patient's MRI did not show signs of compartment pressure elevation [3]. Posterior tibial tendinopathy presents with tendon thickening and degenerative changes, which were absent in this case [4].

MTSS is often associated with biomechanical factors such as overpronation, weakness of the posterior

tibialis muscle, and poor footwear, which exacerbate the load on the tibia, increasing the risk of periosteal irritation [6]. Management is conservative and includes rest, physical therapy, orthotic therapy to correct overpronation, and stretching and strengthening exercises for the lower limb muscles. NSAIDs are used for pain management, and athletes are advised to gradually return to running once symptoms improve. In most cases, MTSS resolves with conservative measures, though recovery can take several weeks depending on the severity of the injury. Early diagnosis and intervention are crucial to prevent progression to more severe conditions, such as stress fractures.

## CONCLUSION

This case underscores the critical role of MRI in diagnosing medial tibial stress syndrome. MRI provides clear visualization of periosteal edema, which is characteristic of MTSS and allows differentiation from other conditions such as stress fractures and compartment syndrome. With appropriate conservative management, most athletes recover from MTSS without long-term consequences. However, early intervention is key to preventing complications and enabling athletes to return to their sport safely.

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