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## Medial Tibial Stress Syndrome

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# Medial Tibial Stress Syndrome

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## Introduction

Medial Tibial Stress Syndrome (MTSS) is an injury of the lower extremity, and the most common leg pain in athletics.<sup>1</sup> A common name for MTSS is “shin splints.”<sup>2</sup> MTSS is an inflammation of the periosteum or muscle from overuse. The cause of this condition is due to many factors including training errors and biomechanical abnormalities.<sup>2</sup> Muscle imbalance and tightness over the gastrocnemius, soleus, and plantaris muscles are associated with MTSS. New research shows that a spectrum of tibial stress injuries is likely involved in MTSS.<sup>1</sup> The percentage of MTSS is between 4 and 35% in athletic and military populations.<sup>5</sup>

Conservative treatment options include rest and ice in the acute phase, and therapy such as whirlpool baths. After the acute phase, stretching of the gastrocnemius, soleus, and peroneals is an important part of treatment, as are exercises that focus on improving the strength and endurance of the muscles which produce dorsiflexion, plantar flexion, inversion, and eversion at the ankle.

Treatment should focus on restoring proper biomechanics, as well as developing lower extremity strength and proper muscle balance to improve shock attenuation for the lower extremity.<sup>2</sup> Proper diagnosis and management of MTSS are the key for helping athletes return to full activity. It is important to learn more about this condition because it is a common injury, and athletes do not know how to treat it properly.

## Purpose

The purpose of this project is to examine an exercise-based approach to rehabilitating an athlete with medial tibial stress syndrome. It presents specific exercises that can be used, and focuses on resolving the core of the problem instead of just addressing the symptom. This review attempts to provide a long-term solution rather than providing a quick fix.

## Exercise Methods

	<b>Ice Massage:</b> An ice massage of the affected area is a great way to relieve pain symptoms. <sup>1</sup> An ice cup is used for this. Ice massages should last for 20 minutes for maximal effectiveness.	
	<b>Calf Stretch:</b> Stretching is an important part of rehabilitation for MTSS. <sup>1</sup> One way to stretch the “gastroc” is to lean against a wall, with one foot back (the one being stretched) and the other leg forward and bent at the knee. Keeping the back heel on the floor, lean into that wall until a stretch is felt. To stretch the soleus, one performs essentially the same exercise, but this time with the back leg bent at the knee. Each of these stretches should be held for 30 seconds. Perform the stretches 3 times a day.	
	<b>TheraBand Exercises<sup>2</sup>:</b> This image demonstrates how to perform exercises with a rubber resistance band (TheraBand). The movements include plantar flexion, dorsiflexion, inversion, and eversion. Resistive plantar flexion strengthens the gastrocnemius and the soleus. Resistive dorsiflexion strengthens primarily the tibialis anterior. Inversion strengthens both the tibialis anterior and tibialis posterior. Eversion strengthens the peroneus longus, brevis, and tertius. Perform 3 sets of 10 repetitions.	

Figure 1. From an upright body position and standing with all body weight on the forefoot and the ankle joint in plantar flexion (A), the calf muscle was loaded eccentrically by having the patient lower the heel with the knee straight (B) and with the knee bent (C).

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## Discussion

In rehabilitating a subject who suffers from medial tibial stress syndrome, it is essential to address not only the symptoms, but also the underlying problems that are causing the condition.

Cryotherapy, such as ice massage, can be used to relieve symptoms in the acute phase.<sup>4</sup> Rest is also essential for this point of the injury. Some sources have mentioned the use of a graded running system, where the athlete begins with participation in light exercise and gradually increases the intensity. However, it has not been proven whether this is more beneficial than complete rest.<sup>5</sup>

Lack of flexibility of the muscles of the leg is a likely contributor for MTSS.<sup>4</sup> Therefore, flexibility exercises should be performed after the acute phase of the injury. This includes daily stretches for the gastrocnemius, soleus, and peroneus.<sup>2</sup>

Muscles of the lower extremity that lack endurance or strength are probable culprits of MTSS.<sup>3</sup> It is also important to identify and correct any biomechanical abnormality in the lower extremity during the rehabilitation of this condition. This includes improper alignment due to muscle imbalances, and particularly an imbalance in strength between the inverter and evtor muscles, which can cause excessive pronation.<sup>6</sup> It is important to put into action a strengthening program to correct this imbalance. Therefore, after a stretching regimen has been adhered to, the patient should add a strengthening program to their rehabilitation process.

The strengthening program should focus on all motions of the ankle joint and the muscles that produce these motions. This includes plantar flexion, dorsiflexion, inversion, and eversion.<sup>1,2,4,6</sup> The use of a rubber tubing or rubber band is an effective way to resist all motions of the ankle, and therefore strengthen the involved muscles. Eccentric calf raises are a way to strengthen the plantar flexors specifically.

The final step of rehabilitation for MTSS includes a progressive return to running or activity. The patient must resume running by gradually increasing the distance and frequency.<sup>2</sup> The patient should be encouraged to avoid running on hills, or on uneven or very hard surfaces.<sup>1</sup>

## Conclusion

Many athletes suffer from this condition, but few know how to properly correct it. By following this program, it is projected that a subject will recover effectively from medial tibial stress syndrome, and be less likely to suffer from reoccurrence of the condition. This method of rehabilitation is more effective than the use of orthotics and stretching alone. More research needs to be done to determine whether a graded running system is as effective as rest in the recovery period for MTSS.