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## Medial Tibial Stress Syndrome **AKA: SHIN SPLINTS**

By Rhonda S. C. Beemer, PhD, LAT, ATC  
Drake University & Physiotherapy Associates

**Shin splints**, a common injury in athletics, is a catch all term for pain in the anterior aspect of the tibia (*front of the shin*) and/or the lower leg, usually resulting from overuse injuries. Stress fractures, muscle strains, and compartment syndromes have all been classified as “shin splints”.<sup>1,4</sup> More specifically, Medial Tibial Stress Syndrome (MTSS) is the most common shin splint condition in the lower leg referring to the anterior aspect of the tibia where the periosteum of the bone (*outside covering*) becomes inflamed (*periostitis*). In the athletic population, specifically runners, this type of “shin splint” (MTSS) can result in tibial stress fractures, if the condition is not cared for properly.<sup>2</sup> In fact, it can cause up to 50 to 60% of all conditions that cause pain in athletes’ legs.<sup>1,5</sup>

What causes MTSS? Repetitive microtrauma or overuse have been linked to MTSS.<sup>1,3</sup> Factors that can specifically cause MTSS include poor biomechanics, leg muscle weakness, poor shoe support, training errors, overtraining, and alignment problems such as flat of feet (*pes planus*), high of arches (*pes cavas*), and/or tight Achilles tendon and other lower leg muscles. Pain may occur during exercise only, or, with advanced stages, there can be pain with normal, daily activities.<sup>1-5</sup>

Signs and symptoms of MTSS include pain and tenderness along the anterior aspect of the tibia (*front of the shin*) and possible weakness with dorsi-flexion (*lifting the toes and feet upward*) and/or plantar flexion (*pointing the toes and feet downward*).<sup>4</sup> Four grades of pain can also be attributed to MTSS. Grade 1: pain occurring after activity; Grade 2: pain occurring before and after activity, but not affecting performance; Grade 3: pain occurring before, during, and after activity affecting performance; and, Grade 4: pain that is so severe that performance is impossible.<sup>1</sup> In the event that pain is so severe that performance is impossible, stress fractures should be ruled out.

Management of MTSS includes referral to a medical professional to rule out stress fractures or other injuries to the lower leg with advanced pain. Bone scans and X-rays are the diagnostic tests usually conducted to rule out stress fractures.<sup>1</sup> Since MTSS is an overuse injury, the best healing results will occur with conservative treatment.<sup>4</sup>

Treatment of MTSS includes applying ice massage for 7-10 minutes or an ice bag for 15-20 minutes to the painful sites, along with stretching of the lower leg, and the use of anti-inflammatory drugs (as directed by a medical professional). If therapeutic modalities are available from a medical professional, ultrasound and/or electrical stimulation can also be utilized. Rehabilitation includes exercises which strengthen the lower leg muscles and correct any biomechanical abnormalities.<sup>1</sup> Exercises should not be conducted if pain persists.<sup>6</sup> Taping of the shins and/or the arches can be beneficial in relieving pain. The use of orthotics can also be beneficial by helping the malalignment of the foot, thus relieving tension and/or pain.

The American College of Sports Medicine (ACSM) recommends at least 7 to 10 days of rest from painful activities to treat MTSS.<sup>6</sup> This does not mean that the athlete should be on total rest. The key is to rest the lower leg. In fact, there are a variety of cross training exercises that the athlete can do that will not put stress on the lower leg such as swimming and other water aerobic activities, as well as bike riding.<sup>4-6</sup> Rest may need to be prolonged if pain persists.<sup>4</sup>

### **Common Injuries Related to the Lower Leg**

Stress fractures, muscle strains, and compartment syndromes have all been classified as “shin splints”. Many of the injuries can be hard to distinguish between one another; however, it may be necessary to do so in order to prevent further or more severe injuries.

**Stress Fractures** are a common overuse stress injury frequently seen in distance runners and/or inexperienced and unconditioned individuals that are often located in the lower third of the lower leg. This injury is more likely to occur in athletes with biomechanical abnormalities who are training under improper conditions. Dietary problems can also attribute to stress fractures.

*Signs and symptoms* of stress fractures include pain in the lower leg that is *most intense after activity*. The athlete will usually be tender to the touch at the site of the injury. The athlete should be referred to a medical professional. Bone scans will be the best diagnostic testing, as X-rays will not show up until the fracture has already begun to heal.

*Treatment* includes rest for at least 14 days. If pain is severe during weight bearing, the athlete will need to use crutches until pain subsides. Non impact activities such as biking or swimming should be done before the athlete begins jogging again. After the athlete has been pain free for a couple of weeks, running can *slowly* begin. Biomechanical problems should be corrected in order to reduce recurrence of the stress fracture.<sup>1</sup>

**Tennis Leg** is a strain to the gastrocnemius muscle (*calf muscle*) and possible tear to another muscle’s tendon (plantaris muscle). This injury most often occurs with running or jumping activities. Because of the intensity of the injury, the athlete may actually think that they have been struck in the back of the leg at the time of injury.

*Signs and symptoms* include swelling of the calf muscle and tenderness to the touch, along with a palpable defect in the muscle. The athlete may also exhibit painful and weak plantar flexion (*pointing the toes downward*). Because some signs and symptoms may be similar to a blood clot, the athlete should be referred to the appropriate medical personnel.

*Treatment* of tennis leg includes rest, ice, compression wrap, and elevation (RICE), as well as partial weight bearing. A heel lift may be needed in the shoe to reduce the amount of strain on the muscle. The more conservative the treatment, the greater chance for a full recovery.<sup>4</sup>

**Achilles Tendinitis** is an inflammatory injury to the Achilles tendon due to repetitive overloading stress such as with running and jumping. Achilles tendinitis often will be a gradual onset injury that worsens with strenuous activity. It can be associated with preseason or early season training where the intensity and duration increases too quickly without sufficient recovery time. Tight muscles can also make an athlete more susceptible to the injury.

*Signs and symptoms* include warmth and pain to the touch with possible thickening and/or redness as compared to the other Achilles tendon. Uphill running or hill workouts will aggravate the condition. There may also be weakness when standing and lifting the heel off the ground and possibly less range of motion (*flexibility*) as compared to the other side.

*Treatment* includes rest, ice, compression wrap, and elevation (RICE). Strengthening of the posterior calf muscles should occur carefully and after pain has decreased in order to avoid recurrence of the injury.<sup>1</sup>

**Compartment Syndrome** can either be acute (*a sudden occurrence*) or chronic (*happening over a long period of time*).

***Acute compartment syndrome*** (occurring commonly in soccer players) occurs when the athlete is hit or kicked in the lower leg, or when there is very strenuous exercise in an untrained athlete.

*Signs and symptoms* include swelling that occurs within the chambers that “hold” the muscles together (fascial compartments) causing pressure to build up on muscles, nerves, and the blood supply. Numbness and tingling may occur, as well as muscle weakness or inability to move the foot. Sometimes a waxy appearance to the skin can also occur.

***Treatment:*** Permanent disability could occur with acute compartment syndrome; therefore, athletes should be referred to a medical professional as soon as this condition is suspected.

***Chronic, or sometimes referred to as, exertional compartment syndrome*** occurs when the pressure within the compartments increases too much. It most often occurs with athletes who perform extensive running. The compartments

that are most often affected are the anterior (*front*) or the deep posterior (*back*) of the lower legs and it is often confused with shin splints.

*Signs and symptoms* with chronic compartment syndrome can actually occur bilaterally. The individual will complain of pain during exercise. Sometimes the pain is considered to be an ache, sharp, or a feeling of pressure. With advanced symptoms, there can be weakness in the foot and toes.

*Treatment* includes RICE; however, if symptoms persist surgery may need to occur. In the event that the compression wrap causes more pain and/or symptoms, discontinue use and refer to a physician.<sup>1</sup>

Whether the injury is Medial Tibial Stress Syndrome, or some other type of lower leg injury, the most important thing is the safety of the athlete. Apply RICE (*rest, ice, compression wrap, and elevation*) to minor injuries. With more serious injuries, or when in doubt, always refer the athlete to a medical professional or appropriate medical personnel.

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*Physiotherapy Associates are the sports medicine providers for the Boys' State Baseball, Basketball and Soccer Tournaments.*