

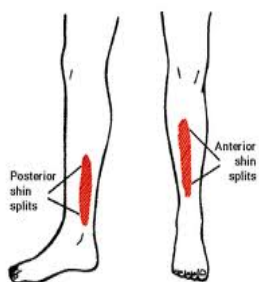
Lower Leg Pain

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Shin Splints

The term 'shin splints' refers to pain in the lower leg induced by running and jumping. The most common complaint is pain in the lower half to one third of the shin, along the inside edge of the *tibia*. This is the larger of the two long bones of the lower leg. Occasionally the pain is at the front of the leg.



The accepted medical term for common shin splints is *medial tibial stress syndrome* (MTSS). The cause of the pain is not fully understood.

It used to be thought that muscle attachments along the bone became inflamed or torn. However no muscles attach along the area where pain is felt. The current theories are:

- (a) A connective tissue, known as *fascia*, attaches along the edge of the tibia. Tension through muscles behind the leg may indirectly cause injury or inflammation along this attachment.
- (b) Bone stress may result from repetitive bending and compression forces. The bone itself becomes painful.

It is possible that one or even both factors could be responsible for MTSS. Less common causes of pain in this part of the leg include:

- (a) Compartment syndrome. This is when pressure builds up inside muscle compartments. The pain is caused by exercise and is only present during sport. It is possible for MTSS & compartment syndrome to occur together.

- (b) Stress fracture. Tibial stress fractures sometimes occur. The pain may be similar to that of MTSS, but tends to be over a smaller localized area. The pain will generally be right over the bone rather than on its edge. There has been speculation that MTSS may represent a *stress reaction*, an early stage of stress fracture. However expert consensus is that the two conditions are different, and that there is no evidence MTSS progresses to stress fracture.

The player with MTSS describes dull pain which is present at the start of sport, and settles once they warm up. As it worsens, the pain may last during sport and even on cooling down. In severe cases it may be present with every-day walking.

Sports & MTSS:



Running and jumping sports, as well as gymnastics and dancing, are the activities most likely to cause MTSS. Hockey players are particularly at risk of developing MTSS. This is most likely due to the hard and unyielding nature of artificial turf. A 2006 study in the US found 39% of female college field hockey players suffered from sport related lower leg pain, mostly MTSS. It is among the most common chronic complaint in hockey, with an incidence of between 10% & 20%. In a 1994 study it accounted for 7% of severe hockey injuries.



Causes:

Over the years, dozens of possible causes have been suggested. Some of the more likely ones are:

1. Poor foot biomechanics. Being excessively ‘flat-footed’ has long been considered one of the major contributing factors to MTSS. This is known as *over-pronation*. As the foot rolls in, the



muscles at the back of the lower leg are excessively stretched & over-worked. This may put added strain on the fascia or overload the bone. While not generally mentioned, it is also likely that high arches, or a *supinated* foot will be a risk factor, as there is less shock absorption with this foot type.

2. Muscle weakness. Bone and muscle strength go hand-in-hand, so weak lower leg muscles make the soft tissues and bone prone to injury. Lack of endurance, leading to muscle fatigue, is another risk factor.



3. Running technique. This is an area of sports medicine where there is still debate.

However a 2012 study showed that in people with chronic compartment syndrome, symptoms were virtually abolished by



training which discouraged a heel striking action during running. The authors speculated that heel striking may also be a major cause of other leg injuries, including MTSS. There have been other recent papers supporting this theory.

4. Over-training. A common cause of MTSS is a sudden increase in training or playing intensity. This is because the bone and soft-tissues have not had time to adapt to the sudden load. This type of pain may settle as the tissues adapt, but there is also the risk of

developing chronic pain.

5. Playing surface. There is evidence that higher impact forces are generated when running on asphalt, concrete and other man-made surfaces, including artificial turf. There are also indications that greater physical effort is required, placing higher demands on the whole musculoskeletal system.
6. Sex. Female players are at greater risk than males. This seems to be due to reduced bony diameter and sometimes bone density. Studies have shown females to be between two to five times at greater risk compared to males.
7. Body type. Players with a higher body mass index are at greater risk. It is also possible that racial background may be a factor.
8. Past injury. Any previous lower limb injury increases the risk of developing MTSS.
9. Inadequate footwear. Shoes that lack support, or the wrong type of shoe, will increase the risk.

Treatment:

1. Reduce the load. As MTSS is often related to doing too much too soon, a period of rest or a reduction in training intensity can help. A 50% reduction in load has been suggested by several authors on the subject. Having rest days in between training or playing days can make a big difference. If the condition is severe, a period of rest (1 to 2 weeks) followed by gradually increasing training load may be necessary.
2. Variations in training. Cross training methods, such as cycling or swimming, are good for maintaining aerobic fitness while reducing stress on the lower legs. Where possible, perform running drills on natural grass rather than artificial turf or other hard surfaces.
3. Ice. Anecdotal evidence suggests that icing the leg after sport can be effective in relieving pain and may help to improve recovery.
4. Shoe insoles. Orthotics will benefit some athletes, particularly those who pronate



excessively. Studies have also shown that flat shock absorbing neoprene insoles can help to prevent the onset of MTSS.

5. Strengthening exercises. It is important to have adequate strength through all the muscles of the lower leg. *Eccentric* calf strength is particularly important (strength where the muscle lengthens under load). It is also important to have good strength and control through the core muscles of the lower back and hips.

6. Running technique modification. In chronic cases, there may be benefit in assessing and modifying the player's running style. A regular heel landing pattern causes a lot of jarring through the whole leg.



7. Dry needling. Acupuncture needles can be used to relieve areas of muscle tension, particularly along the inside or front of the lower leg.



8. Massage. This can also be used to relieve areas of muscle tension.

9. Vacuum cupping. Cupping, which creates negative pressure, helps to release tight connective tissues.



10. Strapping. Various techniques of sports strapping can be used to unload the painful tissues. This can provide temporary benefit during sport.

11. Stretching. Research has not shown stretching to be beneficial for MTSS. However, tight muscles, particularly through the calf area, should be stretched regularly.

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