Lower Leg Pain

For information on all types of injuries visit:
http://www.cssphysio.com.au/Doctors/fordoctors.html

Medial Tibial Stress Syndrome

Persistent sports related postero-medial shin pain is generally put down to one of one of 3 possible causes:

1. A primary bone problem
2. Symptoms adjacent to bone at the periosteal / fascial junction – medial tibial stress syndrome (MTSS)
3. Symptoms due to deep posterior compartment syndrome.

There is also mention in the literature of the possibility of either nerve entrapment or popliteal artery entrapment. These are thought to be rare causes of distal shin pain and the history should exclude these diagnoses.

MTSS is by far the most common of the above conditions. It is most prevalent in sprinters, hurdlers, gymnasts, the football codes, basketball, field hockey, and dancing. It accounts for 6-20% of all running injuries, & up to 60% of all overuse injuries seen in the leg. In cross country it occurs in up to 50% of runners. It is said to account for up to 22% of all injuries in aerobic dance. In field hockey the incidence was said to be around 40%. In military trainees up to 58% of females and 28% of males are affected.

The typical description is dull pain over the posteromedial lower half to one third of the tibia. Early in the disease, symptoms will be present at the beginning of activity, and subside as the athlete warms up. As the condition becomes more severe symptoms may persist throughout the activity, and may even be present at rest. In the most severe cases pain may last for several hours or days after exercise & be present during ADL's including walking.

Careful attention should be paid to recent changes in training. Too much too fast is a common scenario, particularly increasing intensity or duration, and running on hard or uneven surfaces.

Imaging:

The diagnosis of MTSS is a clinical one and usually straight-forward. If there is uncertainty, and particularly concern about the possibility of a stress fracture, bone scan & MRI are the investigations of choice. However research has shown that there will be many false positives with these investigations. Up to 80% of asymptomatic athletes undergoing bone scan had pathological findings. MRI, which shows the presence of periosteal & bony oedema, also has many false positives.

Source of Pain

MTSS is not a muscle injury, as no muscles attach at the area of symptoms. Current theories are that the pain arises from:

1. A traction injury of the deep crural fascia at the posteromedial lower half of the tibia. In a cadaveric study it was found that the tibial fascia was the only structure to insert onto the medial tibial crest from the ankle to the knee. The most distal part of the fascia was found to be thicker and stronger as it passed distally to form the flexor retinaculum.

2. Bone stress reaction. It has been suggested by some authors that MTSS may be due to a bony stress reaction, or represent an early stage in the development of a tibial stress fracture.

Contributing factors: Many possible factors are mentioned in the literature:

1. Over-pronated foot type
2. Hallux limitus
3. Muscle weakness
4. Reduced calf flexibility: this is speculated, but there is no supportive research evidence.
5. Biomechanical abnormalities: including genu valgum or varum, tibial torsion, femoral anteversion, foot arch abnormalities, & leg length discrepancy – all speculative.
6. Running biomechanics: There is good research & anecdotal evidence that changes to faulty running style, including excessive heel striking, can be very effective in settling pain in the lower leg.
7. Altered bone density: Low regional bone density was found in MTSS athletes, & this returned to normal with recovery of symptoms at an average of 5.7 years. It is possible that it is an effect of the injury rather than a cause.
8. Increased BMI
9. Female sex: females generally have a higher incidence of MTSS. It may be no coincidence that they often have reduced bone density, particularly related to hormonal imbalances & the female athletic triad (osteoporosis, amenorrhea, and disordered eating).
10. Load: sudden increase in training intensity or duration.
11. Previous lower limb injury: a past history of MTSS or stress fracture was very predictive.
12. Footwear: change in footwear, quality, or condition
13. Surface: training on hard or inclined surfaces has been implicated.

Management:

Load management: Initially it may be necessary for the athlete to decrease running frequency & intensity by up to 50%, and to avoid hills, uneven surfaces, or very firm surfaces. Cross training, including pool running, swimming, elliptical trainer, and cycling are substituted.

Strength & conditioning: Intensity is then slowly increased over weeks, with gradual re-introduction of impact loading. Calf muscle training, including eccentric calf exercises, are used to build endurance and help prevent fatigue. In particular, increased strength and endurance of soleus is recommended. Exercises to focus on tibialis anterior & other muscles controlling inversion and eversion may be beneficial. Strengthening for the core and hip will benefit some athletes with biomechanical deficiencies, as will proprioceptive & balance training.

Running Technique. As heel striking has been found to increase ground reaction force and lower leg compartment pressures, change to a midfoot or forefoot running style may assist in reducing tibial stress. Other aspects of running may need attention.

Ice: This has benefit for symptomatic relief.

Deep tissue massage or dry needling. This is often recommended but there is no research evidence. Treatment of focal areas of muscle tightness using massage or dry needling is a common clinical intervention. Massage may include digital ischaemic pressure ('trigger point'), transverse friction, or sustained myofascial tension techniques. I find dry needling of the fascia helpful in many cases.

Vacuum cupping: this has been advocated to treat muscle tension.

Acupuncture: Recommended, but no evidence.

Prevention:

Neoprene insoles: In an army study, less recruits developed MTSS when they wore shock absorbing insoles (12.8% who wore them vs 20.4% who did not)

Shoes: It is recommended to wear good fitting shoes with a stable heel counter, & shoes should be replaced every 400 to 800 km, depending on body weight, training surface, & running style.

This is a summary of an extensive literature review I did on this subject in 2013. To view this, and for a full list of references, visit:
http://www.cssphysio.com.au/pdfs/Shin-Splints-Literature-Review.pdf

For information for doctors on physiotherapy management of all types of injuries visit:
http://www.cssphysio.com.au/Doctors/fordoctors.html

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