

# Lower leg pain in runners



**Dr Paul Annett**  
SPORTS PHYSICIAN  
MBBS (HONS I), FACSP  
CONJOINT LECTURER, UNSW

Sports physician with Orthosports, a group of orthopaedic surgeons, sports physicians and physiotherapists based in Sydney.

Investigating the aetiology, diagnosis and treatment of lower leg pain in athletes.

## INTRODUCTION

LOWER leg pain is relatively common in the running athlete and makes up around 20% of running injuries.

There are numerous causes of lower leg pain in the younger athlete. The most common of these include tibial periostitis (the old 'shin splints'), stress fracture and chronic exertional compartment syndromes. In the older athlete, peripheral vascular disease and spinal canal stenosis should be considered.

## AETIOLOGY

Tibial periostitis is an overuse-related inflammation of the attachment of the deep calf (generally considered the soleus) to the medial tibial border. It generally comes about with increased training load on top of intrinsic factors such as poor foot biomechanics (particularly over-pronation) and calf inflexibility.

Stress fracture results from a failure of normal bone to cope with abnormal loads. It generally occurs in the tibia at the junction of the upper two-thirds and the lower third.

Similar factors may cause a tibial stress fracture that causes tibial periostitis, and

there may be a continuum between the two conditions.

In the older female athlete, bone mineral density issues should be considered.

Chronic exertional compartment syndrome is a condition where the fascial covering of a muscle group becomes excessively stiff. With activity, muscles swell and the fascia will stretch accordingly.

If the fascia becomes stiff – and this may occur due to ageing, genetics or trauma – then the muscle becomes constricted. This causes the microvascular blood supply to become compromised, causing a claudicant-type pain.

## DIAGNOSIS

The history and examination provide key clues to the definitive diagnosis.

In tibial periostitis, the pain may initially improve with activity and then disappear. There may, however, be prolonged post-activity pain suggesting inflammation.

In contrast, compartment syndrome is usually painless for the first 5-10 minutes of activity and then the pain slowly worsens. It may be severe enough to make the athlete stop and subside quickly with rest. Stress fracture pain is largely insidious and progressive, occurring initially after exercise only, then progressing to pain during activity and even rest and night pain.

Accurate examination will aid diagnosis. In tibial periostitis, the patient has widespread, exquisite tenderness along the medial tibial border, maximal in its mid-third. In a stress fracture, there will be one area of more focal tenderness, generally at the junction of lower third and the upper two-thirds of the tibia.

Chronic exertional compartment syndrome may show few signs at rest, although examination post-exercise may show increased tension through the affected compartment and sometimes a palpable muscle hernia.

## Key points

- Lower leg pain is common in the running athlete
- Common causes in younger athletes include tibial periostitis, stress fracture and compartment syndrome
- In older athletes, consider vascular and spinal causes
- Compartment syndrome presents with a 'claudicant' history and 'crescendo' pain
- Treatment of tibial periostitis and stress fracture requires rest, biomechanical assessment and correction
- Definitive treatment of compartment syndrome usually involves surgery.



Figure 1. Site of catheter placement in testing for anterior compartment syndrome



Figure 2. Site of tenderness on palpation of a tibial stress fracture

## INVESTIGATION AND TREATMENT

A plain x-ray is appropriate to demonstrate a stress fracture and exclude other pathology, such as a tumour.

A bone scan is a helpful second-line investigation for demonstrating tibial periostitis and also stress fractures. Similar information may be achieved with MRI scanning without the same radiation.

If a compartment syndrome is suspected, the gold standard is a compartment pressure test. This involves placing a needle catheter attached to a pressure gauge into the affected compartment. Pressures are obtained both pre- and post-exercise to establish the diagnosis.

Treatment of tibial periostitis and stress fracture is similar. It includes a period of pain-free rest of around six weeks, with 'hands on' physiotherapy to release tight soft tissue structures, a rehabilitation program of stretching and strengthening exercises, and a bio-



Figure 3. Site of tenderness on palpation of a tibial stress fracture

mechanical assessment, possibly with orthotic prescription.

In the case of compartment syndrome, surgery may be required to release the affected compartment.

Institution of an appropriate management plan will help get both elite and recreational athletes quickly back to their preferred sport.



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