

# Stress Fracture of the Tibia

## What is it?

A stress fracture is an overuse injury of the bone. A bone will fracture (break) when a stress placed on the bone exceeds its ability to withstand it. See figure 1 below. A fracture will usually occur when an abnormally high force is applied to a normal bone e.g. during a fall or crash. Stress fractures occur due to a normal force being applied to the bone an excessive number of times with insufficient rest e.g. with increased running training. Bones are constantly changing and responding to the workload placed upon them. There is a constant turnover of cells as the bone acts to repair itself however when the stress of repetitive loads overwhelms the ability of the bone to repair itself, small cracks will occur i.e. stress fractures.

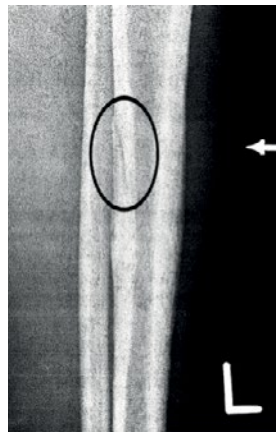


Figure 1



## How did I get it?

Tibia stress fractures occur most commonly among athletes who participate in activities that involve prolonged walking, running or jumping. Although common among runners, these injuries also occur among ballet dancers, soccer and basketball players and military recruits. Risk factors can generally be grouped into three types.

- Activity-related factors, including excessive training, poor footwear and irregular terrain.
- Biomechanical factors including inflexibility or weakness of the calf muscles, unequal leg-length, and flat or high-arched feet.
- Metabolic factors including demineralized bone due to hormonal or nutritional imbalances and specific disease states

## What are the symptoms?

A stress fracture of the tibia is characterised by increasing shin pain developing over a period of weeks. The pain is generally very localised over the site of the stress fracture and made worse by exercise. Initially it may have only been present following activity. However, with continued loading and stress, the pain may progress to be present during exercise. It may also have reached a level such that activity is too painful to perform and the tibia is sore during walking, rest and even over night when asleep. When you touch the site of the fracture it will be both tender and very painful.

## What should I do?

If you have or suspect a stress fracture of the tibia, you will need to modify the activity that contributed to it. A stress fracture represents an area of breakdown and weakness within the bone. If you continue to exercise or compete, this process increases, further weakening the bone. This can potentially lead to a complete bone fracture. A program of modified activity is critical. Low impact 'cross training' e.g. swimming, deep water running and cycling will maintain an aerobic base without delaying healing. A stress fracture of the tibia does not produce any long-term effects as long as it is properly treated and the cause identified and addressed.

## How is a diagnosis made?

A diagnosis is made on the history of the injury and on examination findings. Imaging studies such as x-ray, bone scan or CT/MRI may be used to confirm the diagnosis.

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## What does rehab involve?

Modified activity is the basis of stress fracture rehab. Staying active and training around the injury without further stressing the bone is important. Timing your return to weight bearing activity and carefully monitoring training load in the longer term is also paramount.

### PHASE 1

#### Day to day activity:

Weight-bear as tolerated. For occupations with significant walking/weight-bearing a walking boot may be required. Limit any unnecessary walking wherever possible.

**Exercise:** You can undertake non weight bearing exercise including swimming, upper body weight training only and grinder. You should not undertake any unnecessary walking, running, cycling, rowing, elliptical or anything with weight bearing attached to it. A sample exercise session for an endurance athlete may include swimming preferably with pull buoy to limit kicking, intervals on the grinder, high rep no rest circuit of upper body weights.

### PHASE 2

#### Day to day activity:

Weight-bear as tolerated. For occupations with significant walking/weight-bearing a walking boot may be required. Limit unnecessary walking wherever possible.

**Exercise:** Swimming, upper body weight training and cycling however there can be no walking, running or rowing. A sample exercise session for an endurance athlete might be as previously stated above in phase 1 but including cycling. You should aim to be performing a spin class by the end of week 4. It needs to be noted that the increase in exercise needs to be done gradually. You cannot expect to recover fully if you

are increasing your high resistant loads 7 days a week. Best results will occur if your exercise regime is done slowly and progressively while adding variety wherever possible.

### PHASE 3

#### Day to day activity:

Weight-bearing as tolerated.

**Exercise:** Swimming, upper body weight training, cycling and rowing while avoiding unnecessary walking and definitely no running. A sample exercise session for an endurance athlete might be as previously stated above in phase 2 but including rowing.

#### Sample rowing targets

- Aim for 2500m in 10 minutes. 1 minute row with 1 minute of rest. 10 intervals of 250m per minute.
- 2000m in the shortest time possible
- Concept 2 have a VO2 max calculator and well established records which you can test yourself against. Refer to: <http://www.com/us/interactive/calculators/vo2max.asp>

### PHASE 4

#### Day to day activity:

Weight-bear as tolerated.

**Exercise:** Swimming, upper body weight training, cycling, rowing, low volume jogging on grass but definitely no running.

#### Sample exercise session for an

**endurance athlete:** trial of 4 x 500m jog on grass 3 times over 2 weeks separated by at least 2-3 days

### PHASE 5

PODIATRY REVIEW WITH TREADMILL RUN TO ASSESS BIOMECHANICS

**Day to day activity:** Weight-bear as tolerated.

**Exercise:** No restrictions but be careful not to do too much, increase distance slowly. As an example:-

Week 1: 2km run 3 times per week  
Week 2: 4km run 3 times per week  
Week 3: 6km run 3 times per week  
Week 4: 8km run 3 times per week  
Week 5: 12km and onwards

Progress to greater distances but you will need to carefully monitor your biomechanics or there you will have an increased chance of re injury.

### Pneumatic leg brace

Pneumatic leg brace can help with symptom relief and allow you to tolerate earlier weight bearing activity without slowing recovery. A relatively aggressive rehabilitation protocol allows a quicker return to sport for uncomplicated, low-risk fractures. For these fractures, a systematic review found that treatment with a long air splint, also called a long air cast, enables return to activity up to six weeks sooner than standard casting and other treatments.

### Exogen:

Exogen is a form of Low Intensity Pulsed Ultrasound (LIPUS) which has been shown to accelerate bone healing. For best results the unit needs to be used at approximately the same time each day. Sports Clinic NQ can provide the Exogen unit as a free service however bookings for its use need to be made to ensure availability.

### Alter G:

Sports Clinic NQ has the only publicly available ALTER G treadmill in Queensland. Previously only available to professional athletes and members of the armed forces, the Alter G treadmill allows you to run at only a fraction of your bodyweight. The ALTER G treadmill allows you to run at, as little as, 20% of your bodyweight. This unit provides the following benefits:-

- 1) Sport specific conditioning
- 2) Graded return to running
- 3) Appropriate bone loading to assist healing.

Go online for more information

[youtube link tbc](#)

Do you have a question? Email [info@sportsclinicnq.com.au](mailto:info@sportsclinicnq.com.au)