Oxford University Hospitals
NHS Foundation Trust

OxSport – Department of Sport and Exercise Medicine

Bone Stress Injuries and Stress Fractures

Information for patients

What is a stress fracture?

A stress fracture is a small crack or break in otherwise normal bone. It is typically an overuse injury, which is related to repeated impact on a bone. Bone stress and stress fractures often occur in weight-bearing bones, usually in the shin and foot.

What are the symptoms of a stress fracture?

Pain is usually felt over the injured area and tends to develop over a few weeks. It is typically worse when putting weight on the injured area and better when resting. As it gets worse, the pain can start to be present when at rest and at night. The involved bone may be tender to touch and there is often some swelling. However, it is important to remember not all stress fractures have these typical symptoms.

How does this injury occur?

Bone is alive. Your body is in a constant cycle of removing older and damaged bone and replacing it with new, healthy, strong bone. This is called bone remodelling. This gives our bones the ability to adapt and cope with the different loads we put them through.

However, if the bone fails to adapt quickly enough to a new load, this will cause an imbalance in bone remodelling and an area of weakness can develop. This is called bone stress. This can develop into a stress fracture if the level of load bearing/activity is not reduced.

Stress fractures commonly occur when there is a sudden change in physical activity or increase in training without enough rest time for the bone to adapt and remodel. Examples include not allowing time for recovery between training sessions, training too frequently or a sudden rapid increase in the intensity and/or volume of exercise.

As load is a key factor, stress fractures mostly occur in weight bearing bones. They are particularly common in the shin and foot, but can occur in other parts of the body, including the thigh bone, pelvis and lower back. Sometime fractures can occur in bone that is already weakened or abnormal (e.g. in osteoporosis – thinning of the bones).

How common are stress fractures?

Stress fractures don't develop often. Less than 1 in 100 people will develop a stress fracture. They are more common in people who carry out certain activities, such as runners or those who do a specific sporting activity. In a sport and exercise medicine clinic, such as OxSport, up to 5% (5 in 100) of people seen will suffer with bone stress or a stress fracture.

How are stress fractures treated?

1. Off-load (take the weight off) the bone and allow it to heal

It is very important to off-load the bone and allow it time to heal. For some stress fractures this may mean just avoiding the exercise or activity that may have caused it in the first place, for others it may mean using crutches or wearing a padded walking boot. Your clinician will recommend the appropriate treatment and timeline to follow, depending on the type of stress fracture and the bone involved.

How will I know when I am loading my limb too much?
Pain is often used as a guide for your level of loading. Your clinician can help you to adjust this level until you are pain free. They will then design a gradual return programme to your normal activities.

2. Maintain your fitness

Maintaining fitness levels for your general health and wellbeing will help with a swift recovery. This can be achieved through cross training with less load bearing exercises. This includes static cycling, swimming or aqua jogging (jogging in water).

Your clinician will encourage this and can give you advice on the best activity for you. They may also recommend stretches and conditioning exercises to help keep you in shape and reduce muscle wasting (deconditioning) whilst you recover.

3. Address biomechanical factors

Your clinician may review these factors (how your feet and limbs are aligned) and address any areas that could be improved.

This may include:

- orthotic or podiatry assessment (to check the structure of your feet and how you walk/run)
- stretching and strengthening exercises for certain muscle groups, or adjusting your gait (how you move). As muscles act as shock absorbers for our bones, if there are areas of muscle weakness and/or tightness then this can increase the risk of a stress fracture. You may be referred to a physiotherapist to help address this.

When you start to return to activity, the correct supportive footwear is essential. We recommend you change your trainers every 300-400 miles, to make sure you have the correct foot support.

4. Improving your bone health

Following a balanced diet, which contains a good level of calcium, protein, carbohydrates and fats, is essential for healthy bones. Useful leaflets about how much calcium to have in your diet and with helpful tips on how to improve this level (depending on your dietary requirements) can be found under the 'Calcium leaflets' section on our website.

www.ouh.nhs.uk/osteoporosis/useful-info/useful-information.aspx

Vitamin D is important for healthy bones and a low level of vitamin D has been associated with stress fractures. Vitamin D is mostly made in our bodies in response to sunlight on your skin and we can absorb some vitamin D from our diet, but only a few foods contain vitamin D.

Some examples of foods that contain vitamin D are:

- oily fish (such as sardines, pilchards, herring, trout, tuna, salmon and mackerel)
- liver, egg yolk, mushrooms, cheese, milk
- fortified foods (added to some margarines and breakfast cereals in the UK).

Some people are at greater risk of vitamin D deficiency (low levels) than others. Spending a lot of time indoors, having darker skin and wearing sunblock or being covered up can all reduce your body's production of vitamin D. This is why many people are advised to take vitamin D supplements. Your clinician may organise a blood test to measure your vitamin D level.

In addition to diet, addressing other lifestyle factors, such as stopping smoking, reducing caffeine intake, maintaining a healthy weight (not too high or too low) and making sure you take in enough fuel (calories) to support the amount of physical activity you are doing, will further aid your bone health. Some medical conditions and medications can also impact your bone health, so it is important to discuss these with your clinician.

Recovery time and returning to activity

Your recovery time will depend on a number of factors. These include how long you have had your symptoms, the location of the bone injury or fracture, your previous activity levels and other factors that are specific to you.

However, as a general guideline, bone can take up to 6 weeks to heal. The majority of people get back to sport or their activities within 10-16 weeks.

You will be advised when you can start a return to activity programme. To begin with, this will be every other day. The volume and intensity of your exercise will be gradually increased. The programme will normally take 4-6 weeks. Remember, you should also continue to maintain your fitness with non-weight bearing exercise, as mentioned on page 4.

Your symptoms (mostly pain) are the best guide to know when you're ready to build up your activity. If you start to develop pain, it is important to reduce the activity back to the level at which you were last pain free, then after a week try to gradually increase again. You should build your return to activity up gradually, to avoid any risk of re-injury.

Preventing further stress fractures

If you have suffered a stress fracture you will be at an increased risk of developing another one. It is important to look at the factors which may have contributed to your initial injury. This includes having a sensible training programme, addressing any biomechanical factors and taking steps to maintain your bone health (pages 5 and 6).

Possible complications

The vast majority of stress fractures will heal if treated correctly and promptly. There are a small number of stress fractures in certain bones which have an increased chance of delayed healing or rarely may not heal. These fractures tend to be managed with longer periods of off-loading. If they do fail to heal after a significant period of rest, then you may need surgery.

How to contact us

If you are under the care of the Trauma Team at the John Radcliffe Hospital:

Tel: **0300 304 7777**
Ask to speak to the Trauma clinic reception

If you are under the care of OxSport at the Nuffield Orthopaedic Centre:

Tel: **01865 737 457**

Email: **orh-tr.oxsport-noc@nhs.net**

Website: **www.ouh.nhs.uk/oxsport**

If you have a specific requirement, need an interpreter, a document in Easy Read, another language, large print, Braille or audio version, please call **01865 221 473** or email **PALS@ouh.nhs.uk**

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