



Metatarsal Stress Fracture

A stress fracture is a break in a bone caused by an accumulation of a large number of small stresses, such as occurs with repeated running and jumping. Stress fractures most commonly occur in bones of the lower leg (tibia and fibula) and feet (metatarsals).

There are five metatarsal bones in the foot. Ninety percent of metatarsal stress fractures occur in the second, third and fourth metatarsals, with the second metatarsal being the most commonly affected. Metatarsal stress fractures were first described in 1855 and termed "march fractures" since they commonly occurred in military recruits.

Causes

Bones are in a continuous natural cycle of breakdown and rebuilding. High-impact, weight-bearing activities (such as running, jumping and dancing) generate stress to the bone, causing small areas of bone breakdown. Bone rebuilding occurs naturally during the rest periods between these stressful activities. When there is repetitive stress without sufficient rest, or when there is an abrupt increase in duration or intensity of activity, bone rebuilding is not able to keep up with bone breakdown. This imbalance results in a stress fracture, a collection of tiny cracks in the bone.

Risk Factors

- Rapid increase in volume, intensity or duration of activity
- Repeated bouts of activity with insufficient time for rest and recovery
- Change in shoes or inappropriate shoes for the activity
- Change in playing/running surface (e.g., grass to concrete)
- Change in running terrain (e.g., flat to hills)
- Inflexible or weak muscles
- High-arched feet or flat feet
- Low bone density
- Family history of osteopenia or osteoporosis

Symptoms

The main symptom is gradually worsening pain on the top of the foot. Initially the pain may only be felt with sports. Eventually it progresses to pain with daily activities such as walking. Swelling or bruising may also be present.

Diagnosis

Your doctor will review your symptoms and examine your foot. X-rays may reveal the fracture, but are not the most sensitive test. If your x-rays are normal but your signs and symptoms suggest a stress fracture, an MRI or bone scan can confirm the diagnosis.

Treatment

Treatment of a metatarsal stress fracture requires a period of rest from your activity, usually at least 3-4 weeks. If there is pain with daily activities, you may need to use crutches or a walking boot for a short period of time until you



can walk comfortably without pain. Ice can be helpful in reducing pain. Anti-inflammatory medications are not recommended in the treatment of stress fractures.

This initial period of rest is followed by a gradual return to activity over the next 2-4 weeks. Depending on your individual risk factors, your doctor may prescribe a change in footwear, inserts for your shoes or a course of physical therapy to correct any imbalances in muscle strength and flexibility. It is important that you maintain a healthy diet, with an adequate amount of calories and calcium (1300 mg/day if you are 9-18 years old; 1000mg/day if you are 19-50 years old). Most metatarsal stress fractures heal completely with this non-operative treatment. Rarely, they will require surgical repair.

Returning to Sports & Activities

The goal is to return you to your sport or activity as quickly and safely as possible. If you return to activities too soon or play with pain, the stress fracture may not heal. An unhealed stress fracture can lead to chronic pain, may require surgery and/or may result in difficulty returning to sports. Everyone recovers from injury at a different rate. Return to your sport or activity will be determined by how soon your stress fracture recovers, not by how many days or weeks it has been since the injury occurred. In general, the longer you have symptoms before starting treatment the longer it will take to get better.

You will be able to safely return to your sport/activity when your pain is resolved and the doctor's examination of your foot is normal. Remember that return to your sport will be gradual, starting at a very low level, and building by small amounts each week. This gradual increase conditions the bone, allowing it to become even stronger, which protects it from re-injury.

Prevention

- Increases in activity should happen in small, incremental steps (no more than 10-15% increase in volume, duration or intensity of activity per week).
- Changes to playing/running surface or terrain should be done gradually.
- Rest from your activity for at least 1-2 days each week.
- Wear shoes that are appropriate for the activity (e.g., Run in running shoes, play basketball in basketball shoes). Runners should replace their shoes every 300-500 miles.
- Stay physically fit.
- Eat a well-balanced diet with an adequate amount of calcium (1300 mg/day if you are 9-18 years old; 1000mg/day if you are 19-50 years old).
- Stretch muscles that are tight. Your doctor can show you how to stretch your calf and thigh muscles. The best time to stretch is after a warm-up or at the end your workout.
- Do not play through pain. Pain is a sign of injury, stress or overuse.

Rest is required to allow time for the injured area to heal. If pain does not resolve after a couple days of rest, consult your physician. The sooner an injury is identified, the sooner proper treatment can begin. The result is shorter healing time and faster return to sport.