

# METATARSAL STRESS FRACTURE



## ■ ■ ■ Description

A metatarsal stress fracture is a complete or incomplete break in the foot involving one or more of the longer foot bones (metatarsals) caused by intense exercise or repetitive pressure on the extremity. The wear and injury in the bone exceeds the bone's ability to heal and repair the injury, resulting in a breakdown of the bone, causing a stress or fatigue fracture. This is the second most common bone to sustain a stress fracture in athletes. It can occur anywhere within the metatarsal, although it most commonly affects the lower third of the second metatarsal (next to the big toe's metatarsal).

## ■ ■ ■ Common Signs and Symptoms

- Vague, diffuse pain or ache and occasionally tenderness and swelling in the foot
- Uncommonly, bleeding and bruising in the foot
- Weakness and inability to bear weight on the injured extremity
- Paleness and deformity (sometimes)

## ■ ■ ■ Causes

Stress fractures are caused by repetitive forces greater than the bone can withstand. They usually occur when there is an imbalance between bone injury and bone remodeling (healing). This usually follows a change in training or performance schedule, equipment, or intensity. It is also associated with a bone's ability to heal and may be associated with loss of menstrual period in women.

## ■ ■ ■ Risk Increases With

- Previous stress fracture
- Military recruits and distance runners
- Bony abnormalities (including osteoporosis and tumors)
- Metabolic disorders, hormone problems, and nutritional deficiencies and disorders (anorexia or bulimia)
- Women, especially when there is loss of or irregular menstrual periods
- Poor physical conditioning (strength and flexibility)
- Sudden increase in the duration, intensity, or frequency of physical activity
- Running on hard surfaces
- Poor extremity alignment, including flat feet
- Inadequate footwear with poor shock-absorbing capacity

## ■ ■ ■ Preventive Measures

- Appropriately warm up and stretch before practice or competition.
- Maintain appropriate conditioning:
  - Muscle strength
  - Endurance and flexibility
- Wear proper footwear; replace shoes after 300 to 500 miles of running.

- Use proper technique with training and activity.
- Gradually increase activity and training.
- Treat hormonal disorder; birth control pills can be helpful for women with menstrual period irregularity.
- Correct metabolic and nutritional disorders.
- Wear cushioned arch supports for runners with flat feet.

## ■ ■ ■ Expected Outcome

This condition is usually curable, with appropriate treatment, within 6 to 12 weeks.

## ■ ■ ■ Possible Complications

- Failure to heal (nonunion), especially with stress fractures of the upper part of the fifth metatarsal (outer foot)
- Healing in a poor position (malunion)
- Recurrence of stress fracture
- Progression to complete and displaced fracture
- Risks of surgery, including infection, bleeding, injury to nerves (numbness, weakness, paralysis), and need for further surgery
- Repeated stress fracture, not necessarily at the same site (occurs in 1 of every 10 patients)

## ■ ■ ■ General Treatment Considerations

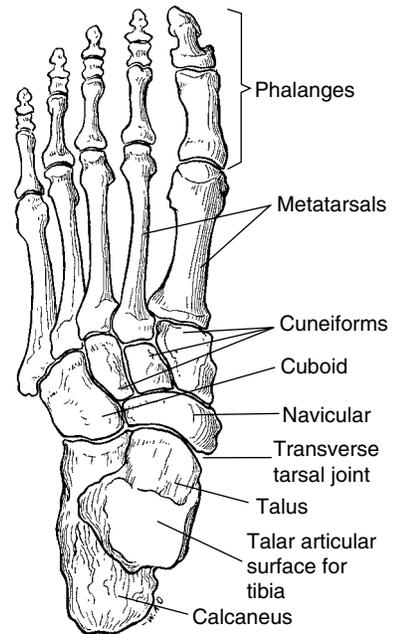
Initial treatment consists of medications and ice to relieve pain and relative rest from the activity that caused the fracture. Occasionally crutches may be recommended to protect the bone while it heals. Some physicians allow activity at a level below that which causes symptoms, while having extra support for the foot. This may be done with special hard-bottom shoes, orthotics, or taping techniques. Menstrual, nutritional, and metabolic abnormalities need to be appropriately identified and treated to help healing and prevent recurrence. After rest, gradual return to activity is recommended. Bone stimulators, which provide electrical currents to the bone, are attempted infrequently. Physical therapy may be helpful in gradually increasing strength of the muscles and bones after stress fracture and in maintaining cardiac fitness while waiting for the bone to heal. Surgery is rarely necessary, although it may be offered for fractures that do not heal after 3 to 6 months despite appropriate conservative treatment, such as fifth metatarsal fractures.

## ■ ■ ■ Medication

- Nonsteroidal anti-inflammatory medications, such as aspirin and ibuprofen (do not within 7 days before surgery), or other minor pain relievers, such as acetaminophen, are often recommended. Take these as directed by your physician. Contact your physician immediately if any bleeding, stomach upset, or signs of an allergic reaction occur.
- Narcotic pain relievers may be prescribed by your physician for severe pain. Use only as directed.

■ ■ ■ **Notify Our Office If**

- Symptoms get worse or do not improve in 2 weeks despite treatment
- The following occur after immobilization or surgery (report any of these signs immediately):
  - Swelling above or below the fracture site
  - Severe, persistent pain
  - Blue or gray skin below the fracture site, especially under the nails, or numbness or loss of feeling below the fracture site
- New, unexplained symptoms develop (drugs used in treatment may produce side effects)



**Figure 1**

From Jenkins DB: Hollinshead's Functional Anatomy of the Limbs and Back, 6th ed. Philadelphia, WB Saunders, 1991, p. 286.

Notes:

(Up to 4400 characters only)

Notes and suggestions