

Stress Fractures

Stress fracture (also called a fatigue fracture) is a weakening or thin crack in a bone caused by repetitive stress on the bone. A stress fracture is an overuse injury. It is different from a fracture that occurs after a traumatic event, such as a fall. Stress fractures are more common in endurance athletes or athletes who perform repetitive, high-impact activities.

Risk factors for stress fractures

With sufficient levels of stress to a bone, anyone can develop a stress fracture. However, there are additional risk factors related to the individual and to the training pattern that can further increase the risk of developing a stress fracture.

Individual risk factors

- Inadequate caloric intake; inadequate calcium intake.
- Low estrogen levels in females; menstrual dysfunction.
- Low body weight; rapid weight loss.
- Ethnicity. White athletes may be at greater risk.
- Biomechanical abnormalities. A high-arched foot is more rigid and transmits more stress to the bone; a flat foot causes greater demands and fatigue of protective muscles resulting in less shock absorption by the muscles.
- Prior stress fracture. This is a risk because it may include a combination of many of the other risk factors.

Training risk factors

- Too much, too soon, too fast. An overly rapid increase in activity—particularly high-impact activity—does not allow adequate time for the bones to adapt to the increased levels of stress.
- Hard surfaces. Running and jumping on roads; concrete; hard gym floors; or dry, compacted, hard fields can increase the risk of stress fracture—particularly if the athlete isn't used to training on such surfaces.
- Inadequate footwear. The shock-absorbing capacity of shoes will diminish even before the shoe appears worn out. Some foot types require more support than is provided by the shoe they use for the sport, and some foot types require more cushion. This is particularly true with cleated shoes, which generally have limited arch support and cushion.

Symptoms

The main symptom of a stress fracture is pain in the bone that is slow to develop, gets worse with impact activity, and subsides with rest. With continued activity, the pain becomes much more sharp, localized, and persistent. Occasionally, a bump over the area can be felt. A limp may also be an indicator of a stress fracture.

Common locations for stress fractures include the tibia (shin bone), fibula (bone on the outer portion of the lower leg) and metatarsals (bones in the forefoot). Stress fractures less commonly occur in the femur (thigh bone), pelvis, spine, and upper extremity. Suspicion of a stress fracture warrants checking with your doctor. Bone pain from other causes, such as bone cysts, infection, and tumors, must also be ruled out.

Tests

To confirm the presence of a stress fracture, your doctor may need to order an x-ray (see Figure 1). If the x-ray does not show a stress fracture, a bone scan (see Figure 2) or magnetic resonance imaging (MRI) may be needed.



Figure 1. X-ray showing stress fracture in second metatarsal.

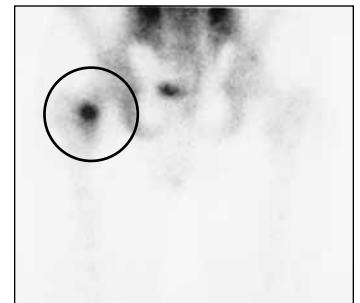


Figure 2. Bone scan showing stress fracture of hip.

Treatment

During the first phase of treatment, it is usually enough for athletes to limit impact activity. Some stress fractures may require casting, crutches, or surgery. Most athletes are able to continue to lift weights, swim, ride a bike, or use an elliptical trainer as long as there is no pain. Ice, acetaminophen, and rest are the main treatments for pain. In general, nonsteroidal anti-inflammatory drugs (NSAIDs), like ibuprofen and naproxen, are not recommended because they may delay healing. Biomechanical, nutritional, and menstrual problems must be addressed during the treatment to help the athlete heal. This can help prevent future stress fractures from occurring.

Healing time depends on the athlete's age, how long the fracture has been present, which bone is involved, and the condition of the bone. The time frame for healing is usually weeks to months. It is crucial for athletes with stress fractures to be followed by a doctor to monitor healing and

approve a level of activity that is safe for the level of healing that is present.

Complete healing may be documented by the resolution of bone tenderness and evidence of healing on x-ray. Once your doctor has determined that the bone has sufficiently healed, running and jumping activities may be gradually reintroduced. The final stage is to incrementally return to play with practice sessions, scrimmages and, finally, games or meets.

Prevention

Ask your doctor how to avoid stress fractures during your preparticipation exam or annual physical. You may discuss nutrition, exercise guidelines, appropriate footwear, and supplements (like vitamin D and calcium). If there are any other risk factors, such as menstrual irregularities in female athletes, this can be further evaluated and treated—before a stress fracture develops. Being aware of the early warning signs of a stress fracture can also help reduce injuries.

NOTES

The information contained in this publication should not be used as a substitute for the medical care and advice of your health care professional. There may be variations in treatment that your health care professional may recommend based on individual facts and circumstances.

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