



Overuse Injuries in Adolescent Athletes

What Athletes Should Know to Prevent Overuse Injuries

What is an overuse injury?

An overuse injury is caused by “doing too much.” The continual stress placed on the body during physical exertion causes the breakdown of tissue, whether it is bone or tendon. When athletes’ demands on their bodies surpass their physical ability, overuse injuries arise, such as stress fractures, tendonitis, and bursitis.

What is a stress fracture?

A stress fracture is a microfracture in the cortex (outside layer) of bone that is a result of repeated physical stress placed on the skeleton that exceeds its capability to remodel for support. Stress fractures differ from regular fractures because they develop over time rather than from one trauma. They often occur in the weight-bearing bones of the lower leg and foot. Stress fractures are the most serious type of overuse injury.

How do these injuries develop?

Stress fractures often occur when muscles become exhausted from excessive force and begin to transfer weight onto the bone. This leads to weak sites in the bone that, with repetitive activity, will become stress fractures. This can occur as the result of a sudden increase in the intensity of training, which suddenly demands too much from bones that are not used to repetitive stress. A change in equipment, such as footwear, or in playing surfaces, such as from grass to turf, can serve as the variable that also causes stress fractures.

What are the symptoms of overuse injuries?

Athletes with stress fractures usually complain of pain that seems to worsen over time. This is the first signal that the bone cannot withstand the physical stress to which it is being subjected. This pain is often felt at the time of impact. Pressing on the site of a stress fracture will elicit great pain, and there may be swelling around the affected area. As activity is modified to eliminate discomfort, the pain associated with a stress fracture should subside.

Who is most susceptible to stress fractures?

Medical studies have shown that female athletes are more susceptible to stress fractures. This is attributed to the more frequent occurrence of reduced bone density, eating disorders, and

infrequent menstrual cycles in women. Because of the repetitive stress of landing on a hard surface, athletes who participate in running sports and repetitive loading sports, such as ballet and figure skating, have a greater risk of developing stress fractures.

Adolescents are especially susceptible to stress fractures because their bones are expected to support more weight while participating in more rigorous activity. In addition, growth plates (regions of developing cartilage in children's bones that act as centers of the rapid cell production) are especially susceptible to stress fractures, which increase the risk of injury in young athletes. Although all of these factors increase the risk of injury, conditioned athletes also can sustain stress fractures.

What do I do if I develop a stress fracture?

If a stress fracture is suspected, a physician should be consulted to rule out, through physical examination or diagnostic imaging, the possibility of a more serious injury. Like other overuse injuries, the basic treatment of stress fractures involves relative rest and avoidance of all activities that aggravated the injury, while maintaining fitness by engaging in pain-free activity. The amount of recovery time depends on the seriousness of the injury, but most stress fractures heal within 6 weeks. Recognizing the risk factors and modifying behavior accordingly are key factors in the healing of an overuse injury. Resuming full participation in athletics should be a gradual process so that the bone can properly adapt to the increased load. During this process, applying ice, elevating the injured area, and applying compressive wraps will reduce discomfort and inflammation.

How can these injuries be prevented?

Overuse injuries can be avoided by following safe training procedures. This can be achieved by exercising according to the following guidelines:

- *Gradually increase the intensity of training.* Many overuse injuries occur because of a sudden increase in the intensity in training. Effective muscle strength increases at a faster rate than bone strength, which can create an imbalance that causes injury if exercise is increased too rapidly. Athletes should focus on allowing their bodies to adjust to more strenuous activity to avoid exceeding their physical capability.
- *Use proper equipment.* Wearing equipment that will add support to your body during activity is very important. Runners should make sure to wear sneakers that are not worn out, so that they have adequate shock absorption that will protect their bones from overuse injuries.
- *Include calcium in your diet.* It is important to keep bones strong and capable of withstanding the pressures placed on them.
- *Maintain appropriate muscle strength.* Proper conditioning will provide muscular stability to the bone during activity. Imbalance in muscle strength can lead to overuse injuries, so uniform strengthening of all muscle groups should be practiced.

Athletes should pay close attention to the physical limitations of their bodies by quickly responding to pain and allowing rest when needed. It is important to recognize injuries at their earliest stages and to treat them appropriately so that play is not impeded.