



Lake Forest High School

Athletic Trainers
1285 N. McKinley Rd.
Lake Forest, IL 60045
(847)582-7397
(847)582-7793 fax

Overuse Injuries: Stress Fractures, Shin Splints, and Tendonitis

Background

Overuse or repetitive stress injuries occur when the demands being placed on the body's structures exceed the body's ability to adapt. Normally, the body follows the SAID principle: Specific Adaptations to Imposed Demands. When you apply a stress to the body's tissues, they respond by growing stronger. If stress is removed completely, they may actually get weaker. But if the stress is too high, or if the change is too rapid, it can increase past the point at which the tissues can adapt, and they begin to break down.

The sports medicine community has seen a great increase in overuse injuries at much earlier ages than we've seen in the past. This is generally being attributed to two causes:

- 1) Overspecialization makes it harder for the body to adapt and rest. In the past, an athlete might be very active year round, but doing different sports. This allows the body to recover from the specific stresses involved in one sport while the athlete is competing in another with a different set of stresses. When an athlete does the same sport year round, the stresses don't change but accumulate, leading to overuse injuries.
- 2) Young athletes are often overscheduled, i.e. doing too many things at once. This is somewhat related to the overspecialization mentioned above. An example we commonly see in the athletic training

room at LFHS are girls during the winter season who are on the LFHS basketball team and playing club volleyball. Often they'll have a couple of days during the week where they practice basketball, have a half hour or hour break, then practice volleyball for their club team. Then at the end of the week, on the one day they have off from basketball (Sunday), they compete in an all day volleyball tournament. Thus the body doesn't get adequate rest, and overuse injuries develop.

Basic Treatment

The basic treatment for an overuse injury can be divided into three phases:

- 1) The overuse must be reduced to a level that allows the body to heal itself. Various therapeutic measures can be taken to help reduce the inflammation during this phase, such as ice, stretching exercises, electrical stimulation or ultrasound treatments.
- 2) The body must be better prepared for the stress that's going to be placed on it. Flexibility and strengthening exercises will help eliminate muscle imbalances or weaknesses. Orthotics and/or protective tapings maybe useful while the body is strengthening.
- 3) Begin a gradual progression back to full activity. There may be some overlap between this phase and the second.

Shin Splints

Shin splints is actually not “a” condition, it’s a non-specific term that applies to lots of conditions. It does not specify which particular tissue is inflamed, but is typically reserved for soft tissues as opposed to bone injuries. No two cases are exactly the same, and the specific cause and treatment will vary from one case to another. The first step is a thorough evaluation to try to identify the underlying factors that may be causing or exacerbating the situation for a particular patient, determine which specific tissues are involved, and screen the athlete for a stress fracture which may be hiding behind the “shin splints”. Some possible factors include the nature of the activity, surfaces, recent changes in surfaces, footwear, foot structure and gait pattern, level of musculoskeletal conditioning, and muscular imbalances (just to name a few).

The treatment for shin splints may involve a certain amount of trial and error. What works for one person may not work at all for another. The athletic trainers always start with what the research and our experience tells us is most likely to work based on the factors we’ve identified. Then if that doesn’t do it, we move on to the second most likely to work treatment, etc. We’ve had some cases where it was the sixth thing that finally did the trick. Generally treatment for shin splints will involve ice and/or cold whirlpools, stretching, additional cushioning in the shoes or possibly even new shoes, arch taping or orthotics to control overpronation (or arch padding to support an overly high arch), and reducing the impact load with bicycling or running in the swimming pool.

Stress Fractures

Stress reaction is probably a better term than stress fracture, as there is usually not a true break (fracture) in the bone. This condition is more an imbalance of a normally occurring process. One type of bone cell is constantly reabsorbing (breaking down) the bone, while another type of cell is constantly forming new bone. The build-up process is usually even with or ahead of the breaking-down, with the body adjusting in response to the demands placed on the bone. If stress is removed completely, the bone actually gets weaker. When the stress on the bone increases, the bone gets stronger – to a point. If the stress on the bone increases too much, the building-up cannot keep up, and the bone begins to break down. Think about an empty aluminum can. If you start bending the can from side-to-side, at first it does just that – it bends. As you keep flexing it back and forth, microscopic cracks begin to develop. Keep going, and those cracks become visible. Eventually, a true fracture occurs and the can breaks apart.

The most common locations for stress fractures are the tibia (the main shin bone) and the metatarsals (the long bones in the middle of the foot). Stress fractures also are seen in the femur (thigh bone), fibula (bone on the outside of the lower leg), and spinal column.

Treatment is similar to that for shin splints, but will involve a longer period of reduced stress on the bone. One problem to avoid is re-aggravating the condition because it felt “too” good. By that we mean testing it as soon as it feels better, rather than waiting for the healing process. Depending on the specific bone and severity of the injury, this could take anywhere from a couple of weeks to a couple of months. If the athlete tries to “run thru” a stress fracture, they’ll most likely just prolong the injury and total time their performance is affected. In some cases they’ll turn a non-surgical injury into a surgical one.

Tendonitis

Tendonitis is an inflammation of the connective tissue which connects the muscle to the bone (tendon). Tenosynovitis is an inflammation of the membrane which surrounds the tendon. They are very similar, as is their treatment. These are caused by many of the same stresses and exacerbated by many of the same factors of other overuse injuries such as shin splints. One sign of significant inflammation is snowball crepitus (a “crunching” is felt when the tendon moves thru its sheath, similar to the feel of compressing a snowball in your hands). Two of the most common locations for these conditions are the Achilles’ tendon, which joins the calf muscles to the heel, and the patellar tendon, which joins the thigh muscle to the shin bone with the kneecap (patella) imbedded within it.

The treatment is similar to that for shin splints, and fits into the same phases discussed in Basic Treatment. The stress on the tendon needs to be reduced, perhaps thru bracing or taping alone, or with a reduction in physical activity. Ice and/or cold whirlpools and stretching may be helpful, as may be other therapeutic modalities such as ultrasound or electrical stimulation. Many of the same exacerbating factors found in shin splints may be at work, or other factors such as biomechanical abnormalities, improper sports technique, etc. Muscular imbalances will need to be corrected with strengthening exercises (after the initial inflammation is reduced). Depending on the specific tendon involved, there may also be a variety of tapings or braces which may be helpful.

One additional consideration is plyometric training, which involves an eccentric (lengthening) load on the tendon. This can be a problem for someone with chronic tendonitis. They may need to reduce the load by lowering the height of the plyometric box, decreasing the duration of each session, or decreasing the frequency of sessions. Some individuals find they just can’t do plyometrics.