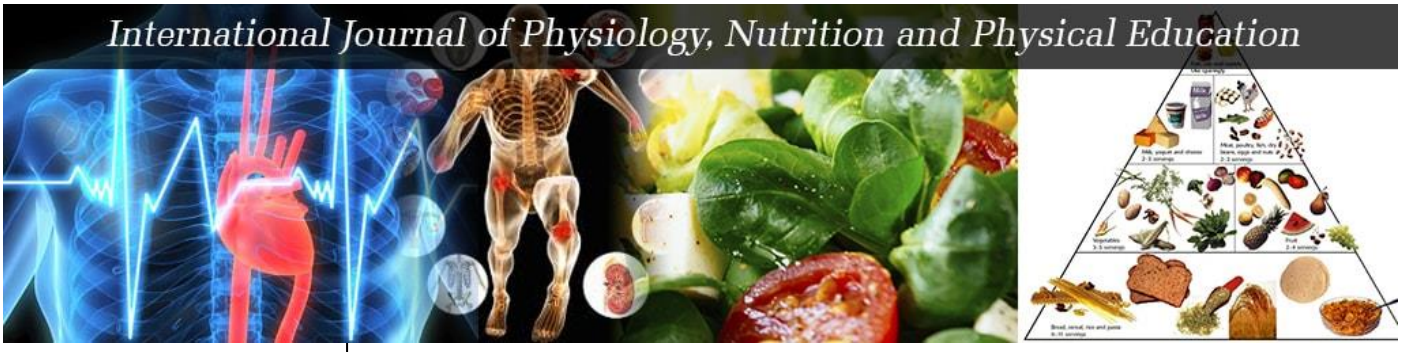

ISSN: 2456-0057
IJPNPE 2018; 3(1): 1912-1914

www.journalofsports.com
Received: 16-11-2017
Accepted: 17-12-2017

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The shin bone injury: A snag for youth athletes

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Abstract
The purpose of this paper is to know the reasons of Shin Bone Injury and to get rid of this problem, especially for Youth Athletes. The painful shins, also called Medial Tibia Stress Syndrome, which is simply an inflammation along the inner side of the shin bone, is a result of fatigue and trauma to the muscle tendons, where they attach themselves to the tibia. In an effort to keep the foot, ankle and lower leg stable, the muscles exerts the great force on the tibia. This excessive force can result in the tendons being partially torn away from the bone. Physiologically, it's an inflammation of the tendons or muscle in this area. Through this article the writer put an effort to guide the Athletes, Coaches and Physical education teachers to follow the under mentioned guidelines to know the causes, symptoms, preventions, rehabilitative exercises and treatment for Shin Bone Injury to the athletes.

Keywords: Shin bone injury, snag, youth athletes

Introduction
Being a track and field coach working with different schemes of SAI and actively involved with National camps dealing with the elite athletes of the country for last 25 years. I have always been finding the athletes especially the youths suffering with lower leg injuries, commonly the shin bone. This practical and common problem of the athletes encouraged me to write this article.

The most common injury for beginner runners is Shin Splints-Painful shins, also called Medial Tibia Stress Syndrome, which is simply an inflammation along the inner side of the shin bone. There are two bones in the lower leg. The tibia is situated on the medial or inside of the lower leg, while the fibula is situated on the lateral, or outside of the lower leg. There are also a large number of muscles that are attached to the tibia and fibula. It is these muscles, when overworked; the pain associated with shin splints is a result of fatigue and trauma to the muscle tendons where they attach themselves to the tibia. In an effort to keep the foot, ankle and lower leg stable, the muscles exerts the great force on the tibia. This excessive force can result in the tendons being partially torn away from the bone. Physiologically, it's an inflammation of the tendons or muscle in this area.

The medial tibia shin bone injury also associated with the raising the arch of the foot attaches to the shin bone at that spot. When the arch collapses with each foot strike, it pulls on the tendon that comes from this muscle. With repeated stress, the arch begins to pull some of its muscle fibres loose from the shin bone. This causes small areas of bleeding around the lining of the bone, and that results to pain.

The other common injury of the lower leg is Stress Fracture- These are small cracks in the bone caused by repetitive stresses or overuse, such as the repetitive impact on the bones of the lower leg and foot during running and jumping activities. This injury commonly occurs in the weight bearing bones of the feet and lower legs. When bones are subjected to stresses they adapt, just as muscles do, to become stronger. To increase in strength they must rob calcium from one area to build another. This weakens that area and new, repetitive, stresses on that weakened area can cause a crack. This fracture is result of the bones inability to handle the stress overtime.

Increases in intensity, duration or frequency can lead to stress fractures due to the process of repair and rebuilding being interrupted. The bones need adequate rest time to rebuild and restructure, if unable to repair, the bone will weaken and become susceptible to fracture.

Treatment must be initiated as soon as possible to prevent further damage and a more severe fracture. Athletes in any sport can fall victim to stress fractures if their form, posture or technique is incorrect or conditions change without a chance to adapt. Changing playing surfaces or using worn shoes, with poor support, can increase the risk as well increasing training loads too quickly or changing intensity without a period of time to adapt will make athletes more susceptible.

The tibia (the larger of the two bones in the lower leg, referred to as the shin bone) is the bone involved in the highest percentage of stress fractures, the fibula (the other lower leg bone) the metatarsals (the long bones extending from the heel to the toes) and the femur are also commonly involved.

Causes

The injuries are caused when repetitive stresses are applied to weakened bone. This is a chronic injury which means that does not happen from a one-time event, but over an extended period of time. The muscles are designed to act as shock absorbers during impact activities. They take the stress off the skeletal system and the internal organs. When the muscles become fatigued due to a workload that is more than they can handle, they will no longer be able to work as shock absorbers. The load is then transferred to the bones. The force is transferred through the bone until it reaches a weak area where it causes a small inflammation or crack. Over time that develops in to a stress fractures.

When the human body is subjected to a slight increase in workload it will adapt by getting stronger. The bones, tendons and muscles will all change to handle the load, if the workload is increased too quickly the body is unable to adapt quick enough and the stress is transferred to the foundation of the body (the skeletal system) if there is a weakness in any part of the body this increases in stress will cause it to succumb to the pressure and crack. This process is known as the overload theory. The other possible causes are:

1. Poor arch of the foot
2. Running with the weight too far forward
3. Striking the ground with the first third of the foot
4. Over striding
5. Over pronation
6. Shoes too tight around the toes
7. Inflexible shoes
8. Weak arches may be present
9. Tight calf muscles stress the shin structures
10. Muscle imbalances
11. Beginner runners are very susceptible
12. Overtraining is its trademark; especially
13. Increasing mileage too quickly
14. Running on hard surfaces
15. Too much speed work, too early, on hard surfaces
16. Excessive uphill or downhill running

Biomechanical inefficiencies

1. Flat feet
2. Poor running mechanics
3. Running with excessive forward lean
4. Running with excessive backward lean
5. Landing on balls of the foot
6. Running with the toes pointed outwards

Symptoms

1. Pain usually increases with weight bearing activities and diminishes with rest. The pain is most sever at the beginning of the activity then subsides in the middle of the activity and increases in severity near the end.
2. Swelling and tenderness.
3. Bruising in the injured area.

Prevention

1. Prevention rather than cure should always be the first aim. Since about half of all lower leg problems are caused by biomechanics inefficiencies. So the proper advice on footwear should be emphasized with the help of qualified podiatrist for a complete foot strike or gait analysis. Good quality of foot wear will help the athlete to prevent many lower leg problems. Replace shoes every 300-400 miles. Use a heal pad to reduce jarring, along with arch supports or padding if necessary.
2. Do not make a sudden increase in training or run too fast too soon. Balance your training. Gradually increasing workloads at a rate of no more than 10% a week and varying the training by using cross training techniques will help to offset the overload and repetition often associated with stress fractures.
3. The concrete surface is a six times harsher to your shin tissues than asphalt. Asphalt is 3 or more times harsher than packed dirt trails. Grass and mud trails are still softer and significantly decrease your risk of shin splints/ stress fracture.
4. The shin muscles works against the large calf muscles, since it is the last muscle to warm up and the first to cool down, keeping with this in mind, do an exercises to build them up.
5. Thorough and proper warm up will help to prepare the muscles and tendons for all type of activity to come.
6. Incorporated the systematic flexibility exercises of the lower leg
7. Gradually strengthening and conditioning exercises of the lower leg muscle.
8. Nutrition is another important preventive measure for lower leg bone injury. Increased nutritional intake of calcium and vitamin D will assist in bone growth and regeneration.

Prevention and Rehabilitative exercises

Here some of the suggestive strengthening and flexibility exercises around the shin bone, in the ratio of 3:1 that is 3 parts of planter flexor and 1 part of dorsi flexor exercises.

a. Walk on ball of the foot (10m. x 3 times)
b. Walk on the heels (10m. x 3 times)
c. Calf stretch (Hold for 10 sec. x 3 times)
d. Dorsi flexor stretch (Hold for 10 sec. x3 times)
e. Heel raise for 20 counts x 3 times (strengthening effect)
f. Dorsi flexor pull with the help of elastic rope or partner (strengthening effect)
g. Finger walk of the foot, for the strengthening of the sole of the foot-the planter fascia (2-3m x 3 times).

Treatment

Rest is the first step in treating a lower leg bone injury and resting the injured area is essential. Ice and elevation are also important in short term treatment. Over the counter non-steroidal anti-inflammatory medicines will help as well. The supplementation of calcium is very essential for bone.

The injury due to poor arch of the foot can be overcome by arch support to prop up the foot and prevent excessive pronation and pull on the tendon. Many people do well with a simple commercial arch support. This usually solves the

problem may need an orthotic devise to control the pronation.
For minor stress fractures simply resting and avoiding the offending activity until pain is eliminated may take care of it. However if the pain returns after re-starting the activity it may be necessary to see a medical professional.
Another helpful method for improvement of recovery is the use of ultrasound and heat. Ultrasound simply uses a light electrical pulse to stimulate the affected area. While heat, in the form of a ray lamp or hot water bottle is very effective in stimulating the damaged tissues.
Some stress fractures require immobilization or reduction of weight bearing stress. An air cast, immobilizing boot, or even crutches may be required. It is important to keep active, during the rest period with no-impact activities, such as swimming, biking or weight training. This will make the return to activity less painful.
When it is time to return the activity, usually 4-8 weeks after the injury, it is important to work back gradually and identify the error that originally caused the injury and avoid the same mistakes.
Use ice for initial swelling. Flexibility work-stretch pre and post exercises.
And off course don't forget to consult with training expert during all course of the training.

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