

Shin Splints and Stress Fractures



Quiz Policies

Eligibility

The NCSF online quizzes are open to any currently certified fitness professional, 18 years or older.

Deadlines

Course completion deadlines correspond with the NCSF Certified Professionals certification expiration date. Students can obtain their expiration dates by reviewing either their certification diploma or certification ID card.

Cancellation/Refund

All NCSF continued education course studies are non-refundable.

General Quiz Rules

- You may not have your quiz back after sending it in.
- Individuals can only take a specific quiz once for continued education units.
- Impersonation of another candidate will result in disqualification from the program without refund.

Disqualification

If disqualified for any of the above-mentioned reasons you may appeal the decision in writing within two weeks of the disqualification date.

Reporting Policy

You will receive your scores within 4 weeks following the quiz. If you do not receive the results after 4 weeks please contact the NCSF Certifying Agency.

Re-testing Procedure

Students who do not successfully pass an online quiz have the option of re-taking. The fees associated with this procedure total \$15 (U.S) per request. There are no limits as to the number of times a student may re-test.

Special Needs

If special needs are required to take the quiz please contact the NCSF so that appropriate measures can be taken for your consideration.

Quiz Rules

What Do I Mail Back to the NCSF?

Students are required to submit the quiz answer form.

What do I Need to Score on the Quiz?

In order to gain the .5 NCSF continued education units students need to score 80% (8 out of 10) or greater on the CEU quiz.

Where Do I Mail My Quiz Answer Form?

You will mail your completed answer form to:

NCSF
Attn: Dept of Continuing Education
P.O. Box 163908
Miami, FL 33116

How Many CEUs Will I Gain?

Professionals who successfully complete the any continuing education quiz will gain .5 NCSF CEUs per quiz.

How Much does each quiz cost?

Each quiz costs the student \$15.00.

What Will I Receive When The Course Is Completed?

Students who successfully pass any of the NCSF online quizzes will receive their exam scores, and a confirmation letter.

How Many Times Can I Take The Quizzes For CEUs?

Individuals can take each NCSF quiz once for continuing education credits.

Shin Splints and Stress Fractures

A common ailment that affects physically active people is shin splints. Or at least that is what is blamed for the localized pain and discomfort of the anterior portion of the lower extremities. Actual shin splints, traction periosteitis, is a condition caused by inflammation of the fibrous covering of the periosteum of bone and the attached muscle fibers. Common symptoms include pain, tightness, and discomfort which may be accompanied by swelling of the lower leg. Improper foot wear and repeated pounding on hard surfaces are common aggravators. So it is not uncommon for persons who engage in activities such as running, basketball, or tennis to experience the problem. But there may be more to it than soft tissue inflammation.



As alluded to in the first paragraph the term shin splints is assigned to any discomfort of the distal anterior portion of the lower limb. But the pain and discomfort may actually be something more severe. Often disguised as shin splints, microscopic fractures occur when muscles become fatigued and lose the capacity to absorb the added shock. Unable to manage the stress, the muscle transfers the work load to the bone. Subsequently, an overload of stress applied to the bone compromises the tissue.

When the bone tissue cannot withstand the additional stress it experiences small incomplete fractures. Often appearing as small cracks on an MRI or bone scan, these fractures seem to most commonly occur in the load-bearing structures. The bones that seem to be particularly susceptible to this type of injury are the tibia, metatarsals, and pelvis. Stress fractures, though, can affect almost any bone in response to excessive stress or overuse. As with shin splints, most stress fractures are sustained during activities involving repetitive foot striking such as running. Distance runners experience the greatest incidence of this type of injury.

Load-bearing exercise, meaning exercise which puts stress forces on bones, has been shown to increase bone density thereby helping to prevent weak bones, fractures and the development of osteoporosis. However, the stressors must be applied in a rational and well-timed manner. Continuous heavy use, day after day, is counterproductive and will gradually weaken bone. Bone requires time to respond to increased work loads. Aggressive doses of stress cannot be managed effectively and are a major contributor to injury.

In bone, two types of cells are active. When bone is used, cells and structures deform and are in need of replacement. Osteoclasts dissolve bone and release the mineral components for recycling. Following these activities, osteoblasts begin to lay down new material. Initially, osteoclast activity is greater than that of the osteoblasts, creating a deficit that the osteoblasts will need to make up. With the proper timing of exercise bouts and appropriate recovery, the osteoblast activity gradually builds up the thickness

of the bone. This improves the integrity of the system, allowing a reduced risk of skeletal problems.

Overuse is considered to be one of the major causes of stress fractures. The effects of overuse are due to many different exercise factors. Runners often increase the mileage they run too quickly, which leads to injury. Training on hard surfaces or with inappropriate foot wear may also present unmanageable stress. Too many hard days in a row or not allowing adequate recovery, can lead to accumulative distress. Although unusual, a single overly aggressive workout can be the trigger for this type of injury. This is often attributed to muscle imbalances, in addition to the exercise stress.

Avoiding overtraining syndrome involves employing a well-designed exercise plan and adhering to it. Monitoring the body's response to the stress is also important. If the signs of fatigue and the need for greater rest indicate the recovery periods are not managing the stress effectively, the exercise components may need to be adjusted.

If training demands were the only factor leading to stress fractures, control of this injury would be relatively easy. Unfortunately, there are many other factors that may contribute to or detract from bone health. Another important consideration related to bone stress is the mineral composition. Calcium, the key mineral component of bone is commonly under consumed by both children and adults alike. One reason may be that milk consumption is only 1/3 of what it was twenty years ago.

Calcium levels are important, but they are not the only nutritional deficit which will lead to stress fractures. Inadequate caloric intake and general lack of sufficient nutrients and amino acids may be a factor. This is particularly true for females. Low calorie diets combine with excessive exercise is a common combination that increases susceptibility to stress fractures. Additionally, eating disorders may lead to estrogen deficiencies, which have been linked with osteoporosis (female triad). Today, there are 800x the number of female athletes compared to the 1970s. In a survey of female collegiate distance runners, a decided majority demonstrated strong tendencies toward eating disorders. These individuals have a propensity for excessive exercise while getting inadequate levels of calcium and other nutrients, which helps explain why stress fractures among female athletes are near epidemic proportions.

The female triad may provide some clarity for that particular population, but it does not explain stress fractures in healthy male and female athletes or the fitness enthusiasts who train wisely and follow all the appropriate guidelines. For these populations muscle imbalances may be the unknown or overlooked cause of stress fractures. The greatest force on any bone during activity is muscle contraction. With muscles acting synergistically, an extreme imbalance over time will place unequal stress forces on bone attachments. Stress imbalances repeated thousands of times, on easy days as well as hard days of training can create significant distress. The probable end result is a stress fracture.

The initial sign of a stress fracture is significant pain during activity. Usually the pain becomes localized to a single point along the bone. X-rays may not show any problems during the first weeks of a fracture but a bone scan or MRI will pinpoint the injury. Later X-rays will display calcification during the healing process.

Recovery always involves rest until the bone heals. Depending on the individual and the severity of the injury (and many of the habits which produced the stress fracture initially), recovery may take anywhere from 6 weeks to 6 months. Obviously, for the athlete or exerciser who wishes to remain productive, the prevention of stress fractures is the desired choice. Here are some guidelines for preventing shin splints and stress fractures:

1. In starting an exercise program, be conservative. Outline the training regimen based on valid criteria and plan progression appropriately. Human physiology adapts at a fairly set pace so increasing training beyond that rate does not make sense. Stick to the plan and monitor results.
2. Use good equipment. Wear supportive shoes designed for your particular style of running and your biomechanics.
3. Monitor calcium intake. If necessary supplement 1000-1200 mg/day to ensure that adequate calcium levels are maintained. Since calcium is only absorbed in 500 mg quantities, smaller supplements should be taken more than once daily.
4. Employ good nutritional habits. Maintain a healthy body composition.
5. If excessively sore, allow more recovery time.
6. Test for muscle imbalances and use resistance training and flexibility exercises to correct these deficiencies.
7. Train on forgiving surfaces. Hard uneven surfaces can be problematic.
8. Treating shin splints: Rest from high-impact activities is usually the recommended treatment, along with using ice packs, warm soaks, protective wraps, and anti-inflammatory medications. Sometimes physical therapy can be helpful.

Quiz

1. What is a shin splint?
 - a. a crack in the bone from impact trauma
 - b. spider fractures from repeated stress
 - c. inflammation of the tissue where the muscle attaches to the bone
 - d. deep tissue bruise which causes swelling

2. Stress fractures are usually diagnosed by _____?
 - a. palpating the area
 - b. MRI
 - c. discoloration in the area
 - d. localized heat

3. Deficiency in _____ is linked to bone weakness?
 - a. potassium
 - b. chloride
 - c. calcium
 - d. zinc

4. Which of the following is linked to the development of shin splints?
 - a. low calorie diet
 - b. calcium deficiency
 - c. running on hard surfaces
 - d. resistance training

5. Which of the following can contribute to stress fractures?
 - a. overtraining syndrome
 - b. rapid increases in training intensity and volume
 - c. nutritional deficiencies
 - d. all are contributing factors

6. How can stress fractures be avoided?
 - a. use well constructed exercise programs
 - b. increase caloric intake
 - c. use arch supports
 - d. all of the above

7. What applies the greatest force on the bone during activity?
 - a. ground impact when running
 - b. ligament tension
 - c. muscle contractions
 - d. articular surface friction

8. What cells rebuild bone tissue?
 - a. osteocytes
 - b. osteoclasts
 - c. osteocytes
 - d. osteoblasts

9. Why are women more susceptible to stress fractures than men?
 - a. men have stronger muscles
 - b. women use higher training intensities
 - c. women have a higher incidence of nutrient deficiency
 - d. men usually do more weight training

10. What is the first step to recovery from stress fractures?
 - a. rest
 - b. increase calories
 - c. decrease running speeds
 - d. stop performing plyometrics

Quiz Answer Form

FIRST NAME _____ LAST NAME _____ M.I. _____

TITLE _____

ADDRESS _____ APT. _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

COUNTRY _____ POSTAL CODE _____

CERTIFICATION NO. _____ CERTIFICATION EXP. ____/____/____

MEMBERSHIP NO. _____ MEMBERSHIP EXP. ____/____/____

Quiz Name	Member Price	Total
	\$15	



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Account No. _____

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Signature _____

Date _____

Quiz Answers

- | | |
|----------|-----------|
| 1. _____ | 6. _____ |
| 2. _____ | 7. _____ |
| 3. _____ | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

Fill in each blank with the correct choice on the answer sheet. To receive 0.5 CEUs, you must answer 8 of the 10 questions correctly.

Please mail this Quiz answer form along with the proper enclosed payment to:

NCSF
P.O. Box 163908
Miami, FL 33116

Questions? 800-772-NCSF