

## Stress Fractures in the Female Athlete



*Female athletes may be at risk for stress fractures as a result of biomechanical, endocrinological and nutritional factors.*

A recent topic of increased interest in the sports medicine world has been the amount of stress fractures that seem to be occurring in the competitive female athlete.

The definition of a stress fracture is a partial to complete fracture of bone due its inability to withstand repeated non-violent stresses. When a bone is stressed in this manner, the bone responds by trying to adapt its form and function to meet the external stresses placed upon it. A stress fracture occurs when the rate of healing is unable to keep up with the rate of breakdown that is being caused by the repetitive stress placed upon it.

Athletes with a stress fracture commonly complain of very specific point tenderness directly on a bone that gets worse while running and improves with rest. They are most susceptible at the beginning of a sport season due to the rapid increase in physical activity that is required of them at this time. Stress fractures are treated with rest from impact activities for about 6-8 weeks or whenever pain-free running is possible.

The three main causes of stress fractures are biomechanical problems, endocrinological problems and dietary problems. We are all familiar with the biomechanical causes of stress fractures such as running on hard surfaces, improper footwear, and malformation problems such as forefoot

hyperpronation, rearfoot valgus, cavus (high arch) and planus (flat arch) deformity of the feet. These problems are a cause of stress fractures in both the male and female athlete. The key to the rise in stress fractures in females is proving to be secondary to the endocrinological and dietary problems that commonly occur in the female athlete.

It is essential that female as well as male athletes wear the proper athletic shoes for their sport and their level of training. In general, it is a good idea to replace your training shoes each sport season or every six months. Even if the shoe does not look worn, a large portion of the shoes ability to support your foot and absorb shock is diminished as the material in the shoe breaks down.

In addition to simply getting new shoes, it is essential that those athletes who have a planus (flat foot) purchase shoes that support the arch very well. If an athlete with these foot types has ongoing problems with medial lower leg and knee pain or a history of stress fractures, it would be wise for them to consult with a sports medicine physician or a podiatrist about obtaining either custom or non-custom arch supports/orthotics. This intervention can drastically change the discomfort associated with training in these individuals as well as preventing future stress fractures.

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When biomechanical issues are determined to be a likely cause for a stress fracture, proper flexibility and strengthening exercises for the lower leg and ankle are just as important as proper footwear. A gradual progression into training is also much more important for individuals with biomechanical problems.

There is considerable evidence to support endocrinological disorders as a predisposing factor for stress fractures. One pertinent study performed by Barrow and Saha evaluated 240 female distance runners. They noted that women with very irregular menses (0-5 per year) had an incidence of stress fractures of 49 percent. Those with irregular menses (6-9 per year) had a 39 percent occurrence, while those with regular menses had an occurrence of 29 percent. Another study by Lloyd and Triantafyllou reviewed 207 female athletes and found that those individuals with absent or irregular

menses had an incidence of 24 percent while those with regular menses had a 9 percent incidence of stress fractures. A recent study by Bennell et al., showed that restrictive dietary patterns and eating disorders are also a causative factor in the occurrence of stress fractures.

The reason stress fractures occur more frequently in amenorrheic females is due to a decrease in the rate of estrogen production. This causes a decreased absorption of minerals in bone which decreases the bone mineral density and thus causes a decreased ability of the bone to withstand the repeated micro-trauma induced by competitive athletics. Likewise, poor nutritional habits hinder the ability of bone to repair and maintain itself because the components needed in the healing process are not present in sufficient quantity. In both cases, stress fractures are often the inevitable result in a female that is training very competitively.

These athletes are commonly helped by estrogen replacement therapy designed to normalize and/or restore normal estrogen levels, and also by dietary counseling. Coaches, athletic trainers, and parents usually become aware of these problems first and should encourage their athletes to see a sports medicine physician for monitoring, counseling and treatment as deemed necessary.



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## References

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