

RESOURCE CENTER - January 15, 2004

As part of our continuing effort to service and educate our membership, each Thursday U.S. Soccer will provide an informative article from one of its departments. Once a week, we will bring you an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.

This month, Drs. Thomas P. Knapp and Bert R. Mandelbaum, who work with U.S. Soccer's National Teams, look at stress fractures.

Stress Fractures

by Drs. Thomas P. Knapp and Bert R. Mandelbaum

While they account for just two percent of all soccer injuries, stress fractures are an injury concern among soccer players at all levels. At the national team level, nine of the 24 members of the 1994 U.S. World Cup team had a history of stress fractures.

The injury is nothing new. Originally noticed in soldiers as early as 1855, they were originally referred to as march fractures. Stress fractures were first mentioned in sports medicine in 1958.

Stress fractures seem to be a result of training on hard ground, poor shoe design, training errors and over-training. The repetitive stress of these activities causes the outer layer of bone (periosteum) to be broken down faster than it can be rebuilt. The cortex underneath weakens, leading to a stress fracture that cannot be seen by X-ray until it starts to heal. The fracture is part of a continuum of bone injury: stress reaction to stress fracture to the underlying bone damage that is visible by X-ray.

The risk of stress fracture increases with an increase in the amount of training. Stress fractures are more common with year-round training, and is evident in the high incidence of this injury in the warm weather states of California and Florida where all-season training is possible.

In soccer, an increase in training is almost always the reason for these injuries. Symptoms start out as a dull, gnawing pain, usually toward the end of a workout, and will gradually increase over two to three weeks. Early on, pain subsides with rest, but as time progresses, pain occurs earlier in exercise and persists long into the recovery period. The intensity of the pain increases over time until a point where running cannot be tolerated. Eventually, pain will continue into the night. Rest and days off can reduce the pain, but symptoms return with a resumption of training.

The tibia is the most common location of all stress fractures, but in soccer players, the most common fractures occur in the second and fifth metatarsals, tibia, fibula, femur and hip. Fractures in the femur and tarsals are common in older athletes, while the tibia and fibula are most common in young athletes. Research has shown that the incidence is similar between boys and girls under age of 16, but they appear more often in adult women than adult men.

In treating the injury, adequate nutrition is a vital consideration for both men and women. Additionally, female athletes may need supplemental calcium intake. Also, menstrual patterns need to be determined during treatment for possible estrogen supplementation. Among females with several recent stress fractures, the existence of an eating disorder needs to be considered.

Stress causes the injury, so stress must be removed for healing. The healing can take six-eight weeks for the bone to adequately heal, depending on the site of the injury. Crutches should be used if there is a limp. Reevaluation takes place at six week intervals for provocation of pain and imaging. Once normal and pain free, the athlete can gradually return to training. If more conservative measures fail to produce results, surgery is an option.

Overall, stress fractures may be a small percentage of the injuries suffered in soccer, but with their six-eight week healing period they can knock players out for a long period of time.

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