Does your shoe wear help in preventing stress fractures?

Pinar Carus, Biomechanics, Fall 2005
INTRODUCTION

Stress fracture is another common condition occurring in active people. If you put too much stress through your foot and leg bones with activities such as running, walking and hiking, your bones can develop little cracks called stress fractures. These cracks in the bone cause redness, swelling and heat in your foot surrounding the area of the broken bone.

Many times the pain associated with this bone crack will keep you from your favorite activity, and even hurt during normal walking or throb while sitting.

The key to preventing the possibility of developing a stress fracture is by eating a healthy diet, which help keep bones strong. Another thing that helps is wearing properly fitted shoes, and socks, and gradually increasing the distances and effort levels in your chosen activity. Certain foot structures such as the rigid high arch, and the overpronating foot, are more likely to develop a stress fracture. For this reason, a foot checkup with your local podiatrist prior to engaging in a new walking, hiking or running program may keep you out of trouble.

BIOMECHANICS / MECHANICS / EXPLANATION

Most stress fractures occur in the weight bearing bones of lower leg and the foot. More than 50 percent of all stress fractures occur in the lower leg. The most commonly affected site is the second or third of the long bones (metatarsals) between the toes and the mid foot.

Stress fractures also can occur in the heel, the outer bone of the lower-leg (fibula) and the navicular, a bone on the top of the mid foot.

Improper sports equipment, such as shoes that are too worn or stiff, also contribute to stress fractures. Running shoes are usually selected to provide support, and counteract biomechanical deformities or deficiencies in the foot. Despite this, injuries such as shin splints, patellar tendonitis, and iliotibial band friction syndrome commonly plague runners. The shoe itself may often be the cause of the runner’s problem. For instance, during the stance phase, a shoe that tilts medially due to uneven wear will have a tendency to cause the foot to pronate excessively. If shoe tilts laterally, it may prevent pronation and prolong supination. This may lead to stress fractures in the foot or leg as well as anterior knee pain.

The gait cycle during running consists of a stance phase and a swing phase. The stance phase constitutes 60% of the gait cycle. Running is distinguished from walking by the flight phase the period when both feet are off the ground. During running, the lower limbs absorbs 1.6 to 2.3 times the body weight as speed increases from an 8:56 minute mile to a 5:22 minute mile. Studies are shown as running speed increases, peak forces of 2.5 to 3 times body weight are generated at heel strike. During a marathon, the body experiences over 25,000 heel strike impacts. This amounts to a tremendous load on the lower limbs. As a result most, if not all, running injuries occur during the stance phase.

The stance phase consists of heel strike, mid-stance, and push off. At heel strike the foot initially contacts the ground in a supinated position. As the foot continues to make contact with the ground during mid-stance, it pronates to absorb shock; minimizing ground reaction forces.
As we know, choosing improper shoe can result to have stress fractures. Thus, when using old or worn running shoes do not help in preventing stress fractures. The best way for using proper equipment. It is important to remember that if you recognize the symptoms early and treat them appropriately, you can return to sports at your normal playing level.

Table 1: GRF

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<td>The type of running shoe worn by an athlete can be a very important factor in the prevention and treatment of lower extremity overuse running injuries.</td>
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REFERENCES


2. Bruce R. Wilk: Director of Orthopedic Rehabilitation Specialist.


