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Stressed out

The importance of healthy bones

By Dr. Jordan D. Metzl, MD

Sara is a 26-year-old woman who came into my office complaining of foot pain. “Dr. Metzl,” she said, “my foot has been hurting these past few weeks. It started out that running was painful, but now it’s even sore when I walk.”

When I looked at Sara’s foot, several things were apparent. First, she limped slightly when she walked; second, she experienced a significant amount of pronation (rolling inward) of her foot; and third, she had a slight bit of swelling over the top of her foot. When I pushed on her foot, there was a focal spot of pain. “Ouch!” she said. “That’s the spot that’s been hurting. What is that?” she asked.

Sara’s foot pain was concentrated in her third (middle) metatarsal, one of five long, skinny bones in the foot that connect the tarsal bones to the toes. Her symptoms, combined with the physical examination, made me concerned she was developing a stress fracture: a crack in the bone that can occur when the demand placed on a bone simply exceeds the bone’s ability to withstand force.



Unlike a bone break, which occurs as a result of trauma, such as a twist or a fall, stress fractures develop over time due to repetitive loading. The symptoms of stress fractures include pain that worsens over time (limiting the sufferer’s ability to load the bone) and which is generally concentrated in one specific area. Tests, including X-rays and MRIs, are sometimes used to confirm the presence of stress fractures. However, stress fractures typically do not show up on X-rays unless they are very serious or already in the healing stage.

TREATMENT AND PREVENTION

There are three key factors to consider when an athlete develops a stress fracture. First, how much activity is he or she doing? Second, are body mechanics causing the problem? Third, is there a problem with bone density?

Activity: In Sara’s case, she was a novice-level runner who was following a training schedule for a fall marathon. She had missed a couple of weeks and wanted to catch up quickly. Despite the fact that her foot hurt a bit, Sara kept upping her mileage, and her body was unable to adapt quickly enough.

Mechanics: In Sara's case, her foot rolled inward (pronated), which has been correlated to an increased tendency to develop stress fractures in the hip, shin and foot. Although the mechanics of her feet were acceptable for shorter distances, once she increased the loading force on her bone through more training, she needed increased support. As with most patients, I initially tried her in a pair of over-the-counter orthotics for \$25. If these don't work (but they usually do), then we consider custom orthotics.

Bone density: The key issue for Sara was her bone density. In speaking with her, I learned that her mother and a grandmother both have osteoporosis (very low bone density), and Sara is lactose intolerant, so she hasn't been a good calcium consumer for years. In addition, she has a history of amenorrhea.

What does all this mean? Family history is strongly implicated in low bone density, so that is red flag No. 1. Calcium intake is important as well; generally, more than 1,200 mg per day is required. Menstrual irregularity, such as failure to start menstruating until later than age 16 or becoming amenorrheic for more than six months, is also linked to low bone density due to low levels of circulating estrogen.

Teenagers acquire 90 percent of their bone density for life by age 18, and women reach their maximum bone density by age 32. After that, unfortunately, it's more about maintenance.

So, what about Sara's bones? I sent her for a test called a DEXA, which is a painless way to measure bone density. In her case she had moderately low bone density (osteopenia).

So let's sum all this up: Sara's stress fracture was caused by a combination of rapidly increased training volume, poor foot mechanics and low bone density. To fix her, I pulled her from training for a month, had her cross-train (bike and swim) and sent her for a set of off-the-shelf orthotics. In addition, Sara now supplements with calcium and vitamin D and was recently able to return to running.

The take-home point of this story? Be good to your bones and they will be good to you, and if you develop a stress fracture, make sure you and your doctor treat both the causes and the symptoms. ▲

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