Low levels of vitamin D may increase risk of stress fractures in active individuals

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Vitamin D plays a crucial role in ensuring appropriate bone density. Active individuals who enjoy participating in higher impact activities may need to maintain higher vitamin D levels to reduce their risk of stress fractures, report investigators in *The Journal of Foot & Ankle Surgery*.

The role of vitamin D in the body has recently become a subject of increasing interest owing to its many physiologic effects throughout multiple organ systems. Vitamin D is an essential nutrient that can behave as a hormone. It is obtained through diet and through the skin when exposed to the sun's rays. It is essential for bone development and remodeling to ensure appropriate bone mass density. Low levels of vitamin D can lead to osteoporosis, osteomalacia, decreased bone mineral density, and risk of acute fracture.

Investigators tested the serum concentration of 25(OH)D, which is used to determine vitamin D status, in patients with confirmed stress fractures. "By assessing the average serum vitamin D concentrations of people with stress fractures and comparing these with the current guidelines, we wanted to encourage a discussion regarding whether a higher concentration of serum vitamin D should be recommended for active individuals," explained lead investigator Jason R. Miller, DPM, FACFAS, Fellowship Director of the Pennsylvania Intensive Lower Extremity Fellowship, foot and ankle surgeon from Premier Orthopedics and Sports Medicine, in Malvern, Pennsylvania, and Fellow Member of the American College of Foot and Ankle Surgeons.

The investigators reviewed the medical records of patients who experienced lower extremity pain, with a suspected stress fracture, over a three-year period from August 2011 to July 2014. All patients had x-rays of the affected extremity and were then sent for magnetic resonance imaging (MRI) if no acute fracture had been seen, yet concern for the presence of a stress fracture remained based on the physical examination findings. Musculoskeletal radiologists independently reviewed all the MRI scans, and the investigators then confirmed the diagnosis of a stress fracture after a review of the images.

The serum vitamin D level was recorded within three months of diagnosis for 53 (42.74%) of these patients. Using the standards recommended by the Vitamin D Council (sufficient range 40 to 80 ng/mL), more than 80% of these patients would have been classified as having insufficient or deficient vitamin D levels. According to the standards set by the Endocrine Society (sufficient range 30 to 100 ng/mL), over 50% had insufficient levels.

"Based on these findings, we recommend a serum vitamin D level of at least 40 ng/mL to protect against stress fractures, especially for active individuals who enjoy participating in higher impact activities," explained Dr. Miller. "This correlates with an earlier study of 600 female Navy recruits who were found to have a twofold greater risk of stress fractures of the tibia and fibula with a vitamin D level of less than 20 ng/mL compared with females with concentrations above 40 ng/mL

"However, vitamin D is not the sole predictor of a stress fracture and we recommend that individuals who regularly exercise or enjoy participating in higher impact activities should be advised on proper and gradual training regimens to reduce the risk of developing a stress fracture," he concluded.

More information: 'Association of Vitamin D With Stress Fractures:

A Retrospective Cohort Study,' by Jason R. Miller, DPM, FACFAS, Karl W. Dunn, DPM, AACFAS, Louis J. Ciliberti Jr., DPM, AACFAS, Rikhil D. Patel, DPM, and Brock A. Swanson, DPM, published online ahead of *The Journal of Foot & Ankle Surgery*, Volume 55, Issue 1 (January/February 2016)