Athletic girls more likely to have impaired bone structure if menstrual cycle stops

June 6 2011

Young female athletes who have stopped menstruating have a weakening in the quality of their bone structure that may predispose them to breaking a bone, despite getting plenty of weight-bearing exercise, a new study finds. The results will be presented Sunday at The Endocrine Society's 93rd Annual Meeting in Boston.

"Given the high number of young women and girls involved in athletic activities and the fact that up to 24% of young female athletes may lose their periods, this finding represents a significant public health concern," said Madhusmita Misra, MD, the study's principal investigator.

Misra, a pediatric endocrinologist at Massachusetts General Hospital in Boston, said amenorrhea, or absence of menstruation, can result from intense physical activity, either alone or combined with inadequate intake of calories. In a previous study, Misra found that athletes who lose their periods have low bone density, a risk factor for fracture and premature osteoporosis. Because abnormal bone structure (microarchitecture) is a known independent risk factor for fractures among older women, she assessed it in the current study.

Misra and her colleagues studied 34 endurance athletes, ages 15 to 21, all of whom were involved in running or other weight-bearing activities. Sixteen athletes had no periods, and 18 had normal menstruation. The investigators studied the athletes' bone density and bone microarchitecture, and compared these measures with those from 16 nonathletic controls. To assess bone structure, they used a form of CT

scanning called high-resolution peripheral quantitative computed tomography.

They found that nonmenstruating athletes have a bone structure that is abnormal compared with menstruating athletes and nonathletes. Differences were seen in cortical bone (the outer rim of compact bone) and in trabecular (spongy) bone at both sites studied: the tibia, or shinbone, and even a non-weight-bearing site, one of the long forearm bones near the wrist. Athletes who still got their menstrual periods did not have impaired bone structure, the researchers reported.

"Our results are of particular concern to teenagers and young women, who are at a time in their lives when they should be actively accumulating bone and optimizing peak bone mass," she said.

Peak bone mass, the amount of bone present at the end of skeletal maturity, is usually achieved by the mid-20s and is an important factor in determining future bone health.

The study, which was funded by the National Institute of Child Health Development, also found that later age at starting menstruation was associated with a greater chance of bone structure impairments.

"Bone microarchitecture may provide information regarding bone health independent of bone mineral density," Misra said. "Your bone density score may not reveal the full risk of poor bone strength."

Provided by The Endocrine Society