Association of Stimulant Medication Use With Bone Mass in Children and Adolescents With Attention-Deficit/Hyperactivity Disorder.

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Abstract

IMPORTANCE: Murine studies reveal that sympathetic nervous system activation leads to decreased bone mass. Stimulant medications used to treat attention-deficit/hyperactivity disorder (ADHD) increase sympathetic tone and may affect bone remodeling. Because bone mass accrual is completed by young adulthood, assessing stimulant effects on bone density in growing children is of critical importance.

OBJECTIVE: To investigate associations between stimulant use and bone mass in children and adolescents.

DESIGN, SETTING, AND PARTICIPANTS: This cross-sectional analysis used data collected from January 1, 2005, to December 31, 2010, from the National Health and Nutrition Examination Survey (NHANES) database. NHANES is a series of cross-sectional, nationally representative health and nutrition surveys of the US population. All children, adolescents, and young adults aged 8 to 20 years with dual-energy x-ray absorptiometry (DXA), anthropometric, demographic, and prescription medication use data were eligible for participation. Of the 6489 respondents included in the multivariable linear regression analysis, 159 were stimulant users and 6330 were nonusers. Data were analyzed from October 8, 2015, to December 31, 2016.

EXPOSURES: Stimulant use, determined by questionnaires administered via interview.

MAIN OUTCOMES AND MEASURES: The association between stimulant use and total femur, femoral neck, and lumbar spine bone mineral content (BMC) and bone mineral density (BMD) was assessed using DXA.

RESULTS: Study participants included 6489 NHANES participants with a mean (SD) age of 13.6 (3.6) years. Stimulant use was associated with lower bone mass after adjustment for covariates. Mean lumbar spine BMC was significantly lower in stimulant users vs nonusers (12.76 g; 95% CI, 12.28-13.27 g vs 13.38 g; 95% CI, 13.26-13.51 g; P = .02), as was mean lumbar spine BMD (0.90 g/cm2; 95% CI, 0.87-0.94 g/cm2 vs 0.94 g/cm2; 95% CI, 0.94-0.94 g/cm2; P = .03) and mean femoral neck BMC (4.34 g; 95% CI, 4.13-4.57 g vs 4.59 g; 95% CI, 4.56-4.62 g; P = .03). Mean BMD of the femoral neck (0.88 g/cm2; 95% CI, 0.84-0.91 g/cm2 vs 0.91 g/cm2; 95% CI, 0.90-0.91 g/cm2; P = .08) and total femur (0.94 g/cm2; 95% CI, 0.90-0.99 g/cm2 vs 0.99 g/cm2; 95% CI, 0.98-0.99 g/cm2; P = .05) were also lower in stimulant users vs nonusers. Participants treated with stimulants for 3 months or longer had significantly lower lumbar spine BMC (0.89 g/cm2; 95% CI, 0.85-0.93 g/cm2 vs 0.94 g/cm2; 95% CI, 0.94-0.94 g/cm2; P = .02) and BMD (12.71 g; 95% CI, 12.14-13.32 g vs 13.38 g; 95% CI, 13.25-13.51 g; P = .03) and femoral neck BMD (0.87 g/cm2; 95% CI, 0.74-0.83 g/cm2 vs 0.91 g/cm2; 95% CI, 0.83-0.84 g/cm2; P = .048) than nonusers.

CONCLUSIONS AND RELEVANCE: Children and adolescents reporting stimulant use had lower DXA measurements of the lumbar spine and femur compared with nonusers. These findings support the need for future prospective studies to examine the effects of stimulant use on bone mass in children.