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Low Bone Mineral Density in Adolescents with Joint Hypermobility

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Background: Generalized joint hypermobility is quite common and seems to be a risk factor for low bone density.

Objective: The goal of this study was to determine the bone mineral density in adolescents with hypermobility syndrome.

Materials and methods: In a cross-sectional study, we measured the bone mineral density (BMD) and bone mineral apparent density (BMAD) of 32 children, 13 to 18 years old with benign hypermobility syndrome diagnosed by Beighton score and 29 age- and sex-matched controls. Age, stage of puberty, height, weight, and body mass index were evaluated and matched between the two groups. Bone age, gonadotropins, IGF1, thyroid function test, sex steroids, serum vitamin D, and calcium intake were also assessed. None of the children were taking any drugs affecting bone metabolism or had any systemic disease.

Results: Bone mineral accretion in both groups occurred at a slowed and consistent pace, with a sharp increase during the pubertal growth spurt. Puberty had a significant delay in onset and peak height velocity in both boys and girls of the hypermobility group. Bone age and IGF-1 levels progressed more slowly in this group. Age at onset of puberty, independent of its length was a strong predictor of bone measurements at skeletal maturity. After correcting the onset of puberty and other interfering factors, the hypermobility group had still significant lower BMAD compared to the control ($P=0.02$).

BMD and BMAD z -scores were significantly lower in hypermobile children compared to the control group ($P<0.005$). Significant negative correlations were found between the Beighton scores and BMAD z -score ($r=-0.30$) in hypermobility children. Low bone mass was more frequently found among subjects with hypermobility ($P=0.004$). Hypermobility was found to increase the risk for low bone mass by 2.6 times (95% CI 1.01–3.38).

Conclusion: These findings suggest that adolescents with joint hypermobility have lower bone mineral density when compared to the controls, and hypermobility increases the risk for low bone mass.

Keywords: hypermobility, BMD, BMAD

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