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Perspective

# Factors affecting Bone Mass and Physical Activity

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## DESCRIPTION

Bone mass is a function of bone size and Bone Mineral Density (BMD) and could be a key determinant of bone strength. Peak bone mass is established in early adulthood and depends on the bone mass throughout skeletal growth and development. Larger peak bone mass counteracts the inevitable bone loss because of aging, menopause, and varied chronic diseases in adulthood. Therefore, bone mass accumulation throughout childhood and adolescence has necessary implications for lifelong bone health. Though heritability estimates for bone mass, structure, and density vary from 40% to 80%, presently known bone genetic markers explain a small portion of the variation in individual bone mass [1]. Several factors influence bone acquisition throughout infancy and childhood, like sex, the temporal arrangement of the onset of pubescence, calcium and vitamin D nutrition, physical activity, and obesity.

Bone mass will increase throughout growth to succeed in a peak in young adulthood, plateaus, and declines. Increasing the peak bone mass achieved and maintaining bone strength throughout life could also be an effective method to reduce the risk of fracture in the later years of life. Genetics, maturity and hormonal secretion, nutrition, muscle force, and physical activity are better known to influence bone mineral accumulation throughout childhood; but, the relative extent of their contribution to boys and girls throughout adolescence is poorly understood.

Factors like physical activity have shown strong associations to bone mass in youngsters, usually in a sex-specific fashion. As an example, moderate-to-vigorous activity has been determined to be strongly related to lower-limb Bone Mineral Density (BMD) and Bone Mineral Content (BMC), however it only related to total body bone mass in young (11-year-old) boys. Similarly, high-impact physical activity in older boys (15-to-18 years old) shows strong positive relationships to whole-body BMC and total hip BMC [2-4]. During a recent cross-sectional study of BMC and BMD (vBMD) across the period of time (8-to-80 years old), physical activity was absolutely related to femoral neck BMC in men, but not in women, whereas physical activity was strongly related to cortical vBMD at the radius for women than for men. Maximizing skeletal exposure to mechanical loading (physical activity) throughout growth seems to be an effective strategy to optimize bone accumulation.

The transition through puberty is accompanied by increasing levels of sex steroids, peak levels of growth hormone and Insulin-like Growth Factor-1 (IGF-1), and associated peak rates of bone growth. Hormones are better known to increase bone formation and decrease when puberty. As an example, the reduction in IGF-1 following start could reduce skeletal sensitivity to mechanical loading. The chronological age of youngsters of constant maturational status will vary widely. The lack of relationship between bone mass and physical activity in mostly postmenarcheal girls of our cohort suggests either that factors decisive overall physical growth and maturity have the strongest influence on the female bone at this age or that the skeleton has enhanced less responsive to physical activity. It's been determined that hormone secretion factors that enhance bone formation decrease following attainment of PHV. McKay et al. postulated that the reduction within the concentration of growth hormone and Insulin-like Growth Factor-1 (IGF-1) the following start would possibly explain a less automatically sensitive skeleton in girls at this age [5]. It is found that the factors influencing the bone status of 12-14-year-old adolescents are sex-specific. Maturational status predicts variance within the parameters of bone mass in adolescent girls, whereas physical activity level and muscle power exert the most influence on the bones of adolescent boys.

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