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Commentary OMICS International

Effects of Physical Activity on the Skeleton

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Abstract

Physical activity beneficial for the skeleton. However, in the young it has been shown that also genetic predispose to a better outcome of physical training. A longitudinal study among elderly or old people coupling genotyping, physical activity and bone measures might help us to develop more specific training programs for patients in need for physiotherapy and rehabilitation programs.

Keywords: Bone; Physical activity

Commentary

Osteoporosis is a diffuse disease of the skeleton that is characterized by the low bone mineral density (BMD) associated with micro-architectural anomalies, leading to an increased risk of fracture [1]. BMD is measured by dual energy x-ray absorptiometry (DXA). BMD 2.5 standard deviation below means of young adult gender matched persons (T-score) are considered suffering osteoporosis [1]. Young adults define normal bone health as highest BMD is reached at age 25 to 30 years. This BMD top level is defined as peak bone mass.

In the western countries 10% of adults older than 50 years of age have osteoporosis i.e. BMD T-score below -2.5. The highest prevalence is among post-menopausal women (about 15%). Enhancing bone accretion to maximize peak bone mass in early life could help reduce the risk of low BMD and osteoporotic fractures later in adulthood [2]. Physical activity, especially high-impact physical activity i.e. weight-bearing activities of at least 150 min per week, seems to be most beneficial in children [3,4] and adolescents [3]. However, the importance of genetic is under investigation among children. In a newly published study by Mitchell et al. [5] they have investigated if physical activity and overall BMD genetic risk score were associated with BMD and bone mineral content (BMC) in children. The scope was to elucidate if physical interacted with BMD genetic risk score to influence BMD and BMC.

This scope is a new way of thinking and support the view that not all patients, even later in life, might benefit the same of physical activity either at home in daily life but also when it comes to physical training during rehabilitation. Cross sectional studies, longitudinal studies and randomized controlled trails have supported the view that physical activity promote bone health, development of higher peak bone mass in children and preserving or even increasing BMD in adolescents [3,4,6,7]. Mitchell et al. conclude in their paper that physical activity on bone accretion apply to children with below-average BMD/BMC and to those who carry a large proportion of GWAS-implicated BMD lowering alleles.

Based on these findings they suggest that children should be encouraged to increase their physical activity and dedicate a greater proportion of their time to high-impact physical activity to enhance or maintain age-appropriate bone accretion.

The study of Michell et al. [5] is the first of its kind coupling genetics and recommendations in children. The question is if the same observation would be found in middle aged, elderly and old? There is lack of good studies on the benefit of physical training on bone measures in elderly patients.

However, there is high evidence for several other positive factors of physical activity on blood pressure, muscle strength, quality of life and more to physical training. Concerning information on bone health we still miss information of how much training, how often and which kind among elderly and among patients suffering from chronic disease as well as chronic ill patients. Furthermore, genetics might be an issue that should be taken into account when we answer the question how much, which kind for how long.

A longitudinal study coupling elderly or old people to genotyping, physical activity and bone measures might help us to develop more specific training programs for patients in need for physiotherapy and rehabilitation for adults.

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