INFLUENCE OF REGULAR PHYSICAL ACTIVITY ON BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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INTRODUCTION: Despite the well established positive influence of specially designed exercise programmes on bone mineral density (BMD), the role of habitual physical activity (PA) in maintaining and improving bone health is still being discussed. As a part of a larger investigation on PA and quality of life, the aim of this study was to determine the effects of regular PA on BMD in postmenopausal women.

METHODS: Study sample consisted of 232 postmenopausal Caucasian women aged 50-72 (58.5+/−4.6 yrs). 132 women participated in regular PA (aerobic exercise programme, intensity 60-70%VO2max) 2-4 times a week for at least 5 years. Inactive group consisted of 100 women who had never been engaged in regular PA. The groups did not differ significantly in body weight and body height (active 69.4+/−9.6 kg, 162.6+/−5.6 cm; inactive 68.3+/−9.7 kg, 162.7+/−5.5 cm).

Physical fitness of the participants was evaluated with the Eurofit test battery. Women were subjected to tests measuring body composition (body weight and height, waist and hip circumference), aerobic fitness (Astrand’s cycle ergometer test), motor fitness (single leg balance test, plate tapping), and musculoskeletal fitness (sit-ups, sit-and-reach, vertical jump, hand grip).

Dual-energy X-ray absorptiometry was performed in order to measure BMD of femoral neck and lumbar spine. Multiple regression analysis was performed to assess the relationships among Eurofit tests variables and femoral and lumbar BMD.

RESULTS: For the active group, a significant association of the Eurofit tests variables with femoral BMD (p=0.006) was found. The partial regression coefficients showed a significant association of systolic (beta=−0.49, p=0.014), and diastolic blood pressure (beta=0.43, p=0.039) with femoral BMD. For the inactive group, no statistical significance was found.

For the active group, a significant association of the Eurofit test variables with lumbar BMD (p=0.009) was found. There was a significant partial influence of systolic blood pressure (beta=−0.56, p=0.006), body height (beta=0.34, p=0.029), hand grip (beta=0.29, p=0.017), and sit-ups test (beta=−0.26, p=0.041) on lumbar BMD. For the inactive group, there was no predictive value of Eurofit variables for lumbar BMD.

CONCLUSIONS: The Eurofit variables describing physical fitness were significantly associated with femoral and lumbar BMD of the active, yet not of the inactive women. The obtained negative relationship of systolic blood pressure and BMD is congruent with previous findings on high blood pressure being associated with increased bone loss, due to abnormalities in calcium metabolism. Body height, representing body size, and hand grip test, representing general strength level, were shown to be significant predictors of lumbar BMD. The negative relationship of the sit-ups test and lumbar BMD might be attributed to high variation of the test results probably due to significant influence of motivation in performing the test. Despite some limitations of the study, we believe the results still contribute to the findings of habitual PA having at least a certain positive impact on BMD in postmenopausal period.


Keywords: Physical Activity, Health and Fitness, Menopause, Bone Mineral Density