

FACTORS INFLUENCING BONE HEALTH: THE ROLE OF LONG-TERM PHYSICAL ACTIVITY AND NUTRITION IN ELITE FEMALE MASTERS ATHLETES

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Background: Regular physical activity positively influences bone mineral density (BMD), helping to prevent osteopenia and osteoporosis. Alongside exercise, nutrition, particularly dairy intake and other bone-supporting foods play a key role in skeletal health through its impact on mineralization processes. However, interactions between long-term sport participation, dietary patterns, body composition, and biological factors in older female athletes remain insufficiently understood.

Objective: To assess relationship between long-term participation in various athletics disciplines, dietary habits, body composition, biological factors and BMD in elite female master athletes.

Subjects and methods: The study included 199 females in the Masters category aged 57.6±11.2 years. The study sample was ethnically homogeneous (European ancestry). Bone parameters of the forearm were assessed using DXA at two measurement sites: distal and proximal. Body composition was analysed using bioelectrical impedance analysis. Usual dietary intake was evaluated through an interview using a semi-quantitative food frequency questionnaire, identifying four dietary patterns.

Results: Long-term sports participation in masters age promoted maintenance of adequate bone mineralization and may influence dietary choices. Extended athletic training, particularly strength and throwing events, showed a beneficial effect on skeletal health and reduced osteoporosis risk after the age of 40. BMD was significantly associated with dietary patterns, especially diets rich in dairy products, vegetables, fish, poultry, nuts, and legumes, along with body composition indicators.

Conclusions: Physical activity in master-aged women supports bone health and may interact with nutritional behaviours. Long-term training, especially strength-based and throwing disciplines, contributes to improved skeletal outcomes and may reduce osteoporosis risk after midlife. Dietary patterns rich in nutrient-dense foods are important determinants of BMD. The findings highlight the need for individualized training and nutrition strategies and further research on biological interactions affecting bone health in ageing female athletes.

Keywords: Aging; Bone health; Skeletal health; Risk of osteoporosis; Biological factors; Sports anthropology.

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