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Evaluation of postural control and proprioception in women with osteoporosis, before and after an exercise training

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INTRODUCTION:
Osteoporosis (OP) is a skeleton systemic disease characterized by a reduced bone mass and deterioration of micro-architecture. OP is often accompanied by an increased risk of fall and consequently a high risk of fracture. Since postural control and proprioception are two of the most significant factors in falls and injury prevention, exercise training, including specific balance and proprioceptive exercises, could be the keys to reducing the risk of fall and fractures. This study was aimed at assessing proprioception and postural control, using Delos Postural Proprioceptive System (DPPS; Delos, Turin, Italy), in persons with osteoporosis, before and after an exercise training.
METHODS:
A cohort of 29 women with osteoporosis aged 66.20±5.80 were involved in the study. The participants will perform training, structured in 2-days per week, to improve joint mobility, muscle force and balance. Moreover, an additional activity between walking, cycling, or swimming was requested to improve endurance and reach the weekly exercise recommended by World Health Organization. Finally, every six weeks, the trainer upgraded the exercise program following the principle of frequency, intensity, time and type. DPPS was used to assess postural control and proprioception in single-limb stance, respectively, with open and closed eyes. The parameter considered is the stability index (SI; percentage score where 100% is a theoretical task performed with maximum stability).
RESULTS:
No significant differences were found in terms of dominant and non-dominant limbs. Thus, the analysis was performed on the average results of two limbs. The SI improved from 84.14%±10.10 to 86.96%±5.60 with opened eyes ($p < 0.05$) and from 52.22%±13.87 to 56.25%±17.60 with closed eyes ($p < 0.05$).
CONCLUSION:
In people with osteoporosis, fall prevention is essential to decrease the risk of fall, build confidence for performing daily-life activities and improve the quality of life. Moreover, preventing falls decrease the costs for the health care systems. Physical activity should be integrated with pharmacotherapy in osteoporosis treatment since it benefits bone tissue and improves global fitness. In particular, including balance exercises in a training program is effective in improving postural control and proprioception. The latter seems to have greater benefit and is very important in poorly lighting places or conditions of sudden instability.

References
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