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Research article

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2014**The Association of Flexibility, Balance, and Lumbar Strength with Balance Ability: Risk of Falls in Older Adults**

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Full Text

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[Author Information](#)[Publish Date](#)[How to Cite](#)[Email link to this article](#)**ABSTRACT**

The purpose of the present study was to determine the effects of a proprioceptive training program on older adults, as well as to analyze the association between flexibility, balance and lumbar strength (physical fitness test) with balance ability and fall risk (functional balance tests). This study was a controlled, longitudinal trial with a 12-week follow-up period. Subjects from a population of older adults were allocated to the intervention group (n = 28) or to the usual care (control) group (n = 26). Subjects performed proprioceptive training twice weekly (6 specific exercises with Swiss ball and BOSU). Each session included 50 minutes (10 minutes of warm-up with slow walk, 10 minutes of mobility and stretching exercises, 30 minutes of proprioceptive exercises). The outcome variables were physical fitness (lower-body flexibility, hip-joint mobility, dynamic balance, static balance, and lumbar strength) and functional balance (Berg scale and Tinetti test). The experimental group obtained significantly higher values than the control group in lower-body flexibility, dynamic balance, and lumbar strength (p = 0.019, p < 0.001, and p = 0.034 respectively). Hip-joint mobility, dynamic balance, and lumbar strength were positively associated with balance ability (p < 0.001, p < 0.001, and p = 0.014, respectively) and the prevention of falls (p = 0.001, p < 0.001, and p = 0.017 respectively). These findings suggest that a 12-week proprioception program intervention (twice a week) significantly improves flexibility, balance, and lumbar strength in older adults. Hip-

joint mobility, dynamic balance and lumbar strength are positively associated to balance ability and the risk of falls in older adults. This proprioceptive training does not show a significant improvement in hip-joint mobility or static balance.

**Key words:** Proprioception, physical condition, training, physical qualities, swiss ball

### Key Points

- A 12-week proprioceptive intervention program (two times per week) significantly improves flexibility, balance, and lumbar strength in older adults.
- The risk of falls and balance ability are significantly improved after a training program with Bosu and Swiss ball in older adults.
- An improvement in joint mobility, dynamic balance and lumbar strength is positively associated with balance ability and improved fall risk in older adults.
- A 12-week proprioceptive intervention program (two times per week) does not show a significant improvement in hip-joint mobility and static balance.

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