The Effect of Different Exercise Modes on Bone Density in Middle-aged and Older Men: A Systematic Review*

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**Purpose**

1) To review and summarize the findings of exercise trials examining the effect of weight-bearing and resistance-based exercise modalities on bone mineral density (BMD) of the hip and lumbar spine in middle-aged and older men; 2) To assess the study quality of these trials.

**Methods**

**LITERATURE SEARCH** (August 2012)
Pubmed, EMBASE, CENTRAL (Cochrane Central Register of controlled trials), PEDro and SPORTDiscus

**INCLUSION CRITERIA**

**Design:** randomized controlled trials or controlled trials

**Population:** men aged 45+ years. Studies including men and women in which results for men were reported separately were eligible for inclusion

**Intervention:** any exercise protocol involving resistance training, impact-loading exercise, weight-bearing exercise or a combination

**Outcome:** lumbar spine, total hip, trochanter, femoral neck or Ward’s triangle BMD by DXA

**QUALITY RATING LIST**

7-item Delphi methodological quality rating list with score from 0-100%; higher score indicating better quality

**Results**

**Study Quality:** 5 of the 8 trials had a quality rating score of less than 50%, indicating relatively low methodological quality

**Population:** men aged 50-79 years old. Sample sizes ranged from 11-147 participants

**Intervention:** duration ranged from 3 months to 4 years
- walking (n=2)
- resistance training (n=3)
- resistance training + walking (n=1)
- resistance training + impact-loading activities (jumping & leaping) (n=1)
- resistance training + Tai Chi (n=1)

**Outcomes:**
- 6 trials, 2 with a quality score >50%, showed a positive effect on BMD of hip or lumbar spine
- 2 trials, quality score of 43% and 78%, showed no significant effect on BMD of hip and/or lumbar spine
- only 2 studies reported adverse events and these were only of a minor nature

**Conclusions**

- Resistance training alone, or in combination with impact-loading activities, is safe and may assist in the prevention of osteoporosis in middle-aged and older men
- Additional high-quality randomized controlled trials are required to establish evidence-based guidelines for the optimal exercise prescription to prevent osteoporosis in this population

**Take home message**

Regular resistance training and impact-loading activities (jumping) should be considered as a strategy to prevent osteoporosis in middle-aged and older men