VIBRATION TRAINING IN THE ELDERLY: POTENTIAL STRATEGY TO PREVENT AND/OR REVERSE SARCOGENEA AND OSTEOPENIA.
Verschueren Sabine, Bogaerts An, Delecluse Christophe, Claessens Albrecht, Boonen Steven
(Katholieke Universiteit Leuven, Belgium)

Introduction
As osteoporosis, sarcopenia and the resulting falls and fractures are becoming important public health issues in our aging population, high priority should be given to the search for prevention strategies for these problems. Recently we showed in a randomized, controlled pilot trial that whole body vibration exercise (WBV) which loads the bone mechanically and evokes reflexive muscle contractions, may be a safe and effective strategy to improve muscle strength, postural control as well as bone density at the hip (1-2).

The aim of this one year randomized controlled trial was to further assess the musculoskeletal effects of WBV in elderly.

Methods
Two hundred and twenty people were randomly assigned to a WBV group (n = 94), a fitness group (FIT, n = 60) or a control group (CON, n = 66). The WBV and FIT groups trained three times a week for 1 year. The WBV group performed exercises on a vibration platform and the FIT group performed cardiovascular, strength, balance and stretching exercises.

Balance was measured using dynamic computerized posturography. Isometric strength of the knee extensors was measured using an isokinetic dynamometer, explosive muscle strength was assessed using a counter movement jump and muscle mass of the upper leg was determined by computed tomography, this only in males. Hip bone density was measured using DXA intervention, this only in females. Data were analyzed by means of repeated measures ANOVA.

Results
WBV and FIT training were associated with reduced falls frequency on a moving platform when vision was disturbed. Only WBV training resulted in improvements in the postural response to toes down rotations at the ankle. In men, isometric muscle strength, explosive muscle strength and muscle mass increased significantly in the WBV group (+9.8%, +10.9% and +3.4%, respectively) and in the FIT group (+13.1%, +9.8% and +3.8%, respectively) with the training effects not significantly different between the groups. No significant changes in any muscle parameter were found in the CON group.

Regarding bone mineral density in women, femoral neck BMD decreased significantly over 1 year (-1.6%; p<0.01) in the CON group whereas in the WBV-group the decrease was not significant (-0.6%; p>0.05). This net benefit of 1% in the WBV-group compared to the CON-group did not reach significance.

Conclusion:
Those results suggest that WBV training may improve some aspects of postural control in community dwelling older individuals. Additionally, WBV training appears as efficient as a fitness program to increase isometric and explosive knee extension strength and muscle mass of the upper leg in community dwelling older men. WBV training resulted in preservation of bone density at the hip, but no significant difference compared to the control group was found.

These findings suggest that WBV training may be a feasible and effective way to prevent sarcopenia, or thus a well recognized risk factor for falls and fractures in postmenopausal women. Future, large scale studies are needed to further establish the effects of WBV on bone density.

References

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