

Brief, low-impact, high-intensity Osteogenic Loading training utilizing proprietary OsteoStrong devices with once-a-week, 10-minute treatments improve Bone Mineral Density in Women with Osteoporosis of the Lumbar Spine

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Introduction: Osteoporosis is a chronic condition characterized by a decrease in bone density and deterioration of microarchitecture. It has been associated with a high bone-fracture risk, an increased mortality, and vast health-care costs. Pharmaceutical treatment along with resistance exercise are usually prescribed. "Osteostrong" is a type of bone strengthening that uses brief (12 min), weekly, low-impact, high-intensity osteogenic loading.

Aim: to investigate the therapeutic impact of Osteostrong in people with osteoporosis of the lumbar spine.

Methods: In total, 140 postmenopausal women with osteoporosis of the lumbar spine, followed at the Unit on Clinical and Translational Research in Endocrinology, University of Athens, Athens, Greece, were enrolled. They were divided into 2 groups. Group A (GA) included 70 women who were treated with Osteostrong (mean age: 57,7 y, 95% CI 54,9- 60,6 y); Group B (GB) included 70 women who had no exercise intervention (mean age 59,2 y, 95% CI 55,6- 61,9 y). All the participants had a complete physical examination, an assessment for exclusion of secondary osteoporosis, bone markers CTX1 and PINP, and a DXA examination [Horizon W (S/N 300472M)], twice, at the time of inclusion in the trial, at 9 and 12 months after onset of intervention. Preliminary data at 9 months are shown in this study. Statistical analysis, Medcalc version 20.2.

Results: Paired Student t-test (chi-squared) of Bone Mass Density (BMD) and T-score before (1) and after intervention (2) in GA and GB showed: BMD lumbar spine (L1-L4): GA1 (mean:0.815), GA2 (mean:0.833) ($p<0.0007$) and GB1 (mean: 0.852), GB2 (mean: 0.851) ($p=0.93$). T-score (L1-L4): GA1 (mean: -2.27), GA2 (mean: -1.93) ($p<0.0001$) and GB1 (mean: -1.98), GB2 (mean: -1.80) ($p=0.054$), respectively. Trabecular bone score (TBS): GA1 (mean: 1.217), GA2 (mean: 1.238), ($p=0.036$) and GB1 (mean:1.22), GB2 (mean: 1.204) ($p=0.14$). T-score (TBS): GA1 (mean: -2.76), GA2 (mean: -2.52), ($p=0.045$) and GB1 (mean: -2.75), GB2 (mean: -2.85), ($p= 0.560$), respectively.

Discussion: The study showed a statistically significant improvement of BMD and T-score in the lumbar spine as well as TBS and its T-score in people with osteoporosis treated with Osteostrong. The Osteostrong method may have a synergistic effect with anti-osteoporotic medication, significantly reducing bone fracture risk.

Conservative therapeutic interventions are important challenges to minimize the osteoporosis-related poor quality of life and mortality.