

## Preliminary Analysis of the Feasibility and Effectiveness of Whole Body Vibration as a Therapeutic Intervention in a Skilled Nursing Facility

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### ABSTRACT

Skeletal muscle sarcopenia results in loss of strength, power and functional capabilities leading to decreased independence and an increased reliance on the healthcare system. Exercise is an effective countermeasure to age related loss of muscle, but may be difficult in elderly patients with complex functional limitations. Whole body vibration (WBV) is a novel tool used to stimulate the neuromuscular system; research indicates it may improve strength, power, and balance in many populations. **Purpose:** The purposes of this study were to determine if WBV training is feasible in a skilled nursing facility and if standard of care (SOC) with augmented WBV training improves physical function in patients compared to SOC alone. **Methods:** A prospective cohort design was used to accomplish the study objectives. Twelve patients (10 females; 2 males) who were residents at a skilled nursing facility consented to the study protocol and were divided into two groups. Group 1 (CON; 73.8 ± 5.7 y; 165.0 ± 0.03 cm; 77.5 ± 11.6kg) underwent SOC therapy intervention including progressive balance, strength, and range of motion exercises. Group 2 (VIB; 74.1 ± 2.3y; 169.0 ± 0.04cm; 70.5 ± 4.3kg) underwent a similar physical therapy intervention but also completed progressive WBV treatment on a symmetrically vibrating plate (2mm; 25-35 Hz). Patients completed clinical tests of physical function before and after the 23 ± 2.3 day intervention. Physical function tests included timed up-and-go (TUG) tests from a 40cm chair and a Berg balance assessment (BBA). Additionally, manual muscle tests were completed using a hand-held dynamometer for hip flexion (HF), hip abduction (HA), knee extension (KE), knee flexion (KF), plantar flexion (PF), and dorsi-flexion (DF). Student's t-tests were used to compare the difference scores pre- and post-intervention; alpha was set at  $p \leq 0.05$  to determine statistical significance. **Results:** No adverse effects were documented in either group throughout the study. Mean physical function improved in all tested variables for both groups. However, no between group differences (CON vs. VIB) were observed in BBA ( $p=0.52$ ), TUG ( $p=0.07$ ), HF ( $p=0.80$ ), HA ( $p=0.47$ ), KE ( $p=0.73$ ), KF ( $p=0.97$ ), PF ( $p=0.59$ ), and DF ( $p=0.83$ ). **Conclusions:** Use of WBV as an adjunct exercise intervention in a skilled nursing facility was feasible and safe in this small sample. Although no between group differences were evident, a larger sample is needed to definitively accept or reject the hypothesis. Moreover, systematic research is needed to develop precise protocols to effectively and efficiently utilize WBV in hospitalized elders.