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Is High-Vibration Exercise Safe for Patients With Osteoporosis?

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Question

Is there clinical research supporting the use of high-vibration platforms in strength training to increase bone density and muscle mass in the elderly (or any age group)? Are these devices safe for seniors with severe osteoporosis?



Response from Barbara Resnick, PhD, CRNP, FAAN, FAANP

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This is a terrific question. Whole-body vibration (WBV) is a new type of exercise that uses an oscillating platform on which the individual stands or sits. The tonic vibration of the platform is believed to activate the fast-twitch muscle fibers, forcing them to contract reflexively. Manufacturers of these platforms claim benefits ranging from increasing muscle and bone strength, to improving balance, flexibility, and circulation. In recent years, WBV has been used in research with elderly patients to determine if it can prevent osteoporosis and bone fractures in this population.

Currently there are 2 marketed vibrating plates: (1) a whole plate that oscillates up and down, and (2) a plate with reciprocating vertical displacements on the left and right side of a fulcrum, increasing the lateral acceleration. A recent study measured bone mineral density (BMD) following exercise with a WBV low-frequency reciprocating platform or walking-based exercise in postmenopausal women. The WBV group participated in 3 WBV sessions per week, consisting of 6 one-minute bouts of low-frequency vibration, with 1-minute rest between bouts. The walking group walked for 55 minutes 3 times per week. After 8 months, BMD in the WBV group increased by 4.3% ($P = .011$), but there was no effect on lumbar spine BMD in either group. In the WBV group only, balance improved by 29%.^[1]

Vibratory plates are considered safe for patients with osteoporosis, but safeguards must be followed to prevent exercise-related injuries.^[1] Vibration sessions should be no longer than 10 minutes, posture should be maintained in a semi-squat position with knees flexed, and the patient should actively participate with the leg muscles to reduce the transmission of vibrations to the head.^[1]

Patients with osteoporosis should not do exercises that involve bending forward to touch the toes, doing sit-ups, or using a rowing machine. Golf, tennis, bowling, and some yoga poses can also

cause bending or twisting at the waist. These activities can compress the bones in the spine and should be avoided.

According to manufacturers, contraindications to WBV include pregnancy, acute thrombosis, severe cardiovascular disease, recent wounds or surgery, hip and knee implants, acute hernia, discopathy or spondylolysis, epilepsy, tumor, and severe migraine. Patients with pacemakers or recently implanted metal pins or intrauterine devices should not exercise with WBV. A recent case study described significant WBV-related morbidity in a patient with nephrolithiasis.^[2]