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Good vibrations prevent bone mineral loss

Oct 14, 2004 | Denise Mann

Seattle, WA – Vibration therapy and resistance leg exercises together prevent the bone–mineral loss and wasting known to occur with prolonged bed rest, according to new research presented at the **26th Annual Meeting of the American Society for Bone and Mineral Research**.

"Resistive vibration exercise, as applied here, appears to completely prevent bone loss from the tibia during prolonged bed rest," conclude the study authors, **Dr Dieter Felsenberg** (Manchester University, UK) and **Dr Joern Rittweger** (University Medicine Berlin, Germany).

The regimen offers "the first effective countermeasure for bone loss in patients on strict bed rest to date," Felsenberg and Rittweger comment. They suggest that about 12 minutes of resistive vibration exercise per day may completely prevent bone loss associated with prolonged bed rest—or space flight. The new findings may be useful for astronauts on prolonged space flights, the study authors point out, as the skeletal and muscular effects of weightlessness in space flight mimic those of prolonged bed rest.

Strict bed rest in healthy young men

The study was performed in 20 healthy young men who were subjected to 8 weeks of strict bed rest. Half of the group acted as controls; the others carried out resistance leg exercises and used the Galileo vibration device (Novotec Pforzheim, Germany) twice daily for 4 one–minute sets, 6 days a week, as they lay on their backs. In the exercise group, vibration frequency ranged from 19 Hz to 23 Hz. Peak measurements of force during squat exercises were around 2000 newtons.

The researchers measured bone–mineral content (BMC) and muscle cross–sectional area (mCSA) at baseline and after 8 weeks of bed rest using computed tomography in the calf and the forearm. In addition, leg–muscle volume was measured by magnetic resonance imaging (MRI). Researchers also assessed jumping height and power, peak reflex–muscle contraction in knee extension, and the ability to stretch the foot upward and downward.

By the end of the study, the control group had lost significant

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amounts of bone mineral from the tibia. On average, the control group lost 3.5% of bone mineral from their ankles. They also showed a 17% decrease in the calf-muscle cross-section and an 18% decrease in calf muscle force.

By contrast, the exercise group showed no significant bone-mineral loss in the tibia, no calf muscle force change, and only an 8% decrease in calf-muscle cross-section. Immediately after reambulation, jumping height had decreased by 31.4% among those men in the control groups and by 13.1% in the vibration group. Peak power declined by 26.2% in the controls and by 10.5% among those in the vibration group, the study showed.

Source

1. Rittweger J and Felsenberg D. Resistive vibration exercise prevents bone loss during 8 weeks of strict bed rest in healthy male subjects: results from the Berlin Bed Rest (BBR) study. 26th Annual Meeting of the American Society for Bone and Mineral Research; October 1-5, 2004; Seattle, WA; Presentation 1145.

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