


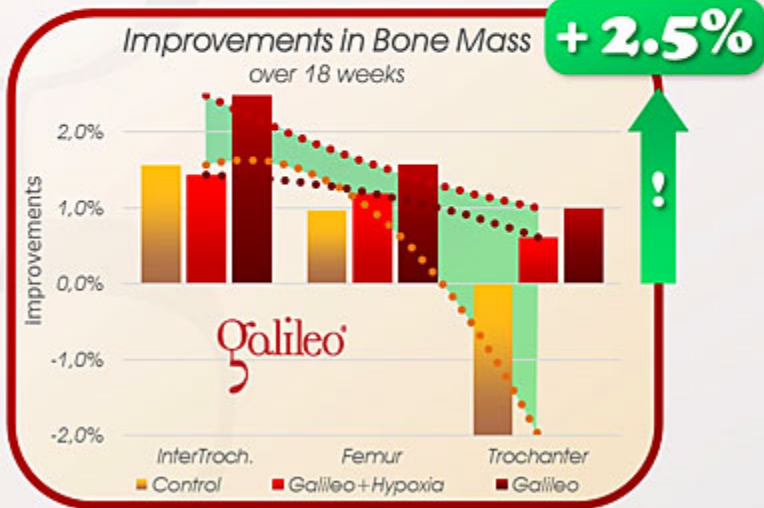
Galileo Research Fact Sheet #156: Can Galileo Therapy increase Bone Mass?




Can Galileo Therapy increase Bone Mass ?

Die Antwort ist: JA

This study investigated possible positive effects of Hypoxia (simulated high-altitude training) on Galileo Therapy for the increase of bone mass in older individuals (age: 65-77). Three groups were used (Control, Galileo with & without Hypoxia, +5min. Ergometer warmup, 12.5Hz, 120° squat, pos. 2, 4x30sec, 2/week, 18 weeks). Both Galileo groups show significant improvements of bone mass compared with the control group.



Site	Control	Galileo+Hypoxia	Galileo
InterTroch.	~1.5%	~1.4%	~2.3%
Femur	~1.0%	~1.2%	~1.5%
Trochanter	~-1.5%	~0.6%	~1.0%



Camacho-Cardenosa M, Camacho-Cardenosa A, Burtcher M, Brazo-Sayavera J, Timon R, et al.: Effects of Whole-Body Vibration Training Combined With Cyclic Hypoxia on Bone Mineral Density in Elderly People.; *Front Physiol*, 10:1122, 2019; PMID: 31543827, DOI: 4982

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Therapy: Increase of Bone Mass
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This study investigated possible additional effects of simulated high-altitude training (Hypoxia, training with reduce oxygen content) in combination with Galileo Therapy on increase in bone mass in older adults age 65 and 77. Three different groups were used: Control and Galileo with and without simulated high altitude training at 2500m over a period of 18 weeks, two sessions per week. All groups received 5 min. of warm-up on a cycling ergometer at 25 to 50W and 5 min. stretching exercises. The Galileo groups received additional 4 sets 30 sec. of static squatting at 120°, pos. 2 and 12.5Hz with 60 sec. break between sets. Both Galileo groups showed significant increase of bone mass at various sites of the leg. Keeping in mind that the selected frequency typically target coordination and maybe balance aspects and that the selected intensity was (squatting angel, short set duration and frequency) was very moderate even at healthy individuals at age 70, and that there was now adaptation over the full 18 week intervention, the achievements of up to +2.5% in bone mass over just 18 weeks is quite remarkable.

A variation of the Galileo protocol towards higher intensities and a constant adaptation to achieved improvements would have been favorable (for example: Start at Pos. 1 and 26z for 60 Sec, 120°, and then slowly increase to pos. 1,5 to 2 and 30-33Hz, 100° - see also: #GRFS113, #GRFS68, #GRFS127). For increase of bone mass high internal forces and as a consequence exhaustion of the muscle is essential – most effectively achieved at high frequencies >25 Hz (and if needed lower amplitudes to further decrease joint forces #GRFS7, #GRFS7) (see also: #GRFS3, #GRFS23, #GRFS78 #GRFS109).

Especially in the context of Osteoporosis, not only increase of bone mass but also of muscle function to prevent falls and therefore fractures are essential – both goals are best achieved at high frequencies >25Hz as shown by research (#GRFS113, #GRFS140, #GRFS26, #GRFS53). Furthermore, when applying Galileo over a longer period basics of training science would be kept in mind: a training stimulus must not be below a certain percentage of individual possibilities, if training is effective possibilities increase and therefore the training intensity need to be increase continuously.

Therapy - Increase of bone mass
#GRFS11 #GRFS