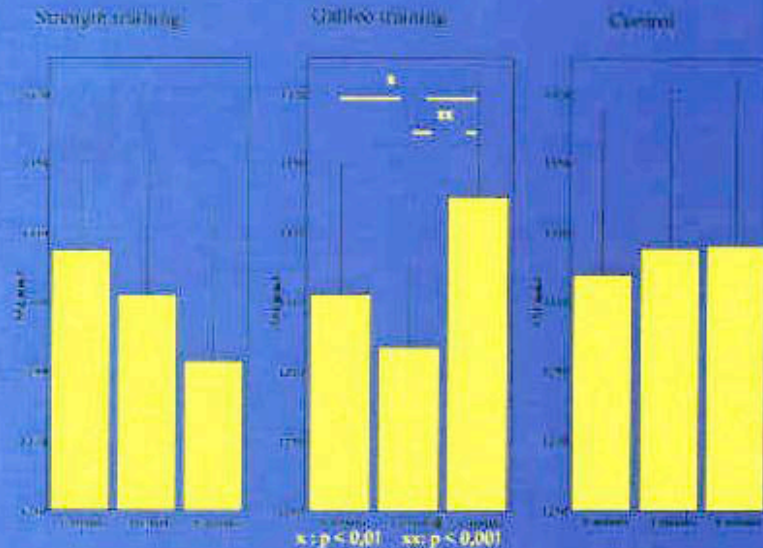


Long term effects of Galileo 2000 - a new training device

S. Häring¹, M. Hartard¹, M. Schlitter¹, P. Bartenstein², H. Schiess³, D. Jeschke¹

¹, Prev. and Rehab. Sports Medicine ², Nuclear Medicine - Klinikum rechts der Isar - Technische Universität München ³, STRATEC Medizintechnik - Germany

Polar SSI 14% of Tibia



Galileo 2000 is a new device for dynamic muscle training. The device evokes rhythmic (25-30Hz) muscle contractions.

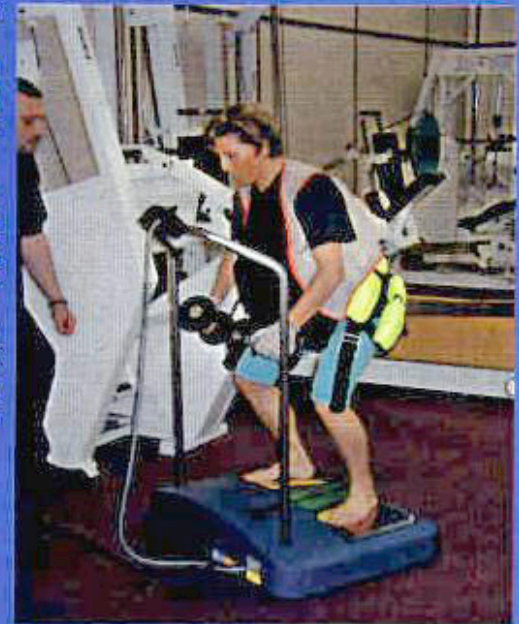
In this study a group of 44 untrained healthy postmenopausal women (50-65 y) were examined to evaluate long term effects (muscle force and bone strength) under two forms of continually adapted dynamic strength training for the lower limbs. Women were randomized into 2 groups.

The first group (Strength) performed a conventional dynamic strength training, providing an intensity of about 70% of each person's one-repetition-maximum (1RM). The lower limbs were trained by the following movements and machines: abduction, adduction, anteversion and retroversion of the thigh (using a hip machine) and extension of the knees and hip (using the legpress).

The second group (Galileo) performed a strength training during an additional intervention of high frequency vibrations (25-30Hz, Galileo 2000). Practising knee bends with weights (4-5 seconds for one knee bend), optimum effectiveness was assumed when marked fatigue of the exercised group of muscles was observed within 180-240 seconds per set.

Both groups performed 2 sets a unit, twice a week over 6 months.

A third group (Control) of 21 persons served as a control.



Bone strength:

The polar SSI at 14% (Stress-Strain-Index) which was measured by the pOCT (Stratec XCT-2003) was used as a method to determine the bone strength. The SSI was calculated from the cortical density/area and the radius of the bone.

Results indicate that strength training with Galileo 2000 leads to a slight decrease of bone strength after 3 months (p = 0,107) followed by a strong increase of bone strength after 6 months (p = 0,0005). In comparison with the baseline data a significant increase of stiffness of 2,15% is remarkable (p = 0,0054) after 6 months.

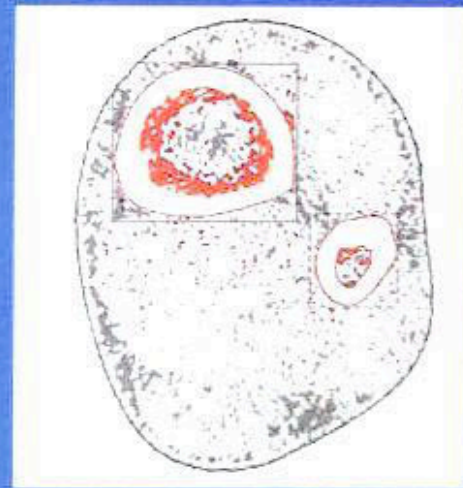
The group practising the conventional strength training showed a tendency towards an decrease of bone strength over the period of 6 months (p = 0,29).

No changes could be observed in the control group.

Muscle forces:

The 1RM at the legpress was used in order to explore the strength of each person. The training was also able to amplify each test person's 1RM (p = 0,0002). The Strength group had an increase of 19,4% and the Galileo group of 27,0%.

Based on these results, we conclude that Galileo 2000 may be a promising device for an effective, safe, reproducible and adaptable method of therapeutic strength training.



$$SSI (mm^2) = \sum \frac{\pi \cdot r \cdot d^2}{d_{max}} \times \frac{CD}{CD_{max}}$$

1RM on the legpress

