Galileo is a new device for dynamic muscle training. The device evokes rhythmic (25-30 Hz) 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 6 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, anterior-posterior movement and rotation of the thigh (using a leg press) and extensor of the knee and hip (using the leg press).

The second group (Galileo) performed a strength training during an additional intervention of high frequency vibrations (25-30 Hz, Galileo 2000). Practicing knee bends with weights (4-5 seconds for one knee bend, optimum effectiveness was assessed 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 every 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 pQCT (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 = 0.10) followed by a strong increase of bone strength after 6 months (p = 0.0002). In comparison with the baseline data a significant increase of stiffness of 2.15% was verifiable (p < 0.0005) after 6 months.

The group practicing the conventional strength training showed a tendency towards an increase of bone strength over the period of 6 months (p = 0.30).

No changes could be observed in the control group.

Muscle force:

The 1RM at the leg press 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 acceptable method of therapeutic strength training.

\[
SSI (min) = \frac{x_{min} + x_{max}}{2} \cdot \frac{1}{\frac{1}{x_{min}} + \frac{1}{x_{max}}}
\]