

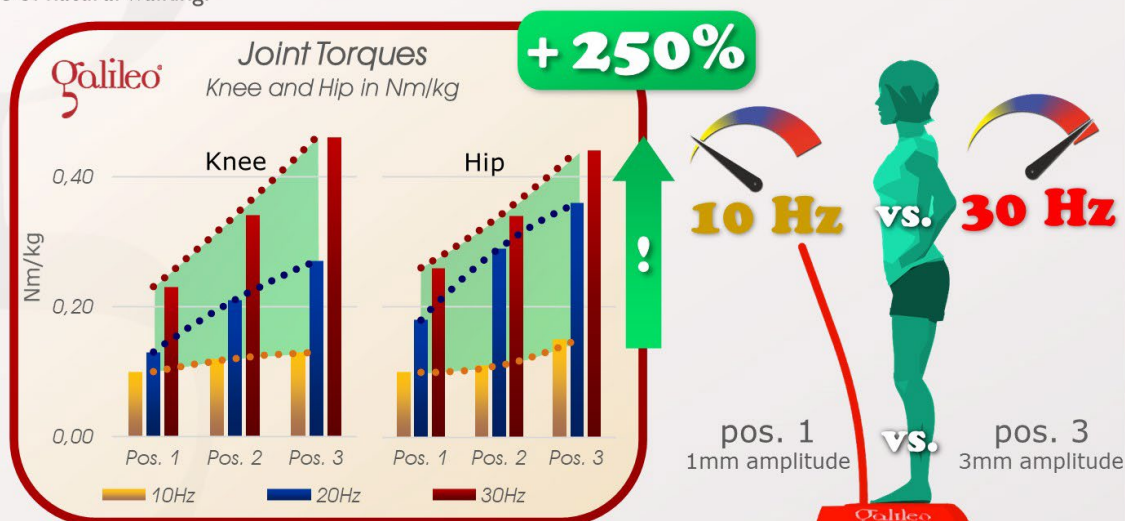
Galileo Research Fact Sheet #167: Are Joint Torques during Galileo Training Dependent on Frequency and Amplitude?



Are Joint Torques during Galileo Training Dependent on Frequency and Amplitude ?

The answer is: YES

This study investigates the effects of Frequency and Amplitude during Galileo Training on joint torques (10, 20, 30Hz, pos.1, pos.2, pos.3, upright standing with straight legs). Joint torque showed an significant increase with increasing frequency and amplitude of up to 250% - nevertheless joint torques stayed below those of natural walking.



Yang F, Underdahl M, Yang H, Yang C: Effects of vibration intensity on lower limb joint moments during standing.; J Biomech, 88:18-24, 2019; PMID: 30904333; GID: 4884

This study measured the ground reaction forces (the forces between the feet and the Galileo Platform) during Galileo Training at different frequencies (10, 20, 30Hz) and different amplitudes (foot position 1, 2, 3) and calculated the resulting torques in the knee and hip joints (also see #GRFS160). While earlier studies (#GRFS7, #GRFS6) investigated joint forces in patients with artificial knee joints, hip joints and vertebra with built-in force sensors, this study measured ground reaction forces and estimated joint torques using mathematic models. The obvious result is that joint moments can be controlled by amplitude and frequency.

According to the actually measured ground reaction forces (#GRFS160) the joint moments were calculated from, even at intense Galileo Training at high amplitudes and high frequencies the resulting joint torques are comparable to those during walking. The study proves once more how safe Galileo Training is especially for joints because even during intense Galileo Training joint forces and joint torques are in the order of natural walking – furthermore, these values can be further decreased by decreasing frequency or amplitude. This shows how scalable Galileo Training is.