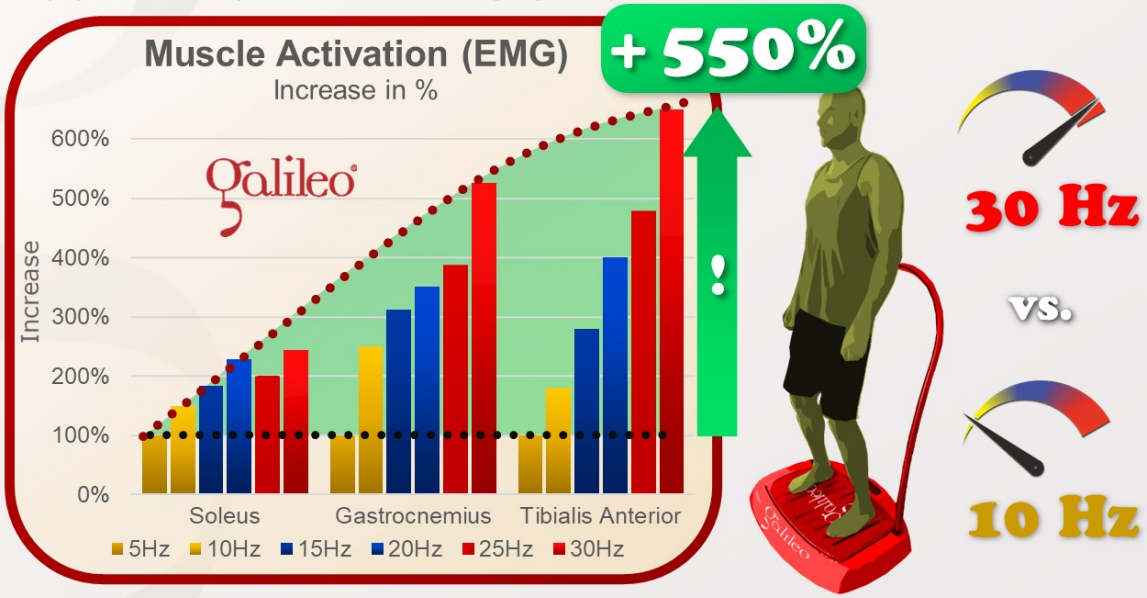
Can high frequencies increase muscle activation during Galileo Training?

The answer is: YES

This study tested muscle activation (EMG) of different muscles of the leg at different frequencies between 5 and 30Hz (pos. 5, slightly flexed legs). It showed that high frequencies (25-30Hz) can increase muscle activation by up to 5.5 times compared to low frequencies at 5Hz. Therefore Galileo Training targeting muscle hypertrophy and muscle power should be using high frequencies above 20 Hz to increase muscle activation.



Pollock RD, Woledge RC, Mills KR, Martin FC, Newham DJ: Muscle activity and acceleration during whole body vibration: effect of frequency and amplitude; Clin Biomech (Bristol, Avon)., 25(8):840-6, 2010; PMID: 20541297, GID: 2379

Galileo Research Fact Sheet #109 Common: Frequency Ranges www.galileo-training.com

An effect that has already been described in several studies (# GRFS3, # GRFS95) and that anyone can feel directly when changing the frequency on a Galileo device: the higher the frequency the higher the muscle activation in the trained muscle groups.

This study examined the EMG signal of different muscle groups of the leg muscles at frequencies between 5 and 30 Hz (position 5, slightly bent knees).

As a result, a significant increase in muscle activation (EMG, the 100% value corresponds to the EMG amplitude at 5Hz) with increasing frequency - High frequencies (eg 30Hz) thus generate up to 5.5 times greater muscle activation than low (eg 5 Hz).

This is the reason why higher frequencies are more effective than low ones in training goals such as muscle building, performance or endurance increase, as the muscle can be expended faster due to the significantly increased activation.

As already mentioned in # GRFS95, this study also used a measurement technique that underestimates the actual muscle activation, because the EMG signal components corresponding to the vibration frequency were filtered out because they were supposed to be motion artifacts. Ritzmann et al.

However, he was able to show that this is not the case, since with every movement of the plate a stretching reflex is actually triggered (# GRFS23).

Clin Biomech (Bristol, Avon). 2010 Oct;25(8):840-6. doi: 10.1016/j.clinbiomech.2010.05.004. Epub 2010 Jun 11.

Muscle activity and acceleration during whole body vibration: effect of frequency and amplitude.

Pollock RD[1], Woledge RC, Mills KR, Martin FC, Newham DJ.

BACKGROUND:
Whole body vibration may improve muscle and bone strength, power and balance although contradictory findings have been reported. Prolonged exposure may result in adverse effects.

We investigated the effects of high (5.5 mm) and low (2.5mm) amplitude whole body vibration at various frequencies (5-30 Hz) on muscle activity and acceleration throughout the body.

METHODS:
Surface electromyographic activity was recorded from 6 leg muscles in 12 healthy adults (aged 31.3 (SD 12.4) years). The average rectified acceleration of the toe, ankle, knee, hip and head was recorded from 15 healthy adults (36 (SD 12.1) years) using 3D motion analysis.

FINDINGS:
Whole body vibration increased muscle activity 5-50% of maximal voluntary contraction with the greatest increase in the lower leg. Activity was greater with high amplitude at all frequencies, however this was not always significant ($P<0.05$-0.001).

Activation tended to increase linearly with frequency in all muscles except gluteus maximus and biceps femoris. Accelerations throughout the body ranged from approximately 0.2 to 9 g and decreased with distance from the platform.

Acceleration at the head was always < 0.33 g. The greatest acceleration of the knee and hip occurred at approximately 15 Hz and thereafter decreased with increasing frequency.

INTERPRETATION:
Above the knee at frequencies > 15 Hz acceleration decreased with distance from the platform. This was associated with increased muscle activity, presumably due to postural control and muscle tuning mechanisms. The minimal acceleration at the head reduces the likelihood of adverse reactions.

The levels of activation are unlikely to cause hypertrophy in young healthy individuals but may be sufficient in weak and frail people.

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