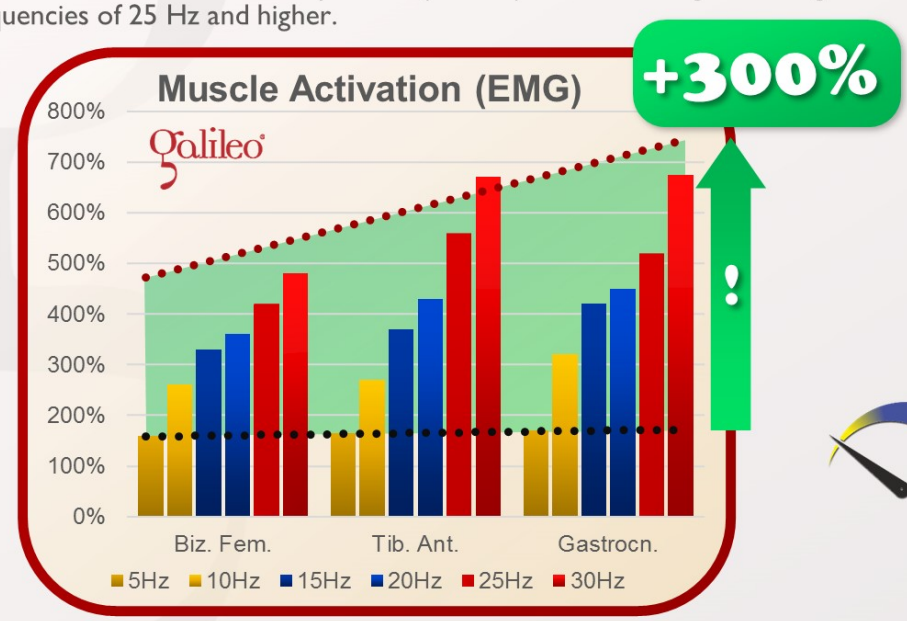
Galileo Training

Do high frequencies cause more muscle activation?

The answer is: YES

This study tested muscle activation (EMG) of different leg muscles at different training frequencies between 5Hz and 30Hz. Is showed that high training frequencies (25-0Hz) lead to up to 4 times (+300%) higher muscle activation than low frequencies (5-10Hz). Muscle strength training should therefore be done at frequencies of 25 Hz and higher.



vs.

Ritzmann R, Gollhofer A, Kramer A: The influence of vibration type, frequency, body position and additional load on the neuromuscular activity during whole body vibration.; Eur J Appl Physiol., (113):1-11, 2013; PMID: 22538279, GID: 2968

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The influence of vibration type, frequency, body position and additional load on the neuromuscular activity during whole body vibration.

Ritzmann R1, Gollhofer A, Kramer A.

Abstract

AIM

This study aimed to assess the influence of different whole body vibration (WBV) determinants on the electromyographic (EMG) activity during WBV in order to identify those training conditions that cause highest neuromuscular responses and therefore provide optimal training conditions.

METHOD

In a randomized cross-over study, the EMG activity of six leg muscles was analyzed in 18 subjects with respect to the following determinants: (1) vibration type (side-alternating vibration (SV) vs. synchronous vibration (SyV), (2) frequency (5-10-15-20-25-30 Hz), (3) knee flexion angle (10°-30°-60°), (4) stance condition (forefoot vs. normal stance) and (5) load variation (no extra load vs. additional load equal to one-third of the body weight).

RESULTS

The results are: (1) neuromuscular activity during SV was enhanced compared to SyV ($P < 0.05$); (2) a progressive increase in frequency caused a progressive increase in EMG activity ($P < 0.05$); (3) the EMG activity was highest for the knee extensors when the knee joint was 60° flexed ($P < 0.05$); (4) for the plantar flexors in the forefoot stance condition ($P < 0.05$); and (5) additional load caused an increase in neuromuscular activation ($P < 0.05$).

CONCULSION

In conclusion, large variations of the EMG activation could be observed across conditions. However, with an appropriate adjustment of specific WBV determinants, high EMG activations and therefore high activation intensities could be achieved in the selected muscles. The combination of high vibration frequencies with additional load on an SV platform led to highest EMG activities. Regarding the body position, a knee flexion of 60° and forefoot stance appear to be beneficial for the knee extensors and the plantar flexors, respectively.

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