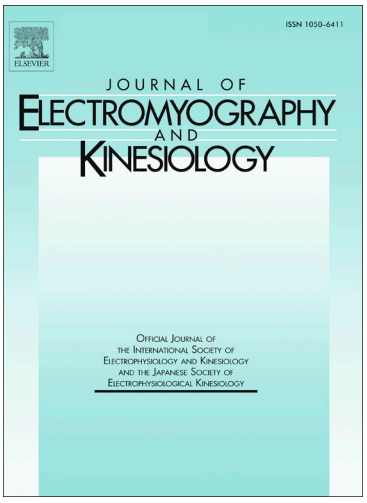

Different Fatigue-Resistant Leg Muscles and EMG Response during Whole-Body Vibration

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Different Fatigue-Resistant Leg Muscles and EMG Response during Whole-Body Vibration

The Influence of Vibration on Muscle Activation

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ABSTRACT

The purpose of this study was to determine the effects of static whole-body vibration (WBV) on the Electromyograhic (EMG) responses of leg muscles, which are fatigue-resistant in different manner. The study population was divided into two groups according to the values obtained by the Fatigue Index [Group I: Less Fatigue Resistant (LFR), n=11; Group II: More Fatigue Resistant (MFR), n=11]. The repeated electromyographic (EMG) activities of four leg muscles were analyzed the following determinants: (1) frequency (30 Hz, 35Hz and 40Hz); (2) stance position (static squat position); (3) amplitude (2 mm and 4 mm) and (4) knee flexion angle (120°). Data were analyzed using PASW/SPSS Statitistics 18.0, and the significance level was set at $p<0.05$. The study results showed that static WBV stimuli given at different frequencies and amplitudes resulted in a significant increase in lower-body muscular activation ($p<0.05$). When the MFR and LFR groups were compared, the LFR group showed significantly (1) higher rates of quadriceps femoris and hamstring muscle fatigue ($p<0.05$), (2) higher levels of knee extensor and flexor torque ($p<0.05$) and (3) higher percentage increases in EMG activation at higher frequencies (max at 40 Hz) and amplitudes (4 mm) ($p<0.05$). The present study can be used for the optimal prescription of vibration exercise and can serve to guide the development of training programs.

Key Words: Fatigue, Vibration, Resistance, Optimal, Sport, Muscle Activation And Electromyography.

Highlights

- LFR group experienced a significantly higher rate of RF and BF muscle fatigue, compared to the MFR group
- Static WBV stimuli produced significant increases in lower-body muscular activation
- Highest EMG activity in the LFR group was recorded when the frequency and amplitude were 40 Hz and 4 mm, respectively
- The muscle activation of MFR group decreased by increasing frequency of the WBV.
- Increasing the amplitude of WBV attains significant increases in the activation of LFR and MFR leg muscles significant