EFFECTS OF WHOLE-BODY VIBRATION ON THIGH NEUROMUSCULAR ACTIVITY

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Introduction

The use of whole-body vibration (WBV) appears to influence in a positive way the performance of athletes in certain characteristics such as muscular strength, power and body balance. The aim of this study was to compare the acute neuromuscular activity caused by different vibration frequencies (15Hz and 25Hz), and different knee flexion angles (120° and 150°).

Methods

A total of 19 male university students underwent 4 sessions of WBV. The subjects were exposed randomly to four different WBV protocols using a vibration platafform (Galileu 2000).The amplitude allowed by the vibration platform was (peak-to-peak) 3 mm. Each vibration session lasted 6 min and they accomplish a rest period of one day between sessions. The protocols used were: 15 Hz of vibration and 120º of knee flexion; 15 Hz and 150º; 25 Hz and 120º; and 25 Hz and 150º. Muscle activity exerted by the muscles *Vastus Intermedius* (VI), *Vastus Lateralis* (VL), *Vastus Medialis* (VM) and *Biceps Femoris* (BF) were evaluated by electromyographic analysis (Biopac MP 100, Biopac Systems Inc. Goleta, CA, EUA). Paired Samples T test with repeated measures was used to compare the main effects of muscle activity of each test.

Results

When comparing the two angles of knee flexion (120° vs 150°) with the 15Hz frequency, it was found a different EMG response of the VI (P=0,01), VL (P=0,00), VM (P=0,001) and BF (P=0,02) muscles. Conversely, when it was applied a 25Hz frequency, the angles of knee flexion showed no significant changes on neuromuscular response. Considering the two frequencies of vibration, the neuromuscular response showed significant differences in VI (P=0,046), VL (P=0,036), VM (P=0,028) e BF (P=0,025) muscles, only with 150° of knee flexion.

Discussion

The results of the present study suggest that in this specific position the increase on vibration frequencies, induce an increased on EMG activity on leg muscles. Similar results were observed by Hazell et col (2007). As suggest by Cardinale and Lim (2003), vibrations-induced increases in EMG activity and the consequent degree of motor unit synchronization have been shown to be dependent on the vibration frequency. It was concluded that exposing young people to low – frequency vibration, the neuromuscular activation decreases when increasing the degree of knee flexion. However, when using a degree of knee flexion of 150°, the electromyographic activity increases with the increasing frequency of vibration, more specifically, when increasing the vibration frequency from 15Hz to 25Hz.

References

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