ASSESSMENT OF CARDIOVASCULAR LOAD DURING STATIC EXERCISES PERFORMED ON A VIBRATION PLATFORM

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Introduction: Typical strength training requires performing heavy efforts to be effective. Cardiovascular system responds to this kind of training with high increase of arterial pressure. Whole body vibration (WBV) training also increases the muscle strength; however, it is accompanied with lesser increases in blood pressure. The vibration training is performed according to overload principle. An increase of load is achieved by increasing the amplitude of vibration, their frequency, and duration. Typically, the training frequencies ranging from 20 to 40 Hz are applied. The data describing effect of different vibration on cardiovascular response are scarce and ambiguous.

Objectives: To determine the effects of different frequencies on blood pressure and heart rate (HR).

Materials and methods: Four (26-55 years old) healthy women participated in the study. They were performing five different exercises on a vibration platform: squat, deep squat, calves, one leg squat: left/right leg. Each exercise lasted 30 sec with 60 sec rest between them. Three sessions were applied: without vibration, vibration of 20 Hz, and 30 Hz. The non-invasive blood pressure was measured by using Portapres. Blood pressure and ECG were continuously registered.

Results: When subjects performed exercises without vibration, a slight increase in systolic blood pressure (SBP), diastolic blood pressure (DBP), and the mean arterial pressure (MAP) were seen during squat and calves with no changes during one leg squat. Only during deep squat were significant elevations of SBP, DBP, MAP, and HR observed. Applying 20 Hz vibration did not changed this response. The cardiovascular response increased when exercises were performed with 30 Hz vibration; however, during a deep squat the cardiovascular response was not augmented. A similar pattern of HR changes was observed.

Conclusions: This study confirmed the presence of a small cardiovascular response to vibration training. The increase of frequency from 20 to 30 Hz augmented only slightly this response. When the subjects performed heavy exercises, vibration did not influence the cardiovascular response.