
The Effects of Movement Velocity During Squatting on Energy Expenditure and Substrate Utilization in Whole-Body Vibration

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- **Resumen:**
 - Garatachea, N., A. Jiménez, G. Bresciani, N.A. Mariño, J. González-Gallego, and J.A. de Paz. The effects of movement velocity during squatting on energy expenditure and substrate utilization in whole-body vibration. *J. Strength Cond. Res.* 21(2):594-598. 2007.-The purpose of this study was to examine whether and how cycle time duration affects energy expenditure and substrate utilization during whole-body vibration (WBV). Nine men performed 3 squatting exercises in execution frequency cycles of 6, 4, and 2 seconds to 90° knee flexion with vibration (Vb+) (frequency was set at 30 Hz and the amplitude of vibration was 4 mm) and without vibration (Vb?) during 3 minutes, each with an additional load of 30% of the subject's body weight. A 2-way analysis of variance for O₂ revealed a significant vibration condition main effect ($p < 0.001$) and a cycle time duration effect ($p < 0.001$). When differences were analyzed by Fisher's LSD test, cycle time duration of 2 seconds was significantly different from 4 and 6 seconds, both in Vb+ and Vb?. Total energy expenditure (EE_{tot}), carbohydrate oxidation rate (EE_{cho}), and fat oxidation rate (EE_{fat}) demonstrated a significant vibration condition main effect (EE_{tot}: $p < 0.01$; EE_{cho}: $p < 0.001$; EE_{fat}: $p < 0.001$) and cycle time duration main effect (EE_{tot} and EE_{cho}: $p < 0.001$; EE_{fat}: $p < 0.01$). EE_{tot}, EE_{cho}, and EE_{fat} post hoc comparisons indicated that values for the 2-second test significantly differed from 4 and 6 seconds when compared in the same vibration condition. O₂ and EE values were greater in Vb+ than in Vb? conditions with the same cycle time duration. Our study confirms that squatting at a greater frequency helps to maximize energy expenditure during exercise with or without vibration. Therefore, cycle time duration must be controlled when vibration exercise is prescribed.

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