

ABSTRACT

THESIS: The Effect of High and Low Amplitudes During Whole Body Vibration on Lower Leg Arterial Blood Flow
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Whole body vibration (WBV) is a technique that has been shown to induce positive blood flow changes, however little is known about the effect of different vibration amplitudes on arterial blood flow. **Purpose.** The purpose of this study was to determine the effect of 2 different amplitudes during an acute bout of WBV on blood flow through the popliteal artery. **Methods.** Thirty healthy, recreationally active subjects (15 women, 15 men) aged 19-34 years performed two, 10 - minute bouts of vibration at a frequency of 30 Hz and high amplitude (6 mm) or low amplitude (3 mm) in random order after a period of prone rest. Doppler ultrasound was used to assess changes in blood flow. Mean blood flow velocity, peak velocity, end-diastolic velocity, pulsatility index, and resistive index measures were taken immediately before vibration and immediately after. **Results.** Mean blood flow velocity increased after 10 minutes of WBV. Mean velocity increased more in the 6mm trial (pre= 21.6 ± 4.74 cm/s, post= 25.3 ± 6.11 cm/s) than in the 3mm trial (pre= 22.3 ± 4.33 cm/s, post= 23.5 ± 5.94 cm/s). Peak blood flow velocity increased following 10 minutes of WBV and increased more in the 6mm trial (pre= 37.1 ± 9.78 cm/s, post= 43.7 ± 10.95 cm/s) than in the 3mm trial (pre= 37.8 ± 8.92 cm/s, post= 39.4 ± 10.5 cm/s) following 10 minutes of passive WBV. Pulsatility index also increased significantly following 10 minutes of WBV and increased more in the 6mm trial (pre= 1.639 ± 0.1299 , post= 1.729 ± 0.1324) than in the 3mm trial (pre= 1.660 ± 0.1219 , post= 1.671 ± 0.1428). No main effects or interactions were observed for resistive index or end diastolic blood flow velocity ($P > 0.05$). **Conclusion.** Ten minutes of passive WBV increases blood flow velocity. High amplitude (6 mm) produced a more pronounced increase in blood flow than the low amplitude (3 mm). Given the relationship between blood flow velocity and WBV, these results suggest that amplitude plays a role in increasing blood flow and that high amplitude (6 mm) may be more effective than low amplitude (3 mm) in improving circulation to the lower leg.

Key Words. WHOLE BODY VIBRATION, BLOOD FLOW, ULTRASOUND, AMPLITUDE