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