

The Acute Effects of a Dynamic Whole Body Vibration Warm-up combined with Blood Flow Restriction on Muscle Peak Torque, Vertical Jump Power, Heart Rate (HR), and Blood Pressure (BP)

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ABSTRACT

Warm-ups are crucial for minimizing risks, such as injuries, and increasing performance. Performing warm-ups on a Whole Body Vibration (WBV) platform have shown to improve performance and strength by recruiting reflex triggered contractions. **PURPOSE:** The purpose of this study was to observe the effects of dynamic whole body vibration with blood flow restriction on muscle peak torque (strength) and vertical jump power. **METHODS:** Eight females (Mean \pm STDEV age = 21.8 \pm 4.3 years; height = 159.7 \pm 4.6 cm; Weight = 58.0 \pm 16.0 kg) and eight males (Mean \pm STDEV age = 21.8 \pm 2.9 years; height = 169.0 \pm 15.4 cm; Weight = 75.7 \pm 7.8 kg) performed four different warm-up sessions. The first session (control) used a cycle ergometer and the following sessions were randomized: one session using dynamic squats, one session using dynamic squats with whole body vibration (WBV), and one session using dynamic squats with whole body vibration (WBV) and blood flow restriction (BFR). Heart rate (HR), systolic blood pressure (SBP), and diastolic blood pressure (DBP) were observed and recorded before and after each warm-up. Tests for Vertical Jump Height and muscle peak torque were performed following each warm-up. Vertical counter movement jump test was performed 3 times with a 30 second rest between each attempt. Peak Muscle Torque was tested on the Biodex from an angle of 60 degrees knee extension. The test consisted of up to three maximum isometric extension contractions, each lasting 5 seconds with 2 minutes of rest between each set. **RESULTS:** No condition main effects of Vertical Jump (power) or Muscle Peak Torque (strength) were observed. Significant main effects for condition and time ($p < .01$) for HR before and after exercise were observed. A significant condition*time interaction ($p = .02$) for HR were also observed. A condition main effect ($p = .04$), time main effect ($p < .01$), and condition*time interaction ($p < .01$) were observed for SBP. In addition, a significant time main effect ($p = .02$) was seen for DBP. **CONCLUSION:** Dynamic WBV with BFR did not cause significant increases in Vertical Jump Height or Peak Muscle Torque of the participants. This could be due to the intensity and volume of the warm-up. The 110 degree squat angle may not mimic vertical jump enough to activate the required muscle fibers. The repetitions and sets of squats performed may not have been enough to cause a significant change. Also, the method for calculating pressure used for participant's BFR may not have been optimal for vertical jump height and peak muscle torque. Future studies using different dynamic squat angles, squat volumes, and pressure of BFR may show differences in Vertical Jump Height or Peak Muscle Torque.