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The Effects of Beetroot Juice Consumption on Cerebrovascular Function during an Orthostatic Stressor

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Beetroot juice (BRJ) consumption improves peripheral vascular function by increasing nitric oxide bioavailability and reducing sympathetic nerve activity. However, it is currently not known if BRJ consumption can improve altered cerebrovascular function during an orthostatic stressor.

Purpose: We tested the hypothesis that BRJ consumption would improve altered cerebrovascular function during lower body negative pressure (LBNP) in healthy participants. **Methods:** Five healthy participants (3 Females, Age: 24±2) completed a 5 min baseline followed by 7 min of LBNP at 40 mmHg. LBNP was performed pre (PRE) and three hours after consumption of 500 mL of BRJ (BRJc). Participants breathed a hypercapnic gas (3% CO₂, 21% O₂, 76% N₂) during baseline and LBNP. Breathing a hypercapnic gas acutely impairs cerebrovascular function. Heart rate (HR; ECG), mean arterial pressure (MAP; photoplethysmography), middle cerebral artery blood velocity (MCAv; transcranial Doppler) and end tidal carbon dioxide tension (PETCO₂; capnography) were continuously recorded. Cerebral vascular conductance (CVC) was calculated as the quotient of MCAv and MAP. Data were analyzed at baseline and at Min 1, 3, 5, and 7 of LBNP and reported as the change from baseline (Δ). **Results:** Baseline HR (PRE: 62±9 vs BRJc: 63±10 bpm; P=0.49), PETCO₂ (PRE: 47±2 vs BRJc: 48±3 mmHg; P=0.24), CVC (PRE: 0.92±0.20 vs BRJc: 0.89±0.14 cm/s/mmHg; P=0.17) were not different between conditions. Baseline MAP (PRE: 95±6 vs BRJc: 92±5 mmHg; P=0.06) and MCAv (PRE: 88±18 vs BRJc: 82±13 cm/s; P=0.03) were lower with BRJc. During LBNP, BRJc resulted in a greater increase in Δ HR at Min 1 (5±6 vs 10±8 bpm; P=0.04) and Min 3 (11±4 vs 15±6 bpm; P=0.06), an attenuated decrease in Δ MAP at Min 3 (-6±3 vs -4±4 mmHg; P=0.07) and Min 7 (-5±3 vs -2±4 mmHg; P=0.07) and a greater decrease in Δ CVC at Min 3 (-0.02±0.08 vs -0.07±0.11 cm/s/mmHg; P=0.08) and Min 7 (-0.04±0.07 vs -0.09±0.10 cm/s/mmHg; P=0.06). There were no differences between PRE and BRJc during LBNP for Δ PETCO₂ (P=0.54) and Δ MCAv (P=0.33). **Conclusion:** These preliminary data indicate the consumption of BRJ in healthy participants does not improve altered cerebrovascular function during an orthostatic stressor.