

ABSTRACT

THESIS PROJECT: The Effects of Heat and Hydration on Orthostatic Tolerance

STUDENT: Tristen McLean

DEGREE: Master of Science

COLLEGE: College of Health

DATE: July 2022

PAGES: 108

Purpose: There is a vast pool of data surrounding orthostatic tolerance; however, there is not much data including heat and hydration simultaneously with orthostatic tolerance. Therefore, the purpose of this study is to observe the effects of fluid loading on autonomic function and orthostatic tolerance during acute heat stress. **Methods:** Five men and one woman (23.17 ± 3.19 yrs) participated in this study. Following assessment of hydration status via urine specific gravity, participants were assigned to a condition (EU – euhydrated; HH – hyperhydrated). On the HH collection day, the participants consumed one liter of oral rehydration solution (ORS) containing 20 g glucose, 90 mEq/L Sodium, and 20 mEq/L Potassium mixed in 1L of water. The participants were passively heated until core temperature increased 1°C . Autonomic function was assessed by completing deep breathing, Valsalva maneuver, and tilt-table testing. Differences between HH and EU trials were analyzed using a paired T-test. **Results:** Significant findings were observed in the difference between EU and HH respiratory sinus arrhythmia (9.21 ± 1.49 bpm & 16.78 ± 3.96 bpm), Valsalva ratio (1.35 ± 0.22 & 1.60 ± 0.41), tilt time (3.84 ± 5.57 min. & 7.98 ± 7.31 min.), baseline plasma volume (59.77 ± 3.15 mL & 66.67 ± 2.35 mL), and heated baseline plasma volume (57.60 ± 4.45 mL & 65.20 ± 6.42 mL) with the HH variables all being at a higher value than that of the EU variables ($p < 0.05$). **Conclusion:** The use of an ORS can

alleviate some of the declines to autonomic functioning during combined orthostatic and heat stress.