ABSTRACT

THESIS: Effects of Head Trauma on Heart Rate, Blood Pressure, Cerebral Blow Flow, and Orthostatic Tolerance

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Contact-sports can elicit concussions, which impacts autonomic function, as well as elicit repetitive head trauma, where autonomic function has not yet been assessed. **Purpose:** To determine if differences in autonomic function exist among three groups (CTRL: healthy non-contact-sport participant; RHT: repetitive head trauma contact-sport participant; CONC: previous concussion). **Methods:** Forty men (16) and women (24), aged 18-37 (22±3), participated. Participants were grouped based on their sport and concussion history (CTRL, RHT, CONC). Body composition was measured via air displacement plethysmography. The participant was outfitted with equipment to evaluate heart rate, blood pressure, and cerebral-artery blood flow velocity (CBFv), as the participant performed three stimuli: deep breathing, Valsalva maneuver, and a 70° head-up tilt test. Following autonomic function testing, a YMCA submaximal cycle test was performed. All group comparisons were analyzed using a one-way ANOVA; all data are presented as means ± standard deviation. **Results:** The groups did not differ in respiratory sinus arrhythmia (CTRL: 22±6bpm, RHT: 21±8bpm, CONC: 19±7bpm; p=0.471), Valsalva ratio (CTRL: 2.19±0.39, RHT: 2.09±0.37, CONC: 2.00±0.47; p=0.519), CBFv (CTRL: 47.74±25.28cm/s, RHT: 40.99±10.93cm/s, CONC: 43.97±17.55cm/s; p=0.657), or tilt time (CTRL: 806.09±368.37sec, RHT: 943.07±339.54sec, CONC: 978.40±387.98sec;
p=0.479). However, CONC (113.24±11.64mmHg) had a significantly higher mean systolic blood pressure during the tilt test than CTRL (102.66±7.79mmHg; p=0.026), while RHT (107.9±9.0mmHg) was not significantly different than CTRL (p=0.39) or CONC (p=0.319).

**Conclusion:** Concussions may have lasting effects on autonomic function; future studies should control sex. Overwhelmingly, dysautonomia is not present during chronic recovery from concussions or in individuals with RHT from contact-sports.