

### 3. SWACSM Abstract

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## Autonomic and Cardiovascular Responses to Acute Exercise in Children with Autism Spectrum Disorder

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#### ABSTRACT

Autism Spectrum Disorder (ASD) is a complex neurological disorder identified in early childhood and is characterized by impaired social interaction and atypical behaviors. Limited studies reported that children with ASD tend to have higher heart rate (HR) and blood pressure (BP) at rest compared to typically developing children (TDC). Previously, we reported that HR and blood flow (BF) did not alter during exercise while BP significantly increased in ASD. Thus, we thought that ASD may have impaired autonomic control of cardiac output via differential contribution of HR and stroke volume (SV) to regulate BP during acute exercise. **PURPOSE:** To determine autonomic and cardiovascular responses to acute dynamic exercise in children with ASD. **METHODS:** A total of 36 adults, TDC and children with ASD participated in the study. HR from ECG, beat to beat arterial BP from Finapres and brachial BP, and SV from Modelflow, were continuously measured before, during and after 2 minutes of dynamic handgrip exercise at 35% and 50% of maximal voluntary contraction. Diameter, blood velocity, and flow of the brachial artery were measured using Doppler ultrasound on the contracting arm throughout the experiment. Time and frequency domains of HR variability indexes were used for autonomic function. **RESULTS:** Mean BP was significantly increased to exercise from rest in all groups with no group differences ( $\Delta 9.8 \pm 1.8$  adults,  $\Delta 8.3 \pm 1.2$  TDC, and  $\Delta 6.9 \pm 1.8$  ASD, mmHg). HR was significantly increased to exercise from rest in adults and TDC; however, there was no change in HR to exercise from rest in ASD ( $\Delta 11 \pm 1$  adults,  $\Delta 7 \pm 1$  TDC, and  $\Delta 1 \pm 1$  ASD, bpm). SV was unaltered from rest to exercise in all groups. Both adults and TDC had similar increase in BF during exercise compared to rest ( $\Delta 17 \pm 3$  adults vs.  $\Delta 14 \pm 2$  TDC cm/s); however, BF did not change from rest to exercise ( $\Delta 0.6 \pm 2.2$  ASD cm/s) in ASD. The rMSSD and high frequency of HRV were similar in all groups while very low frequency HRV was significantly lower in ASD. **CONCLUSION:** While HR and BF were altered to exercise in both control adults and TDC groups in similar fashion, HR and BF did not change in ASD children indicating impaired autonomic and vascular function. Higher total peripheral resistance may contribute to increase BP during exercise in ASD children without a significant contribution of cardiac output.

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