Postural control during quiet standing on firm and foam surfaces in children with and without Autism Spectrum Disorder (ASD)

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Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder which has shown significant motor impairment resulting in difficulty coordinating body movements.\(^1\) Multiple studies indicate dependence on visual information over proprioception to plan and control motor actions in autistic children.\(^2\),\(^3\) Using a BioSway force plate platform and ETG eye tracking glasses, we investigated how children with and without ASD use their vision to inform their postural stability. We hypothesized that individuals with ASD would be less stable during quiet standing on a foam surface compared to a firm surface within the ASD group, and less stable overall compared to typically developing (TD) children. Six children ages 10-12 participated in this ongoing study: three diagnosed with ASD, and three TD matched by stage of motor development. Participants completed two balance assessments on the BioSway: the Clinical Test for Sensory Integration in Balance (CTSIB) and the Limits of Stability (LoS) test. The CTSIB included three visual conditions: eyes open, eyes closed, and eyes open while in a translucent dome each tested on two different platform surfaces (firm and foam). Outcome measures from the CTSIB include stability index and sway index. Higher stability index indicated higher risk of fall. Higher sway index indicated greater postural instability. As predicted, the TD group had lower mean sway (M = 1.09, SD = 0.72) than the ASD group (M = 2.48, SD = 1.16) on the firm surface. The TD group also had lower mean stability (M = 0.94, SD = 0.23) than the ASD group (M = 1.4, SD = 0.55). For the foam surface, the TD group had lower mean sway (M = 2.23, SD = 0.81) than the ASD group (M = 2.32, SD = 0.77), and lower mean stability (M = 1.35, SD = 0.25) than the ASD group (M = 2.21, SD = 0.29). Based on the results, individuals in the ASD group showed greater postural instability than those in the TD group. Notably, the ASD group was as unstable in the firm condition as the TD group was in the foam condition. These data suggest that individuals with ASD have difficulty reweighting proprioceptive information to control posture and maintain balance. We will analyze the final dataset in a 2 (Group: ASD, TD) x 3 (Condition: EO, EC, Dome) x 2 (Surface: Foam, Firm) ANOVA. We will also examine the data collected from the LoS test. These data can contribute to our understanding of sensory influences on balance in ASD, and help inform the development of motor interventions for this population.

References
