

15. SWACSM Abstract

Alterations in Musculoskeletal Function and Body Composition in Children with Autism Spectrum Disorder

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ABSTRACT

Autism Spectrum Disorder (ASD) is a neurological disorder characterized by impaired social interaction and atypical behaviors. Children with ASD appear to have lower muscular function and low bone mineral density. Recent studies have indicated that adolescents with ASD develop obesity and bone fracture incidence at a higher rate compared to typically developing children (TDC). However, it is unclear if such weakened musculoskeletal function is a consequence of neurological disorder state in ASD or if it is due to the limited opportunity for physical activity and exercise in the ASD population. **PURPOSE:** To determine whether regional differences in body composition affect muscular strength differently in prepubescent ASD children compared to TDC. **METHODS:** A total of 36 adults, TDC, and children with ASD participated in the study. Muscular strength (i.e., torque, work, and power) during knee extension and flexion was measured at 90, 150, and 210 °/sec in the lower extremity using Humac Norm Isokinetic Dynamometer. Maximal isometric forearm muscular strength was measured using a handgrip dynamometer. Body mass index (BMI), waist-to-hip ratio, and whole-body scan from Dual Energy X-Ray Absorptiometry were used to identify the body composition. **RESULTS:** Compared to control adults, TDC and ASD had lower BMI (19.2±1.1 TDC, 21.7±1.7 ASD vs. 24.7±1.2 Adults, kg/m²). Compared to TDC, ASD children had significantly lower bone mass (2.6±.14 ASD vs. 3.0±0.14 TDC, %). Waist-to-hip ratio was higher for ASD (0.89±0.02 ASD vs. 0.83±0.02 TDC, p=0.058). The maximal forearm and leg strength were significantly lower in ASD compared to TDC normalized for their body weight (forearm; 27.9 ±3.4 ASD vs. 40.2 ± 3.4 TDC, kg and leg; 17.0 ±3.9 ASD vs. 27.1 ± 3.5 TDC, p<0.05). ASD group showed a significant inverse relationship with muscular strength and percent fat in the leg while TDC showed no relationship. **CONCLUSION:** These findings suggest that regional differences in body composition appeared to influence muscular strength in children with ASD, not in TDC. Less regional fat and higher bone mass rather than the total body mass may contribute to a higher forearm and leg muscular strength in children with ASD.

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