

Bracing Outcomes in Pediatric Patients with Autism Spectrum Disorder and Adolescent Idiopathic Scoliosis

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INTRODUCTION: With the increasing incidence of autism spectrum disorder (ASD), orthopaedic surgeons are encountering more patients with both ASD and adolescent idiopathic scoliosis (AIS). ASD-related challenges, such as communication difficulties and sensory sensitivity, could potentially impact compliance with brace wear, highlighting the need to understand how ASD influences bracing efficacy. The present study aims to evaluate the impact of ASD on brace treatment outcomes and progression to surgical thresholds in children with AIS by comparing post-bracing curvatures and treatment complications between those with and without ASD.

METHODS: Patients aged ≤ 18 undergoing bracing treatment for AIS from 2013 to 2023 were retrospectively identified. Patients with ASD were identified using ICD-10 codes and age-sex matched with non-ASD patients in a 1:2 ratio. Exclusion criteria included those with additional medical diagnoses that could influence the scoliosis (e.g., Rett syndrome), patients with curve magnitudes $>40^\circ$, those with incomplete treatment histories, patients undergoing treatment with the Providence night-time only braces, or those without adequate imaging available for retrospective review. Pre-treatment, in-brace, and post-treatment radiographs were assessed by a fellowship-trained pediatric orthopaedic surgeon. Scoliosis was considered at surgical thresholds for curve magnitudes $\geq 50^\circ$ for thoracic curves and $\geq 45^\circ$ for lumbar or thoracolumbar curves. Brace complications included intolerance due to behavioral outburst, sensory issues, rash, or infection. Noncompliance, defined as brace wear for <18 hours per day, was recorded but not considered a complication. Patients were followed until treatment completion.

RESULTS:

A total of 51 patients with AIS treated with bracing met the inclusion criteria (mean age: 13.3 ± 1.5 years), including 17 with ASD and 34 without ASD. The study population was predominantly male (64.7%) and had an average BMI in the 47th percentile. Pretreatment Cobb angle, Risser stage, curve directionality, and segment involvement showed no differences between groups. Treatment included Boston ($n=48$) and Rigo-Cheneau ($n=3$) braces. Post-treatment, ASD patients had larger curve magnitudes, averaging $48.3^\circ \pm 17.5^\circ$, compared to $37.8^\circ \pm 15.6^\circ$ in non-ASD patients ($P=0.034$). Overall, 33.3% of patients progressed to the surgical threshold, with 52.9% of ASD patients and 23.5% of non-ASD patients progressing to surgical range ($P=0.036$). ASD patients had a higher rate of brace-related complications compared to non-ASD patients ($P=0.004$). Additionally, family-reported compliance was lower in ASD patients compared to non-ASD patients ($P=0.019$). The mean treatment duration was 2.6 ± 0.9 years.

DISCUSSION AND CONCLUSION: The incidence of curve progression to surgical thresholds after bracing treatment for AIS in children with ASD was 52.9%, significantly higher than their non-ASD counterparts at 23.5%. Lower brace compliance among ASD patients, likely influenced by higher rates of brace-related complications, underscores the need for individualized bracing strategies and additional support to improve adherence. Given that bracing appears to be less tolerated and thus less effective in children with ASD, this study provides valuable data for guiding patient and parent counseling. Parents should be informed that outcomes might be less favorable for children with ASD compared to those without.