



Research Paper

## Beyond Braces: Next-Gen Solutions for Autistic Comfort In Orthodontics

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**Abstract:** Autism is a complex neurobehavioral disorder affecting cognition, emotion, language, and communication. It is a lifelong disability that affects perception and social interaction, with an unclear etiology. Individuals with autism struggle with social interaction and changes in their environment. Global efforts aim to improve the lives of those affected. Providing oral health care for autistic patients is challenging due to communication barriers and unpredictable behaviors. The incidence of malocclusion is higher in these special needs population, and the demand for orthodontic treatment is expected to rise with increased awareness and access to care. Understanding their difficulties and anticipating care challenges is crucial for successful orthodontic management. This review gathers insights on the oral health status of autistic patients, treatment challenges, precautions, and approaches. Effective management strategies for autistic patients are also discussed.

**Keywords:** Autism, Behaviour modification, Orthodontic approach, Preschool children

Received 01 June, 2024; Revised 08 June, 2024; Accepted 11 June, 2024 © The author(s) 2024.

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### I. Introduction:

Autism Spectrum Disorder is a heterogeneous neurodevelopmental syndrome classified under pervasive developmental disorders, often with unknown etiology. It includes autism, Asperger Disorder, Childhood Disintegrative Disorder, and Pervasive Developmental Disorder Not Otherwise Specified. It affects approximately 6 per 1,000 children, with boys three times more likely to be affected than girls.<sup>1</sup> Recent estimates show a prevalence of 11.3 per 1,000 in children aged eight, with a male-to-female ratio of 3:1.<sup>2</sup> The etiology of autism involves both genetic and environmental factors. Key genetic elements include the CNTNAP2 gene, de novo mutations, and mitochondrial defects. Autism Spectrum Disorders are influenced by a combination of genetic and environmental factors.<sup>3</sup> Genetic predisposition is more common in males and 20% of infants with affected older siblings develop this disorder. It's associated with conditions like muscular dystrophy, Down's syndrome, and neurofibromatosis.<sup>4</sup> Environmental factors, both prenatal and postnatal, contribute to this spectrum of Disorder. Prenatally, complications during pregnancy, premature birth, maternal alcohol/drug use, and specific medications like sodium valproate play a role.<sup>5</sup> Postnatally, diet, toxin exposure,

and drugs are influential. Neurobiological factors include structural and functional brain abnormalities, influenced by elevated intrauterine androgen concentrations, advanced maternal age, maternal bleeding, metabolic syndromes, abnormal neurotransmitter levels, intrauterine viral infections, and exposure to teratogenic drugs such as thalidomide and valproate.<sup>6</sup> Leo Kanner first identified autism in 1943, observing 11 children with distinct behaviors that hindered their social interactions.<sup>7</sup> Autism is marked by lifelong deficits in social, emotional, and communicative skills, alongside repetitive behaviors. The understanding of autism has evolved over time, with diagnostic concepts developing, including the condition Pervasive Developmental Disorder-Not Otherwise Specified, where some autism features are present.<sup>8</sup>

Early detection and intervention are crucial for improving long-term outcomes in Autism Spectrum Disorder, but diagnosing infants and toddlers is complex. Categorical approaches like the DSM provide official recognition and a conceptual basis for dimensional approaches.<sup>9</sup> Kanner's influential work led to autism's first recognition as a disorder in Diagnostic and Statistical Manual of Mental Disorders-III (1980).<sup>10</sup> The Diagnostic and Statistical Manual of Mental Disorders definitions of autism have been modified over the years. While dimensional diagnostic approaches offer potential advantages for diagnosing infants and children, these instruments also have intrinsic limitations.<sup>11</sup> Approximately 20% of autism cases involve regression, where children initially develop normally until age 3-4, then lose language and self-care skills, exhibiting more pronounced autism features.<sup>12</sup> In their first year, children with this entity show limited eye contact, reduced social responsiveness, and unusual sensory responses.<sup>13</sup> They exhibit decreased interest in people, smile less, have reduced attention to social stimuli, explore objects less, and struggle with arousal regulation. As children with Autism Spectrum Disorders age, delays in language-based problem-solving and social interaction become more evident.<sup>14</sup> Attention abnormalities, characterized by infants showing more interest in objects than people, are well-documented in these disorders. Neurobehavioral models, dating back to the 1960s and 1970s, have evolved to form testable hypotheses.<sup>15</sup> However, there's limited neuropsychological evidence concerning sensory perception and memory abilities in Autism Spectrum Disorders. "Theory of mind" is recognized as a key cognitive mechanism underlying abnormal social behaviour in this group of disorders. Research on toddlers with Autism Spectrum Disorders is expanding, focusing on unusual behaviours, developmental delays, motor mannerisms, and idiosyncratic material uses.<sup>16</sup>

Cognitive psychology highlights deficits in drawing conclusions about mental beliefs and difficulties in social use of eye contact, potentially linked to newly understand neurological functions influencing social functioning.<sup>17</sup> Key behavioural changes to monitor include turn-taking, eye contact intensity, and anticipatory postures. By 20 months, parents should observe facial expressions, pointing to show interest, and using traditional gestures.<sup>18</sup> Additional behaviours to check include social reciprocity, seeking shared enjoyment, imaginative play, and nodding. Social difficulties are the most significant predictor of Autism Spectrum Disorders diagnosis in older children. Preschool children with autism often lack early social skills, such as eye contact and social engagement, with significant difficulties in joint attention hindering social-cognitive development.<sup>19</sup>

## **II. Discussion**

The severity with which Autism Spectrum Disorders manifests in an individual is hugely varied. Affected individuals range from those needing life-long care to high-functioning individuals with better than normal cognition, and therefore the extent to which Autism Spectrum Disorders impacts a patient's care will also vary.<sup>20</sup> As awareness of autism increases and access to care improves, the demand for orthodontic treatment from this group of patients is likely to increase.<sup>21</sup> General difficulties which may be encountered in treating patients affected by Autism Spectrum Disorders include: Various results have been found in studies on children with autism with regard to caries and periodontal status. In a population-based study, parents reported that their children's teeth were in worse condition than other children.<sup>22</sup> On the other hand, some other studies have shown that there was no significant difference between individuals with autism and without autism with regard to the prevalence of cavity.<sup>23</sup>

In some studies, low cavity frequency and severity were determined. Some drugs used for patients with autism may affect the flow of saliva, and this may lead to an increased risk of cavity.<sup>24</sup> Blomqvist et al. found that individuals with autism have a higher cavity risk due to infrequent brushing and reduced saliva flow. Despite brushing less, they had lower gingivitis levels, likely from intensive brushing, especially on buccal surfaces. They also snacked less, reducing dental plaque.<sup>25</sup> Jaber's study echoed these findings, highlighting cavities, poor oral hygiene, and unmet treatment needs in autistic patients.<sup>26</sup> Another study showed heightened gingival inflammation, poor hygiene, and low saliva pH in autistic individuals, likely exacerbated by prolonged soft, sugary food consumption due to language coordination difficulties.<sup>27</sup> Children with autism are more susceptible to dental issues due to dietary preferences, oral hygiene challenges, and habits like bruxism and tongue thrusting, which can lead to soft tissue injuries, tooth wear, and malocclusions.<sup>28</sup> Tailored dental care and orthodontic treatments are crucial for addressing these challenges, promoting oral health, and enhancing

treatment outcomes.<sup>29</sup> Personalized orthodontic care ensures optimal treatment by accommodating unique needs, reducing complications, and considering complex medical histories. This approach improves patient satisfaction, minimizes risks, and helps special needs patients tolerate dental appliances better, ensuring adherence to their treatment regimen and preventing potential oral health issues.<sup>30</sup> Preventive dental care is crucial for evaluating cavity risk, especially as children with autism often have limited access to dental services. Despite needing more restorative/surgical visits, they receive fewer preventive appointments due to barriers like financial issues.<sup>31</sup> Community efforts and involvement of relevant authorities is essential to address these disparities. Behavioral management strategies, clear communication, and tailored approaches are crucial for successful dental care in autistic children. The "tell-show-do" method, visual aids, and parental presence enhance trust and cooperation during dental procedures for autistic children.

Home exercises and visual support tools assist in cooperation, with sedation available when necessary.<sup>32</sup> In orthodontics, patient management prioritizes communication, routine maintenance, and sensory-friendly environments, with gradual appliance introduction and regular monitoring. Long-term support includes resources for patients and caregivers, with a push for further education in special needs dentistry among professionals.<sup>33</sup> Challenges like consent issues and access to specialized care persist. Distance learning programs aid orthodontists in understanding interventions, including medication and diet effects on oral health.<sup>34</sup> Maintaining orthodontic appliances is difficult due to oral motor sensory issues. Communication challenges affect compensation and treatment duration in orthodontics.<sup>35</sup> Pre-visit strategies aim to boost confidence, while behavioral guidance and sensory adaptation techniques are employed during subsequent visits. Orthodontists adjust methods and treatment plans to accommodate environmental factors.<sup>36</sup> Applied Behavioral Analysis focuses on behaviour modification, supported by pain management and nursing assistance. Positive reinforcement aids compliance, particularly in adolescents requiring advanced pain and anxiety control measures.<sup>37</sup> Sonicare kids toothbrushes, sealants, and fluorides are recommended for preventive care. Promoting oral hygiene independence and demonstrating effective cleaning techniques are crucial.<sup>38</sup> Consistency in oral hygiene practices, antimicrobial agent use, and regular prophylaxis are essential for periodontal health. Phenytoin may be suggested for delayed tooth eruption, and strategic appointment scheduling, along with mouth guards for bruxism, supports treatment.<sup>39</sup> Colored appliances improve treatment experience, while legal requirements mandate valid consent for treatment decisions.<sup>40</sup>

Orthodontists face challenges managing unrealistic treatment expectations from families of Autism Spectrum Disorder patients, who may struggle with compliance. Maintaining ongoing consent validity is crucial, with legal precedence prioritizing patient wishes over parental requests.<sup>41</sup> Legislation such as the Disability, Discrimination, and Equality Act prohibits discrimination against Autism Spectrum Disorder individuals seeking orthodontic services, addressing both direct and indirect discrimination.<sup>42</sup> The Mental Capacity Act allows trusted individuals to make decisions for those lacking decision-making capacity, ensuring patient needs are considered.<sup>43</sup> Autistic patients' capacities can fluctuate, allowing for decision-making when appropriate, often involving consultation with close relatives, friends, caregivers, and legal representatives.<sup>44</sup> Restrictions on those lacking capacity may be considered deprivation of liberty, assessed on a case-by-case basis.<sup>45</sup> Advance written statements outlining preferences, especially regarding life-threatening procedures, are legally binding and may be communicated to their support network.<sup>46</sup> The Commission on Dental Accreditation (CODA) has implemented new education standards to enhance dental professionals' preparation for treating ASD patients effectively.<sup>47</sup>

### **III. Conclusion**

Orthodontic care significantly improves the quality of life for special needs patients by customizing treatment to address their unique challenges, leading to optimal outcomes and boosted self-confidence. Despite initial complexity, selecting the appropriate appliance for children with Autism Spectrum Disorders can result in successful outcomes. Overcoming home management challenges with competent support enhances the oral health and overall well-being of these patients without altering their emotions. Future studies could further explore this approach. Understanding each patient's unique needs is essential, and a comprehensive understanding of their behavioral profile is crucial for successful dental management. Tailoring treatment approaches to their behavior orientation can yield positive results.

#### **Financial support and sponsorship**

Nil

#### **Conflicts of interest**

There are no conflicts of interest

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