

Dental Care of Patients with Autism Spectrum Disorder

Abstract:

Autism is a neurodevelopmental disorder marked by significant difficulties in language skills, social interaction and comprehension of abstract concepts. The cerebellum and limbic regions of brain exhibit structural and functional abnormalities, contributing to the wide array of systemic and behavioural symptoms associated with this condition. Dental professionals treating patients with an autism spectrum disorder (ASD) diagnosis must use a family-centered approach that takes into account the preferences and concerns of the particular medical needs, behaviours, and requirements of every patient. In the United States, one in 44 people receive an ASD diagnosis, commonly in childhood, compared to a global prevalence of about 1%. ASD affects boys four times more frequently than it does girls. Genetics may be involved in the aetiology of ASD. The risk of ASD may also be increased by environmental variables like oxidative stress, older parental age at time of conception, mitochondrial malfunction as well as exogenous factors like maternal exposure to alcohol and smoke. Maternal stress may be a factor in the rise in ASD symptoms. The dental care of a child with autism necessitates a thorough knowledge of the autism's history and the theories of behavioural guiding that are now in use. The dental expert should be adaptable enough to change the treatment strategy accordingly.

Key-words: autism, children, dental, autistic, oral

Introduction:

Autism is characterized as a developmental anomaly characterised by difficulty in social communication, inflexible, repetitive behaviour, and atypical sensory sensitivity.[1] It is also defined as a neurodevelopmental disorder that persists from childhood into adulthood. In most cases, signs of this disorder became apparent within the first five years of life. According to the World Health Organization's 2019 report, approximately 1 in every 100 children worldwide is diagnosed with ASD.[2] However, this is an average estimate, and prevalence rates vary substantially between different regions. Controlled studies have reported much higher figures. The prevalence of ASD in many low- and middle-income countries is still unknown. Epidemiological studies conducted over the past 50 years have shown that the prevalence of ASD is increasing globally.[3] A recent study found that individuals with autism often require assistance with at least one activity daily. This includes support for cognitive and emotional tasks (39.2%), self-care (30.9%) and mobility (33.2%).[4] One critical area of self-care that can be significantly affected by ASD is oral health.[5] The concerns

regarding the patient's safety and inability towards accessing the oral cavity can make dental treatments challenging. This is due to rigid, repetitive behaviours to serious self-harm tendencies like head banging, rocking. Sometimes patients on autism spectrum need special restraining devices, dental personnel who have a prior experience in dealing with such behaviour, tools for behaviour modification. Such arrangements are not readily available in normal dental set up. There is a need to educate dentists on special challenges faced by this group of patients. This review highlights clinical

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features of ASD with emphasis on oral health, hindrances to dental care access, behavioural and pharmacological management techniques. It also stresses on the role of the dental team as a unit, peer and parent motivation, education as well as government support in dealing with this neurological disability as an interdisciplinary approach.

Methodology:

A systematic search was conducted using standard databases and search engines. Articles published until December 2024 with keywords such as Autism spectrum disorder, children, non-autistic control, protective stabilization. Included study designs were observational and interventional including systematic reviews in English language which analysed dental care of patients with autism. Only studies with structured and robust research designs, adequate population size and relevant conclusions were considered. Articles with inadequate population size and low evidence articles were excluded.

Characteristics of ASD:

1. Impairment of social communication:

The first signs of autism include inability to respond to collective attention and lack of appropriate eye contact. Some may reject or ignore the social approaches of others interpreting body language signs.

2. Impairment of speech/language:

Patients have marked defects in expressive and receptive language communication. Few express their emotions verbally, many communicate non-verbally or require a specific device.

3. Stereotyped and restricted patterns of interests, activities and behaviour.
4. Eating disorders like overeating, eating only particular foods and pica (compulsive eating of material that may or may not be food stuff).
5. Sleep disorders
6. Bowel, urinary issues and toileting problems
7. Self inflicting injurious behaviour such as self-biting, severe scratching, face slapping and head hitting.

Oral Health and Autism:

Oral health is a state of complete relief from any form of oral disability including dental caries, periodontal diseases, loss of teeth, diseases of orofacial region and oral cancer. If present these can significantly impact an individual's ability to eat, smile, bite and chew properly, which in turn affects their psychological well-being.[6] Individuals with ASD often face challenges that can negatively impact both their oral health and overall quality of life.[7]

1. ASD and Dental caries:

Previous studies have found that individuals with autism tend to have a higher occurrence of dental cavities compared to other oral diseases.[8], non-autistic controls.[9], and schizophrenia patients.[10] However, some studies suggest that ASD patients may have fewer cavities than their healthy siblings.[11,12] and other children with developmental disabilities.[13] The study by Da Silva et al. primarily investigated the occurrence of dental cavities and periodontal disease among individuals with ASD. Their findings revealed a significant prevalence of periodontal disease (69.4%) and dental caries (60.6%) in this population.[14] Factors like age, oral hygiene and diet of an autistic child commonly influence the prevalence of dental caries in this group. It was also found that autistic individuals prefer soft, sticky foods and habitual inclusion of sweet foods as a reward makes such kind of diet a significant risk factor for dental caries.[15]

2. ASD and Malocclusion:

Autistic patients examined by orthodontists had greater rates of open bites, Class II molar relationship tendencies, spacing and reverse overjet[16]. Additional factors such as poor muscle coordination, changes in muscle tone,[17] and habits like thumb sucking and object biting contribute to changes in dental alignment and facial structures in children with ASD.[18] Frequent dental issues in this group include open bites.[19,20] poor lip closure, protruding maxillary incisors.[17,20], and increased overjet.[21] It is likely that certain malocclusions will develop due to children with autism's frequent tongue thrusting, bruxism, and other detrimental practices as well as their poor oral health[9]. These factors, either alone or in combination, may heighten the risk of traumatic dental injury.[22]

3. ASD and Traumatic injuries:

Traumatic dental injury is one of the major oral health concerns affecting individuals with ASD. It commonly occurs due to the impact of external forces on dental structures, especially in children and adolescents.[23] Individuals with special needs face a greater likelihood of experiencing traumatic dental injury due to challenges in motor, cognitive and behaviour function.[24] Behaviours such as self-harm, aggression and impulsive reactions -frequently observed in autistic individuals-can further heighten the risk of dental trauma.[24,25] A study reported a 22% prevalence of traumatic dental injuries (TDI) among patients with ASD, which is significantly higher compared to neurotypical individuals.[22]

Self-injurious behaviour is another major risk factor.[26] Most individuals with ASD experience hyperactivity, anxiousness, and obsessive-compulsive tendencies that may lead to self-injury.[27] It can vary in severity from mild to intense banging of the head, targeting the mouth along with oral-facial complex, potentially explaining the higher rate of dental injuries in this population.[20]

According to the research by Andreasen et al. prevalence of these traumatic dental injuries is shaped by behavioural, cultural and socio-economic influences.[28]

4. Oral health related quality of life of autistic child (OHRQoL)

Oral health plays a crucial role in the overall quality of life for autistic children. Oral diseases can significantly impact daily activities and general well-being. Since children in this age group often rely on their parents for care, their oral health can also influence their parents' quality of life.(OHRQoL).[29] A study conducted by Qiao et al. in China compared the oral health of children with and without autism spectrum disorders (ASD). The findings indicated that children with ASD experienced higher rates of poor oral hygiene and halitosis. Additionally, they often exhibited inadequate oral hygiene habits and did not visit the dentists frequently[30]. Another study (Orellana et al.) reported that only about 25% of autistic children could brush their teeth without assistance, while the majority required parental support. This highlights how a child's well-being can directly impact their caregivers' quality of life (QoL).[31] Patients with higher intelligent quotient require relatively minimal supervision compared to those with lower intelligent quotient who require a protected environment throughout their lives.[32]

Barriers to Dental Care Access:

Providing dental care for children with ASD presents several challenges. Key barriers include the child's response to dental procedures, financial constraint and lack of insurance coverage.[33] Guardians of children battling autism and other developmental disabilities (DD) have also reported that their children are averse to dental care, face challenges related to their medical condition and struggle to find a skilled dentist willing to treat them.[34]

Difficulties in assessing sensory and behavioural characteristics of autistic patients,act as key contributors to unmet dental needs and communication gap.[5]

Category	Barrier
Sensory Sensitivities	Hypersensitivity to sounds, lights and tactile sensations during different dental procedures.
Financial Constraints	High cost of dental treatments for specialized services
Physical Environment	Dental settings that lack comfort
Access to Specialized Care	Limited availability of skilled clinicians
Behavioural Factors	Anxiety and fear associated with dental treatments
Communication Difficulties	Expressing discomfort and following instructions is usually challenging for autistic children

Table 1: Barriers to dental care access of autistic children

Management of ASD:

To facilitate dental treatment, a number of fundamental behaviour guidance techniques have been suggested such as the use of the tell-show-do strategy, parental guidance, brief unambiguous directives, and differentiated verbal reinforcement.[12] Patients with autism are able to undergo clinical dental examination through the enforcement of coordinated use of reinforcement and sensory adaptation. Reward statements might not have the desired effects on a youngster with limited receptive abilities. Some management strategies, including positive reinforcement, may work better with younger autistic children. Therefore, the impact of a child's biological age on social skill set may be crucial in managing the conduct of an autistic patient.[33]

Finding the factors that cause aversive behaviour may help create the right circumstances around autistic youngsters to comply at the dental office. The behavioural functional evaluation procedure may be carried out when parents are consulted prior to the appointment. The dentist can then plan the at-home preparation, which includes familiarising the child with dental tools, teaching the child the skills needed for the dental check-up through phrases like "open your mouth," and creating personalised photographic books to help the child become accustomed to the dental clinic.[19] The latter paradigm makes use of kids' preference for visual communication over spoken communication.[35]

1. Behaviour Management Protocol

1.1 Visual pedagogy

Visual pedagogy has been used to introduce oral hygiene to children with autism through a sequence of coloured photos that show step-by-step dental instructions.[35,36] If ability of the child is hampered by a distaste of flavour and texture of the toothpaste, toothbrush, child with ASD may be introduced to replacements such as washcloth, toothbrushes with different

textures and designs, or a powered toothbrush. Similar to this, trying out several toothpastes under the supervision of a parent or dental professional will help you decide which one has the most bearable flavour. [37]

With the perspective of independent self-brushing behaviour pre- and post-test design yielded positive results with notable improvement in children's ability to brush independently. Initially, 33.7% of the steps were completed by children at pre-test stage, which increased to 77.5% post-test. Additionally, four children were able to achieve full independence in brushing. Parental surveys also indicated a significant increase in the children's autonomy, with some brushing their teeth up to three times a day as part of their hygiene routine.[38]

1.2 Sensory adapted environment:

Loud, unanticipated noises in close proximity have the potential to cause distraction, unpleasant reactions, and behavioural issues. It stands to reason that in crowded dental offices with several operating chairs in the same unit, noise disruptions would be amplified. When exposed to light, autistic youngsters may continue to hide their eyes or squint while their usually developing peers adjust without any issues.[39] Parents can be requested to send their child's admirable music CD or video. Length of the dental appointment and the occurrence of sensory sensitivity should be minimised.[11] A dedicated operating room might be set up specifically for any surgical treatment of the autistic youngster in order to achieve this goal. Finally, dental professionals and assistants should continually focus on detecting parameters-triggering locations of aberrant reactions even while the process is taking place.

1.3 Applied behaviour analysis:

The field of psychology known as "Applied Behaviour Analysis" aims to change conduct by examining how behaviour and environment interact. Through shaping, the kid is encouraged to eventually adopt the behaviour on his own will through gradual approximations. Autistic children may be trained to be seated on the dental chair on their own using this strategy. Establishing communication with an ASD child may benefit from the use of shaping and reinforcement as appropriate for the circumstances.[19]

1.4 Advanced behaviour guidance methods:

Patients with ASD are frequently given antipsychotic drugs to treat their irritability, discomfort, self-harming conduct, violence, and delusions.[40] Dental healthcare professionals should be aware of the medications' oral side effects, which

include xerostomia, sialorrhea, sialadenitis, stomatitis, gingival hypertrophy, edema, and tongue discolouration.[41] In about 40% of instances, the combination of behavioural abnormalities associated with autism and intervention strategies includes the use of general anaesthesia. Advanced behaviour guiding techniques such as conscious sedation, nitrous oxide inhalation, protective stabilisation with the use of a limiting device, dental professionals, or parents, have been shown to be less popular with ASD patients.[40]

2. Pharmacological Management Protocol:

Psychotropic medications, such as antidepressants, antipsychotics, anticonvulsants, and central nervous system stimulants, are essential for medical treatment in order to control the accompanying aggression, hyperactivity, self-mutilation, and peevishness.[42] The most popular alternative treatment is pyridoxine in higher doses.[43] Many of these medications have oral and systemic adverse effects. Dental professionals must be familiar with the characteristics of these medications as shown in table 2 below.

CATEGORY	EXAMPLES OF MEDICATIONS	USES	SIDE EFFECTS
CNS Stimulants	Methylphenidate, Dextroamphetamine salts	Used in stimulating the brain, improve concentration and confidence, increase alertness and attention.	Xerostomia
Antipsychotics	Risperidone, Clozapine, Quetiapine	Reduces the symptoms of mania, anxiety and depression.	Xerostomia, sialorrhea, dysphagia, dysgeusia, stomatitis, gingivitis, tongue discoloration, postural low blood pressure and difficulty swallowing
Antidepressants	Fluoxetine, Sertraline	Relieves the symptoms of depression like irritability, difficulty in sleeping, low mood and anxiety.	Dry mouth, inflammation of salivary glands, gum disease, mouth ulcers, inflammation of tongue and its discoloration.
Anticonvulsants	Carbamazepine, Valproate	Help to treat seizures, epilepsy, neuropathic pain.	Dry mouth, altered taste perception, gum disease, tongue discoloration, prolonged use may lead to excessive bleeding due to reduced platelet count.
Antihypertensives	Clonidine	Helps in preventing complications related to high blood pressure such as myocardial infarction, heart stroke, heart failure, kidney failure.	Xerostomia, dysphagia, sialadenitis

Table 2: Overview of commonly prescribed medications for individuals with autism and their associated side effects.

Fluoxetine, one of the most often prescribed antidepressants, can induce severe allergic tendencies like swollen face and upper respiratory tract, which makes prophylaxis challenging for both healthcare providers and patients. Methylphenidate when specifically used to treat autistic hyperactivity, local anaesthesia with a vasoconstrictor should not be administered since it may result in tachycardia or a hypertensive crisis.[44]

3. Personnel Management Protocol

3.1 Role of dentist:

Dentists play a critical role in providing dental treatment to people with Autism spectrum disorder (ASD). Due to distinctive behaviours that might make dental operations more difficult, dentists need to have a fundamental knowledge of ASD and how it influences patients' behaviour as well as parents' response.

Additionally, explaining processes in a way that makes sense to the patient can be accomplished by employing visual aids like photographs or models. Since certain patients might need more time to comprehend information than others, it's crucial for the dentist to allot extra time for communication during appointments.

By noting what went well and what didn't during past appointments, keeping records of each appointment can make subsequent visits easier. When working with people who have ASD, dentists need to be patient and empathic.

Dental team's role in caries prevention[45]:

Strategies for oral healthcare improvisation for children with autism are as follows:

- Verbal instructions for the caregiver/parent and patient before commencing treatment
- Sturdy, profound touch (instead of a lighter touch)
- Patient seating should be preceded by a reclining dental chair.
- Patients are provided dark glasses to block out light.
- Headphones provided to lower the noise associated with dental/rotary instruments.
- Better tastes and textures in oral prophylaxis pastes.
- Blanket for added comfort.

For patients with autism, oral hygiene education is essential for optimal oral health. Patients with ASD may benefit from using assessment tools (caries risk) like those created by American Dental Association and San Francisco School of Dentistry.[6]

Appointment structure:

The purpose of the first meeting is to build rapport and establish trust. Understanding what the patient is capable of accomplishing is more important than understanding what the patient is unable to achieve.[7] To prevent frustration among these patients, whose attention spans are extremely short, ell-planned schedules should be given from second appointment onwards. The lounge waiting period should not last longer than 10 to 15 minutes.[8] routine should be formed for same timing of the day, same dental personnel in order to accommodate the autistic person's inclination for sameness and dislike to change.[9] Any method involving actual work should not be discussed while it is being done.

As the autistic youngster is easily distracted, movement of personnel should be limited.[50] To familiarise the patient with the clinic and ensure their comfort, parents may be provided pictures or a tale about the dental clinic.

3.2 Role of family and online information services:

Training parents in management strategies should be aimed at reducing stress. The dental staff should try to direct parents to reliable networks of social and professional assistance. Therefore, having access to unwavering scientific data will stimulate active participation of parents in treatment strategies and boost self-assurance. Dental professionals should post evidence-based educational materials and regulated, dependable data about dental treatment strategies of special care patients on their website

4. Role of government

Oral health preventive programmes

There is evidence that poor oral hygiene is seen in autistic children which makes them prone to other oral diseases such as caries, gingivitis, periodontitis etc. Therefore, implementing early oral hygiene education, regular consultations, and scheduled dental visits is not only essential for maintaining a child's overall health but also plays a crucial role in preventing serious dental issues. Also, there should be a scheduled communication between the dentist and the patient's psychologist to inculcate sensory management approach which can improve the patient's oral hygiene practices.[51] Additionally, this proactive approach helps reduce the financial strain on public health services and the broader healthcare system.[52]

A study demonstrated that implementing a targeted oral health prevention program can effectively improve the overall oral health condition of children with ASD.[53]

Conclusion:

As we draw to a close, this review on dental treatment for people with autism spectrum disorder (ASD), it is critical to remember that each person with ASD has different problems. Together, the dentist, parent, or other carer must work to ensure that the patient has a favourable experience. Dentists ought to be familiar with ASD, particularly its behavioural patterns and communication patterns. During procedures, they must also create a calm atmosphere, speak in a non-threatening manner, take frequent breaks, and make sure that all instruments are introduced progressively. Ensuring that their child receives good dental care at home is a responsibility shared equally by parents. This entails teaching their child proper dental hygiene practices like routine brushing and flossing as well as preparing them for any forthcoming treatments. Individuals with ASD may benefit greatly from behaviour management approaches like Tell-Show-Do or desensitisation methods to help them feel more at ease during appointments. These suggestions can help everyone involved have a less stressful experience when visiting the dentist.

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