

# Autism Spectrum Disorders-A Review on the Recent Advances in the Dental Management of Autistic Children.

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## ABSTRACT

Autism spectrum disorder (ASD) is a complex developmental disorder that can cause problems with thinking, feeling, language and the ability to relate to others. It is a neurological disorder, which means it affects the functioning of the brain. (American psychiatric association). ASD presents challenges for patient, caregiver/parent and dental team. Major concerns in providing dental care include behavioral management and side effects of medications. But majority of the time the treatment imparted to these children are partial or compromised due to difficulties in behavior management. It is an undeniable fact that the disabled populations usually have higher prevalence of poor oral hygiene, dental caries and compromised periodontal health than the otherwise healthy population. Oral health of children with special health care needs has been one of grey areas in the field of dentistry. To provide satisfactory dental care to ASD patients, dental practitioners should familiarize themselves with the current management techniques and techniques that are acceptable to parents and guardians. The aim of this paper is to review on diagnosis of ASD for dentist and behavior management techniques for ASD with emphasis on recent modifications in behavior management technique for these children.

**Keywords:** Autism, Autism Spectrum Disorder, Dentistry, Behavioral management, Dental fear, Rett syndrome, SADE, recent advances.

## INTRODUCTION

Autism spectrum disorders (ASD) are a group of neuropsychiatric disorders which show specific deviances and delays in communication, cognition and social development. Pervasive developmental disorders, Asperger's syndrome, Rett syndrome, and childhood degenerative disorders are all considered to be a part of the ASD group, but the distinction between these entities is not clear. Autistic children often exhibit disruptive behavior like aggression, tantrums, or self-injury which can interfere with the child's daily functioning and also poses a challenge to the parents and caregivers. Research on Autism Spectrum Disorder (ASD) has progressed in leaps and bounds with regard to its early identification and diagnosis.<sup>[1]</sup>

With the wide area of the research it is extremely difficult for any single professional to keep abreast of all the developments in this area. Dentists usually are the first health care professionals to treat very young patients in a n up-close personal

atmosphere where communication is absolutely essential. Often, dentists may be the first health care professionals to identify that a child is having some type of irrational behavior and the parents may have suspected instinctively and emotionally but never faced objectively. In many instances this idiosyncratic behavior of the child is attributed to immaturity or the "terrible 2s". Hence, early screening of these children for ASD can be extremely helpful to both the children and their families for proper diagnosis and intervention.<sup>2</sup>

There is currently a high rise in the number of disabled patients, which has led to an increase in need for knowledge of these conditions and different oral and dental finding associated with them. The caries risk prediction models conclude that, past caries experience is the best predictor of new caries experience and good oral health throughout infancy and early childhood contributes to better health in adulthood.<sup>[2]</sup>

ASD can be a huge challenge for dental practitioners in terms of communication and management. Hence, the dental team should be flexible enough to manage these individuals according to their needs. Children with ASD usually have a high rate of anxiety when they attend dental appointments. The fear of the unknown, trouble with direct communication, hand gestures, and sensitivity to loud noises can further

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more lead to noncompliance and uncooperative behavior.<sup>[2]</sup> The aim of this review is to enlighten the dentists about the early diagnosis and behavioral management techniques with recent advances, that could assist or enhance the management and treatment of ASD individuals in the dental office.<sup>[2]</sup>

## MATERIALS AND METHODS

A Medline, google search and PubMed database search from 1950 to 2017 using terms Autism, behavior management, ASD, Rett's syndrome, Autistic Disorder, Autism Spectrum Disorder, pervasive developmental disorders not otherwise specified, dental fear, treatment, oral health, parental acceptance, SADE, Sensory perception, recent advances, prevalence, dental caries and special children was conducted. The search returned 600 articles, however only 40 articles specifically related to recent advances in dental treatment of ASD were included. Articles were excluded if they were not written in English, did not have a reproducible methodology, were not associated with ASD patients, or did not have any relationship to dental treatment or behavioral management of ASD patient in a dental environment. All articles were compared and contrasted for current methods of diagnosis of ASD, effects of ASD on oral health and the most consistently accepted, and non-accepted methods of behavioral management.

### What is an autism spectrum disorder?

ASD refers to a highly variable range of neurodevelopmental disorders observed in young children.<sup>[3]</sup> Often, parents, caregivers, teachers, or the healthcare workers may notice some irrational behaviors, delay in speech or repetitive speech patterns and constant mood swings that indicate a need for a consultation. By the age of two years, 80% of parents notice lack of meaningful gestures or babbling, excessive single word usage without spontaneous phrases, failure to respond to their name, repetitive hand flapping, an aversion to hugging or touching, and difficulty in making eye contact. These symptoms may either be mild, or severe enough for parents to seek professional advice.<sup>[3,4]</sup>

### Autism

Autism is a Greek word 'autos' meaning self or preoccupied. Any type of stimulation from the outside world is considered an intrusion by the autistic kids.<sup>[5]</sup> The diagnosis of ASD is based on both testing and behavioral observation of an extensive list of characteristics such as impairment of social interaction and communication, restricted interests, and focus and repetitive behavior. These characteristics become more evident when in the

course of treating these children clinicians observe the lack of eye contact, echolalia (repetition of the last word you say), self-infliction of pain, addiction to a specific routine and sometimes expert recall of complicated minutiae out of context with the moment. About 30% to 50% of these children do not develop natural speech patterns.<sup>[6,7]</sup> Interestingly children affected by ASD usually possess a strong affliction towards art or music beyond the average, but on contrary they may be incapable of even managing the more mundane tasks of day to day life, such as brushing their teeth, dressing themselves, etc.<sup>[6-9]</sup> They lack empathy and fail to appreciate or understand irony or sarcasm.<sup>[10]</sup>

The hallmark of ASD is their compulsive repetitive behavior.<sup>[6,7]</sup> Repetitive behavior is generally measured on a repetitive behavior scale which evaluates the purposeless movement such as hand flapping or body rocking, echolalia or repetitive speech, compulsive behavior like arranging objects in a certain pattern, and incessant humming. Ritualism is characteristic of ASD. The compulsion of doing things in the same order, one certain toy, the same chair with the same person, one particular television program, etc.<sup>[11]</sup> Self-abuse, ranging from biting their hands to hitting themselves in the head as if they were oblivious to pain, is an often encountered symptom. Parents complain that their child usually has no definitive awareness of self. In the more severe situations, they chew their toys or gloves employed in an attempt to mitigate the physical damage they inflict on them. There are number of variations in the behavior pattern one child may be nonverbal, using gestures or screams, whereas another child may talk incessantly and compulsively about a favorite subject. This kind of behavior should not be mistaken for a lack of intelligence.<sup>[11,12]</sup>

### Regressive Autism

Majority of children with ASD display early onset of the symptoms, whereas about 30% of them seem to be normal when evaluating all the development markers such as gesturing, smiling, talking, walking, socialization, eye contact, etc. and then suddenly at 2 to 3 years of age a regression takes place.<sup>[13]</sup> Initially, it may seem like a hearing loss, but then there is a noticeable decline in word skills and social play. Children begin to lose their acquired language, social awareness and motor functions as well. They may no longer want to be hugged or held. Temper tantrums, aggressiveness, and extended crying spells become the routine.<sup>[14,15]</sup> Pervasive Developmental Disorder–Not Otherwise Specified

The diagnosis of pervasive developmental disorder is made when some autistic symptoms are evident but the entire set of criteria is not present. Generally these children are higher functioning,

have fewer communication problems, and often respond very positively to interventions.

### **Asperger's Syndrome**

This condition is named after Hans Asperger. This is one of the higher functioning forms of ASD and is distinctive because these children usually speak with clarity and have the ability to have normal conversations. These children may speak obsessively about a particular subject of special interest to them and be reluctant to move on to another topic. Their ability to socially interact is noticeably impaired and therefore establishing or maintaining friendships with their peers is impacted.<sup>[16-19]</sup>

### **Rett Syndrome**

Rett syndrome is a degenerative disorder, with early onset in infancy, and all of the autistic symptoms are more severe both physically and mentally. The etiology is considered to be a genetic mutation, with higher prevalence among girls. The self-infliction of pain, nonverbal temper tantrums, lack of speech, and lack of interest in their surroundings are often accompanied by severe physical limitations as well. The condition is rare but devastating.<sup>[20]</sup>

### **Dental Management**

Dentists should be aware of the behavior management techniques that are most appropriate to manage the autistic children. These techniques should be individualized according to the patient's disorder and the severity of the dental findings.

### **Important guidelines to follow for effective dental management of ASD.**

- Parental suggestions are of utmost importance as autistic infants show an intense desire to maintain a consistent environment. The dental team should customize the oral hygiene program based on the needs of the patient. Education of parents/caregivers is important for appropriate and regular supervision of daily oral hygiene.
- Patient's past/current medical history should be recorded and updated regularly to decrease the risk of aggravating a medical condition while rendering dental care.<sup>[24]</sup>
- The patient's other care providers such as physicians, nurses and social workers should be informed of any significant findings and also the dental treatment plan to be imparted, to ensure the safe delivery of oral health care.
- Signed informed consent for dental treatment should be obtained during the dental visit from those who can legally provide this service for them.<sup>[25]</sup>

### **Pre appointment behavior management techniques**

- Brushing twice daily with a fluoridated dentifrice should be emphasized and also the brush can be modified to suit the dexterity of the patient or electric tooth brushes and floss holder can be recommended. If the patient is intolerable to the taste of fluoridated toothpaste than a fluoridated mouth rinse may be applied with the toothbrush.
- Parents should be advised to use toothpastes with different taste at home, to get the patient used to different tastes and textures. Patients should be given the choice to choose the taste they like.
- Parents should be counseled on the importance of non-cariogenic diet for long term prevention of dental diseases.<sup>[26]</sup>
- Sealants, topical fluorides, interim therapeutic restoration (ITR) such as glass ionomers that release fluorides, may be advised when caries risk is increased.<sup>[27,28]</sup>
- Chlorhexidine mouth rinse may be useful in cases of gingivitis and periodontal disease. A toothbrush can be used to apply the chlorhexidine for patients who might swallow a rinse.
- These children are more prone to dentoalveolar trauma, hence, mouth guards can be advised and parents should be educated on management of dental trauma.<sup>[30,31]</sup>
- Audiovisual aids related to dental visits and treatment, should be advised to familiarize the patient with the dental environment (i.e. reception, chair, lights)
- Parents should be advised to use power toothbrush at home to desensitize the patient to the noise and vibration of the dental instruments. They should also be taught what 'open wide' means so that this is not an alien word when the dentist uses it

### **The first dental visit**

- The first appointment should always be short and positive. The parents and child must be offered a tour of the dental office.
- The child should be made aware that they are allowed to carry their favorite toy with them to the dentist. This can make the experience more 'normal'.
- The child should be allowed to listen calming or his/her favorite music with headphones during treatment and while waiting in the waiting room
- It must always be kept in mind that even the smallest changes in the environment may trigger extreme anxiety in the child.
- The child must be allowed to sit on the dental chair in order to properly familiarize with the dental operatory environment. The light must be kept out of the eyes or tinted protective glasses can be given.
- Dentist should talk calmly and in short phrases. The autistic children are prone to tantrums and aggressive behavior.

- Firm touch should be used whenever touching the child. As the deep touch pressure has a calming effect on the patient, wrapping a child with a papoose board OR an x-ray coat can be used.
  - The child should be informed of what is about to happen. Pictures and visual models can be used.
  - Use of time indicators can be a great tool for the patient to realize that the appointment will not last forever and they can monitor the length of their appointment (e.g. stop watch, sand timer)
  - Hand instruments should be used to clean the teeth and remove decay wherever possible
  - Rewards should be given to the child to reinforce positive behavior.
- Despite all such measures some children might still need general anesthesia or sedation, so that proper paediatric dental therapy can be delivered.

#### **Recent Behaviour Modification Technique For Asd**

Research by Stein et al,<sup>[32]</sup> highlighted that sensory over-responsivity is an important factor which influences children with ASD to receive oral care, with a to and fro relationship between sensory over-responsivity and uncooperative behaviors displayed in the dental office. The commonly encountered sensory stimuli in the dental office such as the bright fluorescent lights, taste and smell of oral care products, contact during oral examination or dental treatment negatively impact these children, thereby making it more difficult for the dentists to provide treatment. To overcome this, specific modifications have been suggested for dental room setting called as SADE (sensory adapted dental environment) protocol by Shapiro et al in 2009.<sup>[32,33]</sup>

#### **This protocol suggests**

- Darkening the dental room with curtains on the windows, turning of the dental overhead lamp and all direct overhead fluorescent lights. The dental practitioner can wear a head-mounted lamp directed into the child's mouth, reducing bright lights shining in the child's eyes
- Using snoezelen or controlled multisensory environment, in which the patient is placed in a soothing and stimulating environment by showing slow moving visual color effects onto the ceiling or anywhere in the child's visual field. This can be a fish swimming or colorful bubbles or anything based on the child's preference.
- White noise like playing rhythmic music through portable speakers.
- For tactile (deep pressure) stimulus a butterfly wrap can be used. This butterfly wrap weighs similar to the regular pediatric dental X-ray vest and is made of a washable material so it can be wiped down after each use. The wings of this butterfly wrap the child from shoulders to ankles and provide deep "hugging" pressure input designed to produce a

calming effect. These wings are fabricated in different sizes, decorated with colorful felt circles and made of soft mesh-like breathable fabric so that the child will not become hot during the dental treatment. These wings are detachable from the butterfly "body" which allows for different sized wings to be used. This butterfly wrap slips over the dental chair, thereby not requiring the child to be strapped to a board such as that used for the papoose.<sup>[32]</sup>

The equipment cost is minimal, no permanent renovations are needed for the dental clinic and the equipment is portable and easy to set-up and remove. It is feasible to incorporate the SADE intervention into regular dental practice and the development of a modified dental environment is a promising approach in advanced behavioral guidance techniques, to reduce common dental behavior management problems that occur when treating children with ASD. Besides, treatment may become safer for the child and acceptable by the parents if there is a reduction in the use of general anesthesia, which is more frequently used when children are uncooperative during dental treatment.<sup>[32]</sup>

## **CONCLUSION**

It is a well-known fact that, children with special health care needs always have an increased prevalence of oral diseases. ASDs are lifelong neurobiological disorders with a wide range of behavior patterns and outcomes. A well versed actively participating team of knowledgeable dentists, equal parental involvement are required in planning the dental treatment. The developmental skills of the patient or the severity of the disability will always help the dentist to modify the dental treatment and obtain maximum cooperation from the patient. The dental team should be actively involved in community oral health programs directed for the healthy as well as the children with special needs. The comprehensive school-based programs should emphasize the prevention methods for dental caries by providing fluoride supplements, sealants, and offering dietary and nutrition counselling. Audiovisual aids featuring both children with special needs and healthy children can be a great tool in educating them about oral health. Oral diseases if left untreated may suffer progression. Hence, dental treatment should not be ignored because of age, behavior, inability to co-operate, disability, or medical status. Dentist should make sure to provide the utmost dental care possible in their permitted limits and when the patient's needs are beyond the skills of the practitioner, the dentist should make necessary referrals in order to ensure the overall health of the patient.

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