

Dental Management of Children with Autism Spectrum Disorders

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ABSTRACT

Autism, or autism spectrum disorder (ASD) refers to a range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication, as well as by unique strengths and differences. People with autism may also have unusual sensory interests such as sniffing objects or staring intently at moving objects, sensory sensitivities including avoiding everyday sounds and textures, intellectual impairment, or learning difficulties. Patients who have an ASD diagnosis may, however, be at higher risk than typical patients for some dental problems such as, bruxism, nutritive chewing, tongue thrusting, self-injury, erosion, xerostomia, and hyper gag reflex. Managing of such patients in the dental office poses a great challenge for dentists. The aim of this article is to review the management of autistic children in the dental clinic.

KEY WORDS: Autism, Autism spectrum disorder, Asperger's syndrome, Developmental disorder

INTRODUCTION

“Autism spectrum disorder (ASD) is the fastest growing developmental disability all over the world, including India,” says Dr. Archana Nayar, from Autism Centre for Excellence.^[1] ASD refers to a group of neurodevelopment disabilities with a core set of defining criteria that comprise impaired social interaction, communication, and restricted or repetitive behavioral stereotypes.^[1] ASD is a diagnosis that includes significant social communication deficits along with restricted patterns of interests and behaviors. The prevalence of this diagnosis has increased over the past few decades, and it is unclear whether this is solely attributable to the increased awareness of milder forms of the disorder among medical providers.^[2] ASD's occurrence cannot be restricted to any particular groups, but are almost five times more common among boys than girls. CDC estimates that about 1 in 68 children in the year 2014 have been identified with an ASD.^[1]

ASD is not a single disorder and no two people with ASD are same, so it is important to study and

understand the behavior of the patient before treating the patients. Sumantra Chattarji, the neurobiologist at Bangalore national council of biological science who was diagnosed as autistic, explains his state of mind as “the cells are talking too much.” This is because of the tiny gap between the brain cells which is more than normal in autistic brain.^[3,4] It disrupts the brain circuitry making it difficult for the brain to identify and process signals. This explains the behavior of the autistic person that some cannot speak properly but can play a long composition in musical instrument and others find it difficult to differentiate right and left but can figure a mathematical problem in a lesser time. Autistic brain develops fine but it works differently making them difficult to understand. Hence, when a person under ASD is told information the information is experienced as another leading to anxiety attacks.^[3]

There are four main subtypes of autism recognized within the diagnostic and statistical manual of mental disorders, fourth edition, published by the American Psychiatric Association.

Autistic Disorder

It is also known as autism, childhood autism, early infantile autism, Kanner's syndrome, or infantile psychosis.

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Asperger Syndrome

It is also known as Asperger's disorder or simply Asperger's. Asperger syndrome was generally considered to be on the "high functioning" end of the spectrum. Affected children and adults express repetitive behavior, find it difficult during social interactions and restricted range of interest. Motor development may be delayed, leading to clumsiness or uncoordinated motor movements. Those with Asperger's syndrome do not have significant delays or difficulty in speech and writing/learning a language or cognitive development. Some even demonstrate a very good vocabulary with highly specific interest.^[5]

Childhood Disintegrative Disorder

It is also known as dementia infantilis, disintegrative psychosis, or Heller's syndrome. Heller's syndrome is a very rare condition, which is similar to autism in a number of characteristics and presentations. The condition was first identified by Theodore Heller at the beginning of the century in Vienna.^[6] Unlike, most cases of autism, children with Heller's Syndrome show "normal" development for the first few years of their life and then a sudden and marked deterioration regarding abilities and behaviors which can be immediate or more gradual, but effects many areas of functioning, from cognitive ability to motor skills to communication skills.^[7] The loss of skills include impairments in affective behavior which is similar to the impairments in social interaction that people with autism exhibit.

Pervasive Developmental Disorder (PDD)

It is also known as PDD (not otherwise specified [NOS]) or atypical autism. According to the autism society, mental health professionals diagnose PDD-NOS when an individual struggles with stereotyped, repetitive behaviors and has trouble with at least one of the following:

- Social skills, including reciprocal (back-and-forth) interaction
- Communication skills including verbal and nonverbal communication.

During the fifth edition of diagnostic and statistical manual of mental disorders, DSM-5, published in May 2013 eliminated the four subtypes listed above by dissolving them into one diagnosis called ASD. According to the APA, this represents an effort to more accurately diagnose all individuals showing the signs of autism.^[8]

PREVALENCE

A study conducted by Raina.SK, in the year 2017 among the rural, urban and tribal population in India revealed that forty-three children out of a total of

28,070 children in rural, urban, and tribal area in the age group of 1–10 years were diagnosed as cases of ASD yielding a prevalence of 0.15%. Logistic regression analysis showed a two times significantly higher risk of diagnosing ASD in rural area as compared to tribal. Male sex and upper socioeconomic group of head of family/father had a higher risk of getting diagnosed as autism as compared to lower socioeconomic group.^[8]

ETIOLOGY

A series of multiple independent whole Autism is the result of a neurological disorder that hampers normal brain function and no two children with autism are same. The etiologic background of ASD, though not yet completely understood, is considered to implicate both genetic and environmental factors. Recent research work has elucidated that parameters such as CNTNAP2 gene, *de novo* mutations, mitochondrial defects,^[9] cytosine dysregulation, and advancing maternal age may be involved in the pathophysiology of autism.^[5] Genome scans and chromosomal abnormality studies have pointed out several candidate regions on chromosomes 2q, 7q, 6q, 15q, and sex chromosomes. These regions possess candidate genes that have been screened for mutations or association with autism. In a European multicenter project called PARIS,^[10] a large number of multiply affected families were identified and several mutations of genes encoding proteins implicated in the process of synapse formation (synaptogenesis) have been described.

In 2012, two new highly conserved members of the human neuroligin family – HNL4, located at Xp22.3 – were characterized.^[11] A crucial factor in synapse formation, neuroligins are cell adhesion molecules that can trigger the formation of presynaptic structures in non-neuronal cells. The rare mutations of the neuroligins (1%) are associated with autism spectrum conditions. Another step forward in this compelling neurobiological story was the identification of a *de novo* frame-shift mutation in the X-linked HNL4 gene in two brothers, one with autism and the other with Asperger syndrome. Since autism and Asperger syndrome are overly represented in males, mutations in these genes may influence the process of synaptogenesis, and consequently may predispose males to ASDs. In 2007, mutations of another gene encoding SHANK3 were reported.^[12] This gene regulates the structural organization of dendritic spines in neurons and is a binding partner of neuroligins, previously found to be mutated in autism and Asperger Syndrome. Surprisingly, a mutation of a single copy of SHANK3 at chromosome 22q13 is sufficient to induce language impairment, learning disabilities and/or social communication disorders associated with ASDs. Frequency of SHANK3 variants is very low even among autism patients and nearly absent in the

general population. These results have thus shed light on one synaptic pathway sensitive to gene dosage and associated to ASDs.^[13]

CLINICAL FEATURES

ASDs begin before the age of three and last throughout a person's life, although symptoms may improve over time. Some children with an ASD show hints of future problems within the first few months of life. In others, symptoms might not show up until 24 months or later. Some children with an ASD seem to develop normally until around 18–24 months of age and then they stop gaining new skills, or they lose the skills they once had.^[14]

The children who are diagnosed with ASD do not respond to their name till 1 year of age; they do not point at any object or thing of interest they also avoid eye contact and want to be alone. These children find it difficult to understand others feelings and also to express their own feelings and thoughts. They exhibit delayed speech and language skills, and they have the habit of repeating word and sentences (Echolalia). ASD children also do not respond to questions properly or give unrelated answers. They have obsessive interests and they repetitively doing that particular habit like, flap their hands, rock their body, or spin in circles.^[15-17]

Oral Manifestations of Children with Classic Autism Disorder

It includes bruxism, non-nutritive chewing, tongue thrusting, sounds of speech, ulcers in lips and gingiva because of self-injury, erosions in the teeth due to regurgitation, dental caries due to poor oral hygiene since home care measures is difficult in case of many children.

DIAGNOSIS

ASD is typically noticed in the first 3 years of life, Autism cannot be diagnosed up to 18 months and the ideal time to start its treatment is by 1–2 years. This is the best time because almost 80% of the brain is developed in the first 3 years. Unfortunately, due to sparse knowledge, parents start treatment late and it gets tough for the child to overcome the complexities.

Diagnosis can be made with deficits in social behaviors and nonverbal interactions such as reduced eye contact, facial expression, and body gestures.^[1] Children also manifest with non-specific symptoms such as unusual sensory perception skills and experiences, motor clumsiness, and insomnia. Associated phenomena include mental retardation, emotional indifference, hyperactivity, aggression, self-injury, and repetitive behaviors such as body rocking or hand flapping.^[2] Repetitive, stereotyped behaviors are often accompanied by cognitive impairment, seizures or epilepsy, gastrointestinal complaints, disturbed

sleep, and other problems. In each individual who has autism, the symptoms of autism vary, in severity and expression. Differential diagnosis includes childhood schizophrenia, learning disability, and deafness.^[3]

Imaging studies have shown that many major brain structures are implicated in autism. Other research is focusing on the role of neurotransmitters such as serotonin, dopamine, and epinephrine. The past decade has been marked by an increased interest in the genetic basis of autism, and recent developments point to genetic factors playing a prominent role in the causes for ASD.

There is no “cure” for autism. However, there are range of approaches and strategic methods of enabling learning and development, which people may find to be helpful.^[18]

CLINICAL MANAGEMENT

Dental care should be viewed as integral part of comprehensive healthcare program coordinated by the medical home.^[6] Based on the higher frequency of the regular medical screening of autistic children compared to scheduled dental visits, it can be presumed that an interdisciplinary approach with the child's physician might help to overcome the anxiety of the dental appointment.^[8] Lai and co-authors suggested an oral examination to be planned during primary care attendance to initiate the introduction of the child to dentistry.^[11] Successful management of children with ASD requires preparation of the parents and child prior the dental visit, systematic desensitization of the operatory environment, case-by-case adaptation of conventional behavioral methods.^[9]

Upbringing a child with ASD generates stressful conditions which in most cases are associated with adaptation to child's routine, interference with education and healthcare systems, coordination of multidisciplinary caregivers, and limited availability of resources.^[19]

Teamwork with the Parents

Parents of children with ASD's often hesitate to visit dental clinic due to the child's fear of unpleasant experience, which can lead to uncooperative and problematic behavior of the child. To avoid this, dentist can discuss about the treatment to the parents or even to the child. Parents and the child may feel very helpful if they know what to expect to prepare for the dental visit and provision of appropriate daily oral healthcare. Motivating the parent to help the children feel more comfortable with the experience, especially once they understand that everyone in the office is supportive. Thus, the dentist and the parents must work together for easy management and better prognosis.^[20]

Behavioral strategies which are found to be successful by the parents can be used to make the visit successful. Asking if the parent would like a desensitization appointment to help the child become familiar with the office and staff. The child can be kept occupied by a preferred toy or material during the procedure or examination. If the patient is nonverbal, the parents are encouraged to bring the child's communication system or the device to the appointment. A family member, babysitter, or autism interventionist must obtain permission from the parent and the dentist to join them at the dentist's office and help to make the dental visit a success.

The arrival time is decided by the parents for better management and to obtain a better cooperation from the patients. Some children may have difficulty while waiting for their appointment. If it's easier for the child, inform the parent they can wait outside or in their car. Have the office call on a cell phone to let them know when the dental team is ready.

It is important to record all the communicative details about the patient for better management the appointments. It is important to record all the communicative details about the patient for better management of the appointments. A welcome packet must be provided in advance of the treatment visit to expedite the intake process, so that the parent can focus their attention on the child during the office visit and not be distracted by paperwork.

Considerations for patient management strategies during the appointment are the important steps to be followed to avoid any mishaps. The instructions include as follows:

- Avoid interruptions
- Communicate with the child at a level that he or she can understand. Use a "tell, show, do" approach when explaining treatment and procedures. When talking to the child we should be clear and concise.
- Start the oral examination slowly, using only fingers at first. If this is successful, begin using dental instruments.
- Reward cooperative behavior with reinforcements that are motivating to the child (e.g., music, stickers, verbal reinforcement, etc. Refer to the intake form for additional ideas.)
- Observe unusual body movements and anticipate future movements. Keep area around the dental chair clear.
- Immobilization techniques may be used only with parental consent to keep the child from potential injury.
- If possible use the same staff and dental operator for all services and visits.
- Sedation may be used with appropriate precautions and possible physical consult.

- General anesthesia may be required for complex surgical or restorative treatment.^[21]

The current treatment options for the core symptoms of autism are limited to psychosocial therapies, such as applied behavior analysis. Treatments for autism include therapies such as anger management therapy, applied behavioral analysis, behavioral therapy, sensory processing therapy and tele practice; medications include antipsychotics.

CONCLUSION

ASD is not a single disorder; it is a group of developmental disorders, which includes a spectrum of symptoms like difficulty in performing certain skills, and certain level of disability. Autistic children find it difficult to understand the situation and any new situation makes them anxious and once an ASD child becomes anxious and gets scared of dental office or the dentist it is difficult to change their mind or bring back to normal. Treating an ASD child in dental clinic is not always an easy job. It requires a coordination of the parents, child, and the dentist. Not all, ASD children are the same. The treatment and management varies based on their level of the child's disability to understand and behaviour. Thus, before the treatment of any autistic child, it is important to understand their behaviour and then planning the treatment according to the child's behavior. To reduce caries rates, it is crucial to teach primary caregivers the methods of providing optimal home care. Referral to the autism dental information guide for autism providers and autism dental family information guide for families and caregiver are also very important.

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