

Comprehensive Behavioural Management of Autistic Children in Pediatric Dental Practice - An Update

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Abstract: *Autism, characterized by impaired social interaction, communication deficits, and restricted behaviors, poses significant challenges in pediatric dentistry. This article provides an in-depth exploration of autism, including its etiology, clinical manifestations, and the critical role of pediatric dentists in managing autistic children. The prevalence, genetics, prenatal factors, and postnatal influences of autism are discussed. Clinical manifestations, such as behavioral problems and oral health issues, are detailed. The importance of behavior management techniques, communication strategies, and pharmacological interventions in dental care for autistic children is emphasized. This comprehensive review aims to equip pediatric dentists with the knowledge and strategies needed to provide effective and compassionate care to this unique patient population.*

Keywords: Autism, Pediatric Dentistry, Behavioral Management, Etiology, Clinical Manifestations

1. Introduction

Autism is incapacitating disturbance of mental and emotional development that causes problems in learning, communicating and relating to others. This developmental disability manifests during first 3 years of life and is difficult to diagnose and has no cure.¹ It's a behavioral syndrome consisting of impaired social interaction, impaired communication skills, sensorimotor deficits combined with stereotyped and restricted behaviour.¹

Prevalence of autism is 1 to 1.5 percent between age of two to nine years. The male: female ratio is 3.7:1, but females exhibit severe form of mental retardation. Higher prevalence rate in males suggests X-linked mode of inheritance. It occurs in approximately 5 of every 10,000 births.¹

It is mandatory to train pediatric dentists in management of autistic children as they are the ones who regularly interact with autistic children in day-to-day basis.²

Children with autism have benefited from specialised educational programmes that employ behaviour modification approaches created for a particular individual.²

This paper highlights on etiology, various problems encountered while managing the child with autism and comprehensive behaviour management of autistic child in dental setup.

Etiology

The psychodynamics of autism are thought to be influenced by the parents' personalities, attitudes, and behaviours, according to Lotter, but it is also widely believed that autism may be an early sign of childhood schizophrenia.²

Genetics:

CNTNAP2 gene mutations, De novo mutations, mitochondrial defects, increased level of inflammatory cytokines are believed to cause autism.³

Other factors like maternal bleeding during pregnancy, metabolic syndromes and advancing maternal age are persuasively linked to autism.

Some patients with autism disorder also showed abnormal levels of serotonin or other neurotransmitters that can affect the brain development.³

Prenatal factors:

Teratogenic medication exposures during pregnancy, such as thalidomide and valproate, as well as intrauterine virus infections like rubella, cytomegalic inclusion disease and metabolic abnormalities play significant roles in the pathogenesis of autism.⁴

Maternal nutritional status throughout pregnancy is a critical component for normal brain development.⁴

An excess, or a deficit, of micronutrients such as folic acid, zinc, iron, vitamin D, and omega-3 may lead to impaired neurodevelopment.⁴

Comparative studies have found a higher risk of ASD in children who develop under folic acid deficient conditions

Medical conditions:

Coexisting medical conditions of AD may be linked with seizure disorder, fragile-X syndrome, tuberous sclerosis, allergies, immune system problems, gastrointestinal disturbances, developmental delay, dysmorphic features, obstetric complications, and phenylketonuria.⁴

Environmental factors:

Trace metal dyshomeostasis has shown to affect brain development and is linked to ASD. Accumulation of toxic metals such as mercury and lead, and the lack of the essential metal zinc during pregnancy is associated with ASD.⁴

Post natal factors:

Herpes simplex, encephalitis, untreated phenylketonuria and infantile spasm.⁴

Clinical Manifestation of Autistic Child

Children with autism have multiple medical problems like seizure disorder, immune system problems, gastrointestinal disturbances, developmental delay and behavioural problems such as Temper tantrums, hyperactivity, short attention span, impetuous, anxiety, anger, and a tendency for aggressive and self-injurious behaviours making the dental treatment difficult.⁴

They often have poor muscle tone, poor coordination, drooling, hyperactive knee jerk and strabismus and 30 % eventually develop epilepsy.⁵

The mean age noted for these deviations is 17 to 44 months. Early detection is crucial for the early provision of behavioural and educational assistance, which will benefit these kids and their families in the long run.⁵

Early signs and symptoms include baby does not seek parent attention, fails to cuddle, making direct eye contact, imitation games, no reaction to known faces, or other warm joyful expressions by 6 months of age, afraid of new things, try to make repeated actions to gain attention by 12 months of age, oversensitivity to textures, not able to understand pretend play by 16 months of age; 50% of patients do not develop speech.⁶

Abnormal and immature speech develops in virtue of intonation, pitch, rate, rhythm, grammar and word integration, understanding, and nonliteral speech.⁷

Around 75% of autistic patients have mild to moderate mental impairment. They don't like participating in group activities and prefer to be alone, so they can't share another child's enthusiasm for a particular activity.⁸

Temper tantrums, hyperactivity, short attention span, impetuous, anxiety, anger, and a tendency for aggressive and self-injurious behaviors (SIBs) are common behavioral features in these patients.⁹

An automatic stereotyped behavior of psychogenic origin-like arm flapping and toe walking are common.⁹

Echolalia and delayed echolalia are also present. Even small change in daily routine may increase or initiate it. This repetitive behavior is more frequent in females.¹⁰

The SIB can occur in 4 to 5% of autistic patients. It may be simple one, like self-pinching, or severe reactions, like self-biting or head banging, can even involve oral structure,

such as lip biting and deep gingival cleft on canine caused by scrapping with finger nail.¹¹

The cause is not clear. It might be to gain attention of caregivers or avoid unwanted events.¹¹

Oral Manifestations:

Children with autism have very strict routine and prefer soft foods and sweetened foods.¹²

Because of preference of food, long time presence of food within the oral cavity and difficulties in brushing and flossing due to lack of motor coordination and high sensitivity to taste of toothpaste, there is increased propensity to caries.¹²

Unique fixation of diet and preference for low-textured food by these autistic patients can contribute to low incidence of caries.¹³

Most of the times, tooth eruption might be delayed due to gingival hypertrophy which is caused by phenytoin.¹³

Dental injuries were also common in autistic patients owing to the need of skills.

These patients exhibit higher tendency to certain malocclusions, like ogival palate, crowding, and open bite.¹⁴

Harmful oral habits like nocturnal bruxism, tongue thrusting, and lip biting and gingival pricking were common.¹⁴

Importance of Pediatric Dentist in Management of Autistic Child:

- Establishing dental home at an early age
- Obtaining thorough medical, dental, and social patient histories
- Creating an environment conducive for the child to receive care
- Providing comprehensive oral health education and anticipatory guidance to the child and caregiver, and
- Providing preventive and therapeutic services including behavior guidance and a multidisciplinary approach when needed¹⁵

Prevention

Differently abled children are at increased risk for oral diseases owing to their actual disability or any other medical, economic/social causes. Moreover, their parents/caregivers find it difficult to perform routine oral hygiene practices.¹⁵

Many conditions such as mental retardation, developmental or physical disabilities, cerebral palsy, craniofacial abnormalities, and epilepsy can influence a child's oral health.¹⁵

They generally have an increased prevalence of poor oral hygiene, compromised gingival/periodontal health, and a higher prevalence of dental caries.¹⁶

Staying at home and pampering with cariogenic snacks and other unhealthy dietary habit might render them at higher risk for dental caries.¹⁶

Education of parents/caregivers is critical for ensuring appropriate and regular supervision of daily oral hygiene.¹⁶

Toothbrushes can be modified to enable individuals with physical disabilities to brush their own teeth. Although many types of grips are available, using the patient's hand to custom-design a handle has often had good results.¹⁷

Electric toothbrushes and floss holders may improve patient compliance. The vibration and noise tend to desensitize the patient for future dental appointments if followed by positive reinforcement, while the design and color are motivational for the child.¹⁷

The team of dental professionals should develop an individualized oral hygiene program that accommodates the unique disability of the patient.¹⁷

Brushing with a fluoridated dentifrice twice daily helps prevent caries and gingivitis as long as the child is not swallowing it.¹⁸

In addition, during appointments fluoride varnish can be applied as these varnishes are low fluoride exposure but high fluoride to tooth surface contact, thus lowering risk of GI problems as well as reducing risk of decay.¹⁹

If a patient's sensory issues cause the taste or texture of fluoridated toothpaste to be intolerable, a toothpaste without sodium laurel sulfate (SLS) to eliminate foaming nature, a fluoridated mouth rinse, or an alternative like CPP-ACP may be applied with the toothbrush.¹⁹

Practitioners should encourage a noncariogenic diet for long term prevention of dental disease. When a diet rich in carbohydrates or the use of high calorie supplements is medically necessary (e.g., to increase weight gain), the dentist should provide strategies to mitigate the caries risk by altering frequency of and/or increasing preventive measures.²⁰

Medications and their oral side effects (e.g., xerostomia, gingival overgrowth) should be reviewed as these can have an impact on caries and periodontal risk.²⁰

Interception:

Timely regular checkups for patients with SHCN regarding dental caries, malocclusion, habits is very important to maintain proper oral health. Application Sealants in these patients reduce the risk of caries in susceptible pits and fissures of primary and permanent teeth.²⁰

Topical fluorides (e.g., sodium fluoride, silver diamine fluoride) may be indicated when caries risk is increased. 5% neutral sodium fluoride varnishes have been shown to be beneficial.²⁰

The major controversy about the fluoride application is possible neurotoxin, and two other possible effects are

gastrointestinal irritation and dental fluorosis. So fluoride application in autistic patients is controversial, until unless the patient is under high risk for caries²¹

Fluoride varnish can be applied as these varnishes are low fluoride exposure but high fluoride to tooth surface contact, thus lowering risk of GI problems as well as reducing risk of decay.²¹

Interim therapeutic restoration (ITR) using materials such as glass ionomers that release fluoride, may be useful as both preventive and therapeutic approaches in patients with SHCN. In cases of gingivitis and periodontal disease, chlorhexidine mouth rinse may be useful.²¹

Preventive strategies for patients with SHCN also should address traumatic injuries. This would include anticipatory guidance about risk of trauma (e.g., with seizure disorders or motor skills/coordination deficits), mouthguard fabrication, and what to do if dentoalveolar trauma occurs.²²

Additionally, they are more likely to be victims of physical abuse, sexual abuse, and neglect when compared to children without disabilities.²²

Patients with severe bruxism and interproximal decay may need their teeth restored with stainless steel crowns to increase the longevity of the restorations.²³

Craniofacial, head, face, and neck injuries occur in more than half of the cases of child abuse. Because of this incidence, dentists need to be aware of signs of abuse and mandated reporting procedures.²³

Behaviour Management:

Children with ASD are usually unable to cooperate for dental procedures. The dentist should know each patient and which techniques are the most appropriate for managing them

Pre operative preparation of differently abled child:

Role of mother: It is important to record the complete medical history and previous dental experiences of the child. The child's favourite daily routine such as favourite cartoon, game, toy, blanket etc and those triggering the child's temper should be identified from the parents.²⁴

Instructions and appropriate education material like visual pedagogy for home teaching of procedures related to dental appointment must be provided to parents.²⁴

Parents should familiarize the dental environment/instruments using the education materials provided by the dentist to the child. Internet information can also be used by the parents.²⁴

Factors under the control of dentist:

Dental clinic setup for differently abled children

The environmental factors should be comfortable to the child as distraction, aversive reaction and behavioral difficulties may be provoked by loud and unexpected noises.²⁵

The dental operatory setting must be kept as seen by the child in the education material and the child must be treated in the same operatory in subsequent visits also to avoid repulsive behavior.²⁵

Duration of dental appointment: Duration of the dental visit should be kept to a minimum time because of the limited attention span of these children and the appointments should be well organized so that the waiting time should not exceed 10-15 minutes to avoid upsets.²⁵

Communicative behavior management techniques:

Techniques that are commonly advocated in children with ASD are the same as those used for non-autistic individuals: tell-show-do, frequent positive and negative reinforcement.²⁶

However, there should be a higher degree of flexibility to comply with their quickly changing needs. Very often, to improve the clarity of messages euphemisms can be used to explain procedures.²⁶

The communication should be clear in short and simple sentences. The pitch of voice, level of eye contact and the content of the communication is very important to attain appropriate behaviour of child.²⁷

Multisensory communication (nonverbal communications) can also be used. Body contact can be a form of nonverbal communication. The dentist's simple act of placing a hand on a child's shoulder while sitting on a chairside stool conveys a feeling of warmth.²⁷

Eye contact is also important. The child who avoids it often is not fully prepared to cooperate. Apprehension can be conveyed without a spoken word.²⁷

Detecting a rapid heartbeat or noticing beads of perspiration on the face are observations that alert the dentist to a child's nervousness.²⁸

The ability to follow directions, learn new things, and articulate wants and needs may be difficult for some patients with autism. Some require assistive communicative devices, such as a Smart/Scan 32 pro, an augmentative communication device or a Picture Exchange Communication System (PECS).²⁹

For autistic patients, PECS is an alternative communication technique with no or little verbal skills. The PECS consists of a book of pictures to express desires, observations, and feelings.²⁹

Tell-show-do:

"Tell-Show-Do" is a basic and effective exposure therapy and a way to introduce dental instruments, equipment or procedures to a patient.³⁰

For individuals with limited language, use pictures or objects to explain what will occur. Example: Pictures of radiographic film, disposable plastic mouth mirrors, mouth props or rests, saliva ejectors/ suction tips.³⁰

Desensitization:

Desensitization techniques based on classical conditioning theory are required to diminish the apprehension present in autistic patients, which is very severe. Such techniques are time-consuming.³¹

Familiarizing the child with basic dental procedures in home by using certain mobile apps, mobile games, performing brushing technique/ fluoride application on toy and placing the similar toy at the dental clinic.³¹

Further child can be familiarized to the dental procedure and equipment by dividing dental procedures into smaller steps.³¹

Each procedure should be successfully completed by a slow and step-wise approach and achievement of specific behavior. Then only next step is introduced.³¹

Desensitization includes pre-examination to familiarize the child with the dental office, the techniques, the staff and the instruments that would be used during the child's visit.³¹

Distractions:

Distraction techniques like watching a favourite cartoon, playing favourite mobile games, listening to music, or holding onto special toys might help autistic patient to get distracted while undergoing treatment.³²

Significant reduction of anxiety and improvement of behavior is seen in children with autism spectrum disorders during routine, non-invasive dental treatment procedures using Virtual Reality distraction.³²

Virtual Reality distraction can be used as a successful behavior management method in autistic children during routine dental treatment.³²

Autistic patients with high intellectual can be distracted by soothing and relaxed enough to undergo a procedure.³²

Applied behavior analysis using behavioral learning theories:

In dentistry, the use of ABA practices has a high chance of improving the outcome of conventional behavior management techniques.³³

By increasing the likelihood of patients who accept simple and routine dental procedures, dentists can decrease the need for more intrusive procedures, such as restraints and sedation.³³

Each component of this skill would be divided into specific steps, each step would be taught separately, and a child would be rewarded as they learned each component skill. In shaping, the child is reinforced to adopt the behavior eventually on his own initiative. With this method, the child can be trained to sit on the dental chair by themselves.³³

Pharmacological management:

Conscious sedation has variable effect on autistic child. Usually, the physician is aware of an underlying health problem that would be a contraindication for sedation.

If the patient has minimal dental treatment needs that can be accomplished in two operative appointments or less, then conscious sedation can be selected as a treatment plan.³⁴

According to Marta Eloiza et al a mean success rate of 70% was noted when differently abled children were treated with oral midazolam and nitrous oxide inhalation.³⁴

General anesthesia is described as the most effective modality for providing dental care to patients who have difficulty accepting treatment. However, GA is the most complex and expensive procedure to arrange and has the greatest risk of side effects.³⁴

Whereas conscious sedation via enteral benzodiazepines or parenteral benzodiazepines or nitrous oxide or a mixed technique, is found to be an effective method of performing dental treatment with a success rate of more than 75% and the success for nitrous oxide alone was even higher³⁵

Parenteral benzodiazepines showed the lowest number of adverse events, while nitrous oxide and enteral benzodiazepines showed similar results with less than 20% of events

Nitrous oxide and enteral benzodiazepines have proven to be the safest drugs, with less than 2% deep sedation in more than a thousand subjects.³⁶

Repeated sessions of conscious sedation have shown to significantly improve the level of cooperation. These advantages enable patients with intellectual disabilities to cope with dental treatment without resorting to sedative drugs

The sedation drugs most commonly used alone or in combination are: Versed, Vistaril, Demerol, Chloral Hydrate, and Nitrous Oxide.³⁶

During sedation there must be a second assistant employed to document vital signs every 5 minutes.³⁶

Some authors noted that administration of long duration and higher concentration of nitrous oxide than usual is required to get the preferred level of sedation in patients with AD.³⁷

Management of autistic patients under general anesthesia is effective and it will help the patients to tolerate conventional treatment.³⁷

2. Conclusion

The dentist and assistant must have a deep understanding of each patient because they are all unique. Parents must simultaneously be aware of what is comfortable for their children as well as what is appropriate for them. More helpful than clinical and academic abilities are emotional ones. Instead of following precise logic, the ability to handle patients should be guided by instinct and inventiveness.

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