

REVIEW ARTICLE



Oral health status and dental management considerations in autism

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Abstract

Autistic individuals suffer primarily from a pervasive impairment of their cognitive and/or perceptual functioning; the consequences of which are manifested by limited ability to understand and communicate, and to learn and participate in social relationships. The behavioral abnormalities that characterize autism include a developmental impairment of reciprocal social interaction, a markedly restricted repertoire of activities and interests, and impairments in verbal and nonverbal communication skills. Among the various handicapping conditions, studies on oral health conditions in children with autism are sparse. The complicated disability itself makes clinical research difficult. A close correlation among autism, mental retardation, and seizure disorder is also seen. Hence, this review updates on the behavior, oral health and dental management of autistic children to help the pediatric dentist to treat such patients in their practice efficiently.

Keywords: Autism, autism spectrum disorder, oral health, self-injurious behavior

Introduction

Autism is a complex neurodevelopmental disorder characterized by qualitative impairments in social interaction and communication, with restricted, repetitive, stereotyped patterns of behavior, interests and activities. It is categorized under a group of disorders known as pervasive developmental disorders (PDD). These behaviors manifest along a wide spectrum and commence before 36 months of age.^[1] An individual with autism will have difficulty with three domains: language and communication, socialization and repetitive behaviors.^[2] Autistic individuals do not represent a large percentage of the handicapped or special population, but they require a unique management of their behavioral characteristics. Since the prevalence of autism is increasing worldwide,^[3-5] a review on their oral conditions would enable pediatric dentists to plan and provide appropriate preventive protocol as well as an effective treatment for these patients.

History

Autism is not a single disorder, but a name (derived from Greek "autos," meaning "self") given to the behavioral phenotype. The term autism was first used by Bleuler in 1911, to label a particular

withdrawal behavior disorder observed in schizophrenic patients.^[6] Kanner, a child psychiatrist, in 1943 first published a report describing 11 children with "disturbances of affective contact" and coined the term "autism" to describe the "extreme aloneness" that he saw as its characteristic trait. Kanner^[6] noted that these children demonstrated a profound lack of social engagement, failed to use language to communicate and had an obsessive need for sameness and proposed that these problems were due to difficulties in the parent-child relationship. Many myths about the condition originate from the works of Kanner; for e.g., the cause of autism being "cold intellectual mothers," "children with autism are from upper social classes," "the children are unwilling to speak," and "the first and the only child," theory.^[7] At the same time, a German scientist, Dr. Hans Asperger, described a milder form of the disorder that became known as Asperger syndrome. Thus these two disorders were described and listed as two of the five PDD, more often referred to today as autism spectrum disorders (ASDs).^[8]

Epidemiology

The incidence of autism is about 0.2% in the US.^[9] More recently, the Centers for Disease Control and Prevention reported the prevalence as 5.7/1000 (National Survey of Children's Health,

2006), with a male:female ratio of 3.7:1.^[10] Although this complex mental disability is more prevalent in males, it is more severe in females. The prevalence rate of autism was reported to vary between 4 and 13/10,000.^[11-13] At present, the generally accepted prevalence value is one in 1000 children.^[14] Males are affected more than females.^[15-19] The preponderance of males with the disorder suggests an X-linked disorder, and recent genome-wide screenings have found evidence of linkage to the female chromosome.^[20,21] The prevalence of autism appears to be unrelated to race, socio-economic status or level of parental education.^[22]

Clinical Manifestations

Autism is a complex neurobehavioral disorder. According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM), the diagnostic criteria are impairments in social functioning; deficits in communication and restricted interests.^[8] Common comorbidities include motor deficits, sensory abnormalities, cognitive deficits, medical conditions such as epilepsy and psychiatric problems such as attention deficit/hyperactivity disorder and mood disorders.

Interpersonal skill weaknesses are evident during infancy, when the baby does not seek the attention of the care-giver and fails to cuddle, make direct eye contact, raise arms in anticipation of being picked up, engage in imitation games (for example, peek-a-boo), or respond to smiles or a mother's voice.^[23] Cognitive impairment is evident in approximately 70% of children with autism and about 50% do not achieve spoken language.^[24] When speech does develop, the pitch, intonation, rate, rhythm, grammatical structure, word integration with gestures and understanding, and non-literal speech, that is, the use of irony and implied meaning, are often abnormal and immature.^[8]

Tasks that require reasoning, interpretation, integration or abstraction are difficult for people with autism to complete. The majority of people with autism function in "moderate" range of mental retardation.^[25] Young children with this disorder do not participate in group play, but rather appear to be in their own world and unable to share in another child's interest in an activity.^[26] Mental retardation occurs in approximately 75% and seizure disorder in approximately 25% of the autistic population.

Behavioral symptoms such as temper tantrums, hyperactivity, short attention span, impulsivity, agitation, anger, and a tendency for aggressive and self-injurious behaviors (SIBs) are common. Disorders of language and social communication, poor response to external stimulation, tendency to isolate themselves, and poor eye-to-eye contact are also commonly seen.^[27] The interaction with an autistic child always requires constant repetitions and patience in dealing with bizarre behavioral patterns. The difficulties can be seen even during a routine dental examination. Children with autism can generally be categorized into three groups: Aloof and passive; reachable, but socially alienated unless actively engaged, and active-but-odd, but can initiate interactions, but in awkward and inappropriate ways.^[28]

Ritualistic behavior and stereotypes, such as arm-flapping and toe-walking, are two commonly observed patterns. Autistic children frequently have atypical responses to sensory stimuli, such as apparent hyposensitivity to a pain stimulus.^[29]

Diagnosis

The DSM-IV lists seven features of autism that are as follows:

- Marked impairment in the use of multiple non-verbal behavior (e.g. eye-to-eye gaze, facial expression, body posture, and gestures) to regulate social interaction and communication;
- Failure to develop peer relationships appropriate to developmental level;
- Little or no interest in establishing friendships in younger individuals;
- Older individuals may have an interest in friendship but lack an understanding of the conventions of social interaction;
- Lack of seeking to share enjoyment, interests or achievements with-other people;
- Lack of social or emotional capacity may be present;
- They may be oblivious to other children - (including siblings), and they have no concept of the needs of the others or even notice another person's distress.^[8]

Diagnosis is based solely on thorough clinical observation and evaluation.^[30]

Medical Management

Judicious use of psychotropic drugs is necessary to manage associated aggression, hyperactivity, self-mutilation, temper tantrums, but drugs are not a substitute for behavioral and educational interventions.^[1] The most commonly prescribed class of medication is antipsychotic drugs that are used to manage symptoms of irritability, agitation, SIB, aggression, repetitive behaviors, delusions, and hallucinations. As many of these drugs have adverse effects and interactions with drugs used in dentistry, it is essential for dentists to be familiar with their properties. Orofacial adverse effects of these medications include xerostomia, sialorrhea, dysphagia, sialadenitis, dysgeusia, stomatitis, gingivitis, gingival enlargement, glossitis, bruxism, edema and discoloration of tongue.^[15]

Oral Health Status

Most autistic children have problems with their day to day activities such as eating, drinking, sleeping, bathing and tooth brushing. All these factors could make them more prone to oral disease. Although the caries experience in these children is not high, their oral hygiene is fair. Gingivitis secondary to drug-induced gingival enlargement can be present. Children with autism also commonly have damaging oral habits such as bruxism, tongue thrusting, pricking at the gingiva, lip biting, and pica.^[27]

SIB

In autistic individuals, there is a failure to use facial expression, inability to integrate words with gaze and use of body language to interact with others. Verbal and non-verbal skills are delayed or absent in autistic children. Echolalia and delayed echolalia are also present.^[31] This may lead to frustration as they are unable to express their feelings. Their emotional outburst manifested in the form SIB.

SIB is one of the most distressing events for autistic children. Seventy percent of autistic children practice SIB at some stage in their lives. This repetitive behavior is more common in females, mentally and psychologically impaired individuals. The head and neck region is usually affected.^[32,33] It may take the form of pinching, scratching or head banging and can even involve the oral structures.^[34-37] Signs of trauma and scars observed during clinical examination should be verified with the history and parent's response, for any possible findings of child abuse and/or neglect.

Pica or mouthing may be part of a patient's behavior. Pica refers to the intentional ingestion of non-food items. Mouthing occurs when nonfood items are chronically manipulated in the patient's mouth. Both these activities have been associated with a vitamin B deficiency and may result in fractured or mobile teeth.^[2] Another behavior with dental consequences is chinning. This refers to the tendency of the autistic patient to press the chin into an object or another person's leg to apply pressure to the mandible or temporomandibular joint. It has been observed that this deep pressure seems to relieve the symptoms of gingival or carious condition.^[2]

Lowe and Lindemann^[35] stated that the SIB ranges from self-pinching or scratching to severe self-biting or head banging. Murshid *et al.*^[17] reported self-injurious habits of hitting, banging, biting, pricking, pinching and grinding to be present in 70% of autistic children. Pica eating, biting of extremities/inanimate objects and flapping of hands were most commonly seen. A 4 - year-old autistic girl was reported to have extracted her own primary teeth.^[32]

Parental reports indicate that between 20% and 25% of children with autism brux during sleep.^[38,39] Pediatric gastroenterologists have noted that children with autism regurgitate their food and acidic stomach contents (gastroesophageal reflux disease) more than once a week.^[40,41]

Dental Caries

Though many factors influence an individual's dental caries risk, there is not enough evidence to show whether autism is a risk factor for caries.^[42] The unique fixation of diet shown by these children might contribute to a minimal amount of dental disease if the diet is particularly low in carbohydrates.^[16] Demands for low textured foods from patients with autism are relatively common and do not necessarily imply dental pathology.^[43] High sensitivity to taste and food consistency is common in people with autism, and it is important that the

dental staff are aware of this fact.^[44] Autistic children are less partial to sweets and characteristically are more regular in their behavior at meals than other healthy children.^[19,45] Moreover, these children prefer semi-solid and liquid food, which has a fairly good clearance.^[46]

Swallow^[47] believed that the prevalence of dental disease in children with autism is unlikely to be any greater than in healthy children. Various other studies have also stated no difference in dental caries experience between autistic and non-autistic populations.^[16,17,48]

Shapira *et al.*^[48] found that caries rates in non-institutionalized children with autism were similar to that of unaffected children. Kamen and Skier^[49] also found that caries susceptibility was lower in people with autism than in unaffected people. Autistic Swedish children between the ages of 3 and 19 years were found to have a similar dental caries status when compared to normal children.^[50] An Indian study reported lower caries experience among autistic children compared to non-autistic individuals.^[19] However, Desai *et al.*^[51] reported that dental caries rates were higher in autistic children. Caries prevalence and severity in these individuals is not associated with institutionalization, presence of seizure disorders or additional diagnosis.^[15]

From the various studies, it can be concluded that autistic children have comparable or lower caries than the normal children in spite of their disability, improper brushing and dietary habits. Further investigations pertaining to other salivary parameters such as pH, buffering capacity and levels of antioxidants, and immunoglobulins are necessary.

Oral Hygiene

Maintaining good oral hygiene in children with autism is a difficult task both for the parents of the child, and the dental staff because of the lack of interest by these children, hypersensitivity to various stimulus and lack of necessary manual dexterity.

Autistic patients may object to the taste or texture of food or oral product such as a toothpaste or toothbrush, which result in poor oral hygiene and a subsequent increase in caries and periodontal conditions. It is worthwhile to have the patient sample different toothpastes or oral hygiene products until a tolerable one is found.^[2] Lowe and Lindeman^[35] reported that patients with autism have a lower hygiene level, but comparable caries index when compared with patients without autism. Subramaniam and Gupta^[19] found autistic children to have more debris and calculus deposits than non-autistic individuals. The presence of more debris in these children may be due to failure to rinse after meals, lesser frequency of brushing (only once), minimal use of tongue in cleansing, improper/lack of swishing and gargling and lack of interests in oral hygiene.

Pilebro and Backman^[44] emphasized the importance of maintaining good oral hygiene to children with autism. Based on visual pedagogy, a series of pictures were produced that showed a structured method and technique of tooth brushing. The

pictures were placed in the bathroom or wherever toothbrushing was performed. After 12 months, the amount of visible plaque was reduced. After 18 months, most parents found maintaining good oral hygiene easier than before the study. It was concluded that visual pedagogy is a useful tool in helping people with autism to improve their oral hygiene.

Dental Management

Individuals with Special Health Care Needs encompasses a wide variety of physical, developmental, mental, sensory, behavioral, cognitive, and emotional impairments that require medical management, health care interventions, and/or use of specialized services or programs beyond that required by children generally.^[52] These children present a special challenge to the dental health care team. It is generally acknowledged that the majority of disabled children have been dentally neglected. This reluctance may arise due to various reasons like lack of knowledge, fear and anxiety regarding these children and unfamiliarity with the techniques required for their dental care. Each disabled condition has dental needs that require immediate attention; any delay in the treatment increases the severity of the handicap and makes the condition much more difficult to bear.^[53]

The syndrome of autism is a complex disorder, with many ramifications directly affecting the regimen of dental care. Numerous studies have reported that children with autism have more unmet dental needs and are difficult to treat.^[50,51]

Children with autism are a heterogeneous group with variable ability to cooperate in the dental setting.^[34,54] The oral examination of autistic children is difficult when compared to the normal children, because of the sensory hypersensitivity seen in these children. These subjects often show increased sensitivity to sounds, light, odors and colors, a feature that also makes achieving good oral health very difficult.^[44] The fear of unknown treatment causes the autistic child to resist entry to the oral cavity.^[55] Resistance to change may make it difficult for an autistic child to respond positively in an unfamiliar environment. Thus, unfamiliar dental staff cannot examine them. Hence, a preliminary visit to assess their capabilities, obtain a medical history and gauge the extent of dental disease should be done. Children with autism also generally dislike being touched.^[56,57] The dental examination should be carried out in the presence of the parent.

Many parents do not visit the dentist because of the highly uncooperative behavior of autistic children, the cost of treatment under general anesthesia, the associated medical conditions of the child and reluctance by the general dentists in handling autistic children and thus their dental treatment is neglected. The behavior of autistic children has been assessed by Frankel's behavior rating scale. Negative behavior in autistic children was reported by Loo *et al.*,^[15] Murshid *et al.*,^[17] and Subramaniam and Gupta^[19] to be 55.2% and 87.25%, and 65% respectively.

The impairments seen in autism characterize an individual who has great difficulties interacting with other people, and in understanding and following instructions. Attempts should be made to explain the nature of the investigation to the children with the help of pictures to familiarize the children. Compliance should be further enhanced by the use of tell-show-feel-do technique and by giving short, clear commands and positive verbal reinforcements.^[34,49] Behavior conditioning, preoperative sedation, the nitrous oxide-oxygen analgesia, together with patience, kindness, and firmness are also recommended to provide dental care for autistic children.

Caregivers need to know the nature of tooth brushing materials. Parent education and motivation are required for diet control and regular dental visits. An interdisciplinary approach including medication, psychotherapy, speech therapy and parental counseling, would help pediatric dentists to understand the behavior of these children and deliver optimal preventive and restorative care.

Summary

The prevalence of autism is rising worldwide. Hence, dentist's will find an increasing number of such children in their routine practice, whose treatment will require special considerations in their dental management. Knowledge regarding the oral health status of autistic children is vital for the pediatric dentists. Negative behavior toward dental treatment was strongly significant in autistic children. Self-inflicting trauma/habits was observed in autistic children. It was concluded that the autistic children do not have a higher dental caries score compared to that of normal children. Their oral hygiene was fair, and they exhibited more debris deposits than normal children.

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