



Dental Care of Children with Autism Spectrum Disorder – An Overview

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Abstract

Individuals with Autism Spectrum Disorder (ASD) are subjected to inequality in oral health in terms of unmet health care needs. The main barriers attributed towards the unmet needs are the lack of their ability to express their needs, lack of ability for self-care, a greater need of behavior management techniques for dental procedures and the lack of knowledge or professional uncertainty in treating the children with special needs. This article gives a review on the general and oral characteristics, dental care and management of the children with ASD.

Keywords: Oral Health; Toothbrushing; Self-Injurious Behavior; Dental Office; Social Impairment

Abbreviations

ASD: Autism Spectrum Disorder; ADHD: Attention Deficit Hyperactive Disorder; SPD: Sensory Processing Disorder; VM: Video Modeling; VSM: Video Self Modeling; VPOV: Video Modeling Point of View; TEACCH: Treatment and Education of Autistic and related Communication-handicapped Children; ABA: Applied Behavior Analysis.

Introduction

Autism Spectrum Disorder is an umbrella term which includes three neurodevelopmental disorders – Autism, Asperger syndrome and Pervasive Development Disorder (PDD) [1]. It was first described by an American child psychologist, Leo Kanner in 1943, when he noticed the behaviors of 11 children which were obviously different from those of others. Kanner suspected that these children had an inborn feature which prevented them from socializing with others. ASD is also referred as Kanner's autism, early infantile autism or childhood autism [2]. The global prevalence of ASD is increasing and currently it is estimated to be 1 in 110 children, with male predilection of 5:1 and the rise in the prevalence is attributed to the increase in awareness and better diagnostic tools. The etiology of majority of cases is idiopathic, although genetic and environmental factors are also known to play a role [1]. This narrative review creates an insight on the general and oral characteristics and dental management of children with ASD.

Materials and Methods

An electronic database search using PUBMED, Google Scholar search engines was done to select the articles and textbooks were also referred to prepare this narrative review. The keywords oral characteristics, dental care of children with ASD, dental management and behavior management were used.

Results and Discussion

General characteristics

Three levels of impairment are noted in the individuals with ASD:

- Social impairment – lack of eye contact and do not respond to one's name
- Communication impairment – delay or complete lack of spoken language
- Repetitive behaviors – staring, floppy hands, an odd interest in or preoccupation with specific objects [3].

Signs and symptoms

Infants upto 1 year with Autism are distinguished by:

- A baby who does not babble or gesture by 12 months of age
- A baby who lacks eye contact with its mother by 12 months age
- A baby who resists being held or cuddled by mother
- A baby who does not respond when the mother says its name
- A baby who appears to be deaf
- An infant who does not say single words by 16 months of age

- A toddler who does not say 2-word phrases by 24 months of age
- Absence of social smiling and lack of facial expression
- Lack of pointing/showing
- Lack of spontaneous imitation

Young children

- Do not take part in any group play/activities and always appear to be in their own world
- Do not recognize others desires, feelings and beliefs and that these may differ from their own
- Inability to interpret or predict the behavior of others
- Do not use facial expressions and body language to interact with others

Teenagers and young adults

- Prefer to engage in solitary activities rather than form friendship
- Remain oblivious to the need and presence of others
- Unable to empathize with others [4]

The diagnosis of ASD in children is usually delayed to two or three years because of the clinicians reluctance to confirm the condition, though the parents suspect of something wrong in their child by 18 months of age. 75% of the children with ASD possess some level of mental retardation. The children in addition to the above mentioned behaviors may also develop abnormal eating habits, abnormal sleep patterns, temper tantrums, aggression and self-injurious behavior. Since the children with ASD keep to their routine strictly, any change in their routine or environment makes them violent. Most of the children develop seizures in their first year of life [4]. These children also exhibit attention deficit hyperactive disorders (ADHD), increased tactile sensitivity and sensory hypersensitivity and food selectivity [5]. These features makes the maintenance of oral health in these individuals very difficult for both dental procedures and home care procedures.

Oral characteristics

Although there are no known autism-specific oral manifestations, problems in oral health arise due to their autism-related behaviors. Generally these children exhibit poor oral health with plaque and calculus accumulation which is attributed to the tactile defensiveness against tooth brushing and use of other intraoral hygiene devices [5] and also these children do not possess the necessary manual dexterity required for tooth brushing and do not comprehend its importance [6].

A typical feeding behavior which is commonly exhibited by the children with ASD is sensitivity to food texture and extreme selective preferences for particular type of foods. Most of the children prefer only soft food and no hard parts and they tend to

hold the food in their mouth (food pouching). Children with ASD have damaging oral habit like bruxism and together with comorbid conditions like gastrointestinal disturbances lead to attrition and erosion of the teeth [6].

Children with ASD are known to possess unusual sensory processing. Sensory Processing Disorder (SPD)/ Sensory Integration Dysfunction is a neurological disorder in which the individual finds it difficult to assimilate, process and respond to sensory information from the environment and also from within their own body. The senses are visual, auditory, tactile, olfaction, gustatory, vestibular and proprioception (kinesthetic, the sense of one's own limbs in space). Oral sensitivity issues in children with ASD can be of two different types: Oral hypersensitivity and Oral hyposensitivity.

Children with oral hypersensitivities/oral defensiveness have the following characteristic features

- Do not like their teeth to be brushed and/or face washed.
- May avoid food of mixed textures
- Take the food from the fork or spoon by keeping their lips retracted and using only their teeth.
- Have gag reflex, so each spoon of food will be swallowed taking a drink with it
- Exhibit signs of tactile defensiveness - dislike being touched, avoid messy play with glue, mud, sand, finger paints, etc. and do not pick up thins with a grasp involving the palm of their hand.

In contrast to the above, the children with oral hyposensitivity exhibit

- Crave for intense flavours i.e., sweet, sour, salty, spicy
- Avoid mixed textures as they find it difficult to chew and swallow properly. This is because they cannot "feel" the food in their mouth correctly
- Messy eaters - smear food all over their face and/or leaving bits of food in their mouths at the end of meals
- Food pouching - take large bites and stuff their mouths or "pocket" food in their cheeks
- At risk of choking as they do not chew the food thoroughly before swallowing
- Excessive drooling is seen
- Tend to put inedible things in their mouth [7]

But in spite of these behavior patterns, children with ASD have less caries experience in terms of both prevalence and extent than children without ASD [6]. The plaque pH and saliva buffering capacity are similar to the children without ASD [5].

Drugs and their dental implications

Many of the drugs used to treat the associated features of autism have systemic side effects, orofacial side effects and adverse orofacial interactions with drugs used in dentistry.

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- CNS stimulants (methylphenidate, dextroamphetamine) - causes xerostomia and hypertensive episode also may occur if local anesthetics with vasoconstrictors are given in excess or by inadvertent intravascular injections
- Anticonvulsants (Carbamazepine and valproate) - When given along with aspirin and other non-steroidal anti-inflammatory drugs, excessive bleeding may result. Erythromycin and clarithromycin may cause carbamazepine toxicity by inhibiting its metabolism in liver.
- Antipsychotic medications (Risperidone and olanzapine) - May induce motor disturbances affecting speech, swallowing and the use of removable prostheses, produce transient sialorrhea followed by xerostomia.
- Antidepressants (Fluoxetine and sertraline) - Xerostomia, dysgeusia (altered taste sensations), stomatitis and glossitis. Use of fluoxetine is also associated with a risk of developing involuntary orofacial movements, which may manifest as sucking, smacking and pursing movements of the lips and protrusion of the tongue [4].

Dental care

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: basic techniques (communication, distraction, imitation, desensitization), physical techniques (restraint by the professional/assistant/parents or using specialized devices) and advanced techniques (nitrous oxide, sedation or even general anesthesia). These techniques should be individualized, keeping in mind not only the patient's disorder, but also the degree of cooperation that can be obtained and the patient's oral pathology, since the possibility of long or complex treatments require the selection of the most suitable technique.

Pre-Visit parent consultation

It is important to record the complete medical history and previous dental experiences of the child. The child's favorite items and those triggering the child's temper should be identified from the parents. Instructions and appropriate education material like visual pedagogy for home teaching of procedures related to dental appointment must be provided to parents.

Home preparation of child

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 [8].

Appointment structure

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.

Dental environment

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

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, along with firmness, wherever necessary. However, there should be a higher degree of flexibility to comply with their quickly changing needs. Other recommendation is modeling with constant positive reinforces and immediate verbal praise after each accomplished step of a procedure and a prize at the end of a dental session. The communication should be clear in short and simple sentences [9].

Visual pedagogy

Visual Pedagogy was first used in 1999 by Backman B & Pilebro C in dentistry for increasing the cooperative levels of the children with ASD for dental treatment [10]. At the time of pre-visit consultation of parents, the dentist can organize a home-centered preparation that includes custom-made photo books to familiarize the child with dental office and the dental instruments, teaching phrases required for the dental examination such as 'open your mouth' so that the child gets acquainted with the dental operatory room. Through visualization, the actual office set-up, the staff, the instruments and the procedure could be studied at home by the child before visiting the clinic which helps them to understand the scenario easily, thereby their cooperation level also increases. The photographs should be arranged in the sequence the child will see them at the time of appointment [8,11,12]. Visual pedagogy has also been utilized through series of colored photographs describing toothbrushing to improve oral hygiene in children [8,11,13].

Video Modeling (VM) is an effective method for developing various skills in children with ASD such as social, communication and self-help skills. Video Modeling consists of a video which shows a model perform a target behavior or a specific task which has to be trained and the participant will be repeatedly made to watch the video and has to perform the skills presented in the video.

Any person who is either familiar or unknown to the participant can act as a model and they can be an adult or peer. There are two main versions of the VM; video Self Modeling (VSM), where the video shows the participant itself as a model, and Video Modeling Point of View (VPOV), where the target skill is filmed from the participant's perspective, at him/her eye level. Video modeling is an effective and efficient technique for teaching children with ASD tooth brushing [14-16].

A pedagogic concept called TEACCH (Treatment and Education of Autistic and related Communication-handicapped Children) was developed by Schopler in 1972, which is a structured teaching in which visual pedagogy is one part of the concept, and it is an effective technique to teach children with autism both at home and in school [13]. Application of the TEACCH concept to desensitize the children to dental procedures and oral hygiene procedures are usually effective in training the children [3].

Sensory adapted environment

The intervention strategies for addressing the sensory issues: Systematic desensitization - Playing face touch game with rubber dolls and taking turns through touching, wiping the face with warm clothes and application of deep pressure. Oral motor exercises - Using chewy tubes to improve the chewing skills and increase the tongue movements which reduces drooling like tongue push-ups, back and forth tongue movements for improving the motor coordination, blowing, sucking and whistling for tongue and lip strengthening. Oral sensory exercises - Tactile stimulation on lips for improving the awareness/desensitization, brushing of lips and gums for improving the tactile awareness, vibratory stimulation to tongue, lips, cheeks for improving proprioception [7].

Tooth brushing habit should be introduced using alternatives such as a washcloth, toothbrushes of different texture and design or an electric toothbrush may enhance the acceptance of toothbrush by the children. Similarly, various types of toothpastes can be tried under the supervision of dental professional or parents selecting the one with which the child can tolerate [8].

Applied behavior analysis (Aba)

Applied behavior analysis are based on the analysis and modification of human behavior and environment in order to modify behaviors so that the desired effects are achieved. American Academy of Paediatrics have accepted the ABA procedures in the management of children with ASD. Reinforcement forms the basis of behavioural concepts and it occurs when there is an increase in certain behaviour, due to a stimulus or event following that behavior and it can be either a 'positive' or 'negative' reinforcement.

For example, a material reinforcement like giving a gift of the child's liking, or a social reinforcement like saying 'good job' or 'well done' can serve as a positive reinforcement, it leads to an

increased compliance in the dental chair. But if the child is not compliant, he/she can be negatively reinforced by making them to stand still during procedure for a predetermined time period of counting from 0 to 10. The events are repeated as long as necessary for the procedure to be completed [8,17].

Advanced behavior guidance methods: All the children with ASD cannot be managed with non-pharmacologic techniques. Some children can be managed by light sedation and for those who cannot be managed with it; general anesthetic treatment may be required [18].

Conclusion

It requires that the oral health care providers should be aware of difficulties in securing the oral health care of children with ASD not only in their childhood days but also in their transition to young adult's stage. The system of preparing and maintaining the abilities to provide oral health services for these children of diverse nature must be brought up to +date to meet the challenges posed by them.

Conflict of Interest

Nil.

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