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Autism and Its Management in Pediatric Dentistry-A Review

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I. 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]. Autistic Disorder is categorized in the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th ed) under the section, Pervasive Developmental Disorders (PDD), which is also referred to as Autism Spectrum Disorder (ASD). It is characterized by abnormal emotional, social behaviour and linguistic development[3]. There is increasing indication that some of the autistic disturbances originate during gestation, are present at birth, and become obvious when they interfere with the normal course of development. This review creates an insight on the general and oral characteristics and dental management of children with ASD.

Autism Disorder (299.00 DSM-IV): People with autistic disorder (or "classic" autism), the most severe form of ASD, have significant difficulty in talking and relating to others, they display compulsive and repetitive behaviors, and they have intellectual disability[4].

Asperger Syndrome (299.00 DSM-IV): People with Asperger syndrome display milder symptoms of autistic disorder. They may have social challenges and unusual behaviors, but they have no significant problems with language or intellectual disability[4].

Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS; or "atypical autism") (299.80 DSM-IV): People who display some classic symptoms of autistic disorder or Asperger syndrome but do not meet the criteria for a specific diagnosis, may be diagnosed with PDD-NOS. Characteristics of PPD-NOS include impaired communications and social interactions in varying degrees, sensitivities to sights and sounds, and repetitive and stereotyped patterns of behaviour[4].

DEFINITION

Autism Society of America (ASA)[5] defined AD as: A complex developmental disability that typically appears during the first 3 years of life and is the result of a neurological disorder that affects the normal functioning of the brain, impacting development in the areas of social interaction and communication skills.

The National Institute of Child Health and Human Development defined Autism Disorder (AD) as:"A complex biological disorder that generally lasts throughout a person's life, as it starts before age three, in the developmental period, and causes delay or problems in many different ways in which a person develops or grows.

ETIOLOGY

Considering the complex nature of autism, a single cause is unlikely. Possible aetiologies of autism are

- Genetics
- Biology of Brain
- Prenatal Factors
- Coexisting Medical Conditions

Genetics:

Genetic factors are clearly important. Gene mutations, gene deletions, copy number variants

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(CNVs) and other genetic anomalies are all persuasively linked to autism[5]

Biology of Brain:

Strong evidence suggests that AD is an organically based neurodevelopment disorder which is associated with abnormalities in brain structure and function. Characteristic findings are a

i. Reduced number of purkinje cells in the posterior inferior regions of the cerebellar hemisphere.
ii. Truncation in the dendritic tree, development of neurons in the limbic system[5].
iii. Hypoplasia of cerebellar lobules VI and VII[6].
iv. Size of the brain stem structures and the entire cerebellar vermis and their components were significantly smaller in an autistic group than in control group, which was found on using magnetic resonance imaging.

Prenatal Factors:

Intrauterine viral infections or metabolic disorders may play an important role in the pathogenesis of AD[7]. Intrauterine exposures to the teratogenic drugs, thalidomide and valproate have been implicated as the cause of autism in few affected children[8].

Coexisting Medical Conditions[9]

i. Seizure disorder
ii. Fragile –X syndrome is found in 2-5 % of autistic individuals and it represents the largest known subgroup of patients with AD, with known aetiology.
iii. Tuberous sclerosis complex (TSC): 0.4-3% of patients with AD had TSC and 17-58 % of subjects with TSC had AD.
iv. Autism patients have allergies, immune system problems, gastrointestinal disturbances and seizures. Dentists must be aware of these co-morbid conditions so that they can give optimal care to the children with autism disorder.
v. Neuropsychiatric disorder: Developmental delay, dysmorphic features, obstetric complications, an unequal sex ratio, and extremes of head size represent nonspecific signs of autism.

SIGNS AND SYMPTOMS

Infantsupto 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 of 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

DIAGNOSIS:

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 theirfirst year of life .These children also exhibits attention deficit hyperactive disorders (ADHD), increased tactile sensitivity and sensory hypersensitivity and food selectivity. These features makes the maintenance of oral health in these individuals very difficult for both dental procedures and home care procedures.

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 thepossibility 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[10].

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[11].

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[12]. At the time of pre-visit consultation of parents, the dentist can organize a home-centered preparation that includes custom-made photo books to familiarizethe child with dental office and the dental instruments, teachingphrases required for the dental examination such as ‘open yourmouth’ so that the child gets acquainted with the dental operatoryroom. Through visualization, the actual office set- up, the staff, theinstruments and the procedure could be studied at home by thechild before visiting the clinic which helps them to understand thescenario easily, thereby their cooperation level also increases. Thephotographs should be arranged in the sequence the child will seethem at the time of appointment . Visual pedagogy hasalso been utilized through series of colored photographs describingtoothbrushing to improve oral hygiene in children[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].

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 . Application of the TEACCH concept to desensitize the children to dental procedures and oral hygiene procedures are usually effective in training the children[15].

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 pushups, 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[16].

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 Paediatricshave 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 notcompliant, 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[17].

II. 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.

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