PROVIDING DENTAL CARE FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS

Diana MURARU¹, Tudor CIUHODARU², Magdalena IORGA³

¹Psychologist, PhD, Dept. Behavioral Sciences, „Grigore T. Popa” University of Medicine and Pharmacy, Iaşi, Romania
²Associated Professor, PhD, MD, „Apollonia” University of Iaşi, Romania
³Lecturer, PhD, Dept. Behavioral Sciences, „Grigore T. Popa” University of Medicine and Pharmacy, Iaşi, Romania
Corresponding author: Tudor Ciuhodaru; e-mail: tudorciuhodaru@yahoo.co.uk

Abstract

Given the increasing prevalence of autism spectrum disorders, it is realistic to assume that dental professionals are likely to treat individuals with this diagnosis. Understanding the complexities of this disorder and its behavioral manifestations is indispensable for dentists. The present article presents several characteristics of autism spectrum disorder that impact dental interventions, along with medical and behavioral alternatives to better manage the dental problems of children with autism spectrum disorder. A multidisciplinary approach and family support are important for planning a dental intervention for these patients in order to avoid anxiety. Knowledge on autism, the dentist-patient relationship and the individual preparation for dental interventions is useful for constructing a controllable medical experience.

Keywords: autism spectrum disorder, dental care, dental professionals.

1. INTRODUCTION

Autism spectrum disorder (ASD) is a neuro developmental disorder that affects lifelong living. The signs can be seen in early infancy, but there are also children who develop normally during the first 1-2 years of life and lose their verbal and social skills afterwards. Autism spectrum disorders include a wide range of disorders - like autism, Asperger’s syndrome, childhood disintegrative disorder and pervasive developmental disorder not otherwise specified [1,2].

Diagnosis of autism spectrum disorder is based on two main criteria:

(a) persistent deficits in social communication and interaction,
(b) restricted, repetitive patterns of behavior, interests, or activities [3].

Both genetic and environmental factors appear as causes for ASD:

• the pathophysiology identified mitochondrial defects, cytosine disregulation, high maternally-derived intrauterine androgen concentrations [4],
• boys are 4 times more likely to develop this disorder compared to girls (4.6: 1),
• families with an older child suffering from ASD face an increased risk of developing this disorder. Verbal delay, the lack of social interaction skills or emotional disturbances frequently occur among family members or relatives,
• comorbidities,
• extremely preterm babies,
• older ages of parents.

The characteristics of ASD are different and diverse. Autistic children show delayed or inexisten verbal skills, difficulty in developing social relationships, inflexible adherence to rituals, mental retardation, repetitive movements; they develop daily routine activities and are resistant to changes.

2. ORAL HEALTH-RELATED PROBLEMS IN AUTISTIC CHILDREN

Oral health-related problems in autistic children are due to several causes:

• harmful behavioral problems (bruxism or tongue thrusting, lip biting),
• dental problems (anterior open bite and dental crowding).
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• difficulty in maintaining oral hygiene (mental retardation, difficulty in performing oral hygiene, prolonged food retention in the oral cavity, dislike of the taste of toothpaste),
• food habits (preferences for certain food and sweets, alimentary rewards used during therapies; usually, they can eat only foods with a certain texture),
• drugs.

Different studies performed on autistic children showed that regular dietary habits with decreased carbohydrate intake and a relatively lower frequency of snacking between meals have a good impact on oral health for children and adolescents [5].

Children with ASD often have difficulties with daily living activities (ADLs), [6] such as feeding, dressing and toileting. Although autism does not appear to cause specific dental deficits, several studies have been conducted in order to identify the status of caries in people with ASD. The results obtained are divergent: some authors have found that people with ASD have fewer caries [7-9] while others suggest the opposite [10]. Moreover, some studies claim that there are no differences between people with ASD and those with TD as to caries prevalence [11,12]. Conflicting results concerning caries status were identified; however, most of the studies agree on the fact that people with ASD have a poor oral hygiene [10,13] and higher periodontal treatment needs [9,12].

Although behavioral therapies are the most common approaches to ASD, sometimes the medication prescribed to treat some symptoms has consequences on dental health status. For example, the study of Nagendra and Jayachandra [14] presents some oral side effects of drugs used in ASD:
• CNS Stimulants (Methylphenidate Dextroamphetamine, Mixed amphetamine salts, Pemolin) – xerostomia,
• Antidepressants (Fluoxetine and Sertraline) - xerostomia, disphagia, sialadenitis, disgeusia, stomatitis, gingivitis, glossitis, discolored tongue, bruxism,
• Antihypertensive (Clonidine) - xerostomia, disphagia, sialadenitis,
• Anticonvulsants (Carbamazepine and Valproate) - xerostomia, stomatitis, glossitis, and disgeusia. Excessive bleeding can result when medication is combined with either aspirin or non-steroidal anti-inflammatory drugs,
• Antipsychotics (Risperidone, Clozapine, Olazepine, Quetiapine, Ziprasidon) - xerostomia, sialorrhea, disphagia, disgeusia, stomatitis, gingivitis, tongue edema, glossitis, discolored tongue.

3. FAMILY PARTICIPATION IN DENTAL CARE

Some studies pointed out that the dental hygiene routine of children with ASD is developed and supervised by parents or caregivers. Families that have a child with special needs are very oriented towards developing this habit in their children in order to avoid major medical interventions and related distress, for both children and parents. The success depends on patients’ characteristics (intellectual level, acceptance of routine activities, etc.) and tolerance to some materials (toothpaste or some dental cleaning materials).

It is proved that families that have a child with mental disability are more prone to experience depression, anxiety and distress during daily activities and medical experiences. In a study of Magoo et al. [15], the authors stated that one of the main reasons for parents to avoid dental appointments is that they believe that their child lacks cooperative ability (55.8% of parents).

Parents’ involvement can either increase or impede the progress of dental treatments. The research of Crossley and Joshi pointed out that dentists agreed that the presence of parents could lead to increased levels of anxiety [16]; they also favored parental company (due to parents’ success in behavior management). Also, the presence of parents can be helpful, due to their ability to predict whether their child would permit examination in the dental chair and cooperate for radiographs, which may influence acceptance/rejection of behavioral guidance techniques, such as communication and communicative guidance, tell-show-do, voice control, nonverbal communication, positive verbal reinforcement, distraction, parental presence/absence, etc. [17].
Sensory processing, considered to be atypical in 69%-95% of children with ASD [18-20], constitutes a factor that influences the ability to successfully complete ADLs. Also, difficulties in sensory processing limit family participation in work, family and leisure activities and, given child’s sensory-related behaviors, individual and family routines are managed by parents with specific strategies [21].

4. THE IMPORTANCE OF ROUTINE DENTAL CARE

Sensory processing difficulties also exacerbate oral care challenges in children with ASD [22-24]; comparatively with typically developed (TD) children, they display significantly more uncooperative behaviors during routine dental cleanings [25]. When they come into contact with the standard sensory characteristics of the dental operatory moment (for example, bright fluorescent lights, touch inside or around the mouth, the taste and smell of various oral care products), children with ASD have negative behavioral reactions and display high levels of anxiety. As a result, it becomes difficult for dentists to offer appropriate dental treatment [23]. Furthermore, when the dentist performs various movements inside or around the mouth, children with ASD may look for all possible mechanisms to protect this area because they may consider it an aggression. Dental interventions are likely to be complicated, impaired, delayed or blocked by various disruptive behaviors [26-29].

Given these considerations, routine dental care is very difficult in people with ASD, requiring special dental management [7]. As a result, dental professionals should have extensive knowledge about ASD symptoms and treatment methods. Moreover, they should display flexibility in dental treatment in order to meet patient’s individual needs [30]. Also, before establishing an appointment, it could be helpful for the dentist to ask questions about toilet training, tooth brushing, haircuts, academic achievement and language, considered to be predictors of child’s cooperative skills [31].

On the other hand, except dental problems due to hygiene or type of food, dentists should take into consideration that children with this diagnostic present higher risks of traumatic dental injuries, due to their behavioral disturbances. Habbibe et al. [32] identified that 39.3% of the children with ASD present traumatic dental injuries as a consequence of their routine activities, of falling while walking or of self-harm episodes.

It is very important that health policies target the oral hygiene habits into the academic curricula and early diagnostic by dental professionals during the school years. Successful routine dental care could increase the compliance of the patient with special needs and could also avoid complicated medical interventions in such patients.

5. DEVELOPING GOOD COMPLIANCE IN PATIENTS WITH ADS

Developing good compliance in patients with autism is very important, in order to solve medical problems and to avoid anxiety about dental interventions. This is difficult to achieve with people suffering from autism spectrum disorder, but a trained interdisciplinary team, combined with family support, will increase the rate of compliance.

Dental professionals should have knowledge and develop skills in working with people with this disability. Every patient has different behavioral characteristics and also different needs. Medical decisions are made considering dental health conditions, patient’s behavior and ways of treatment (such as anesthesia).

6. THE MANAGEMENT OF DENTAL INTERVENTIONS

The management of dental interventions in children with ADS should be individually shaped and adapted to their characteristics and needs. Children with ADS may be unusually sensitive to light, sound and touch, and yet oblivious to pain. They can constantly move and some indications or demands of the doctor are difficult for them to understand and follow.
Research on this vulnerable population is limited because of medical conditions and also for ethical reasons. That is why, techniques should be carefully evaluated and applied. Some studies proved that visual supports may represent a good strategy to provide dental care for these patients. Moreover, a good compliance with dental treatments was identified for most of the children, regardless of verbal fluency, intellectual level, age and gender.

At home preparation is crucial for any kind of dental intervention and the role of parents is a prerequisite for a successful intervention. Parents must be trained how to perform at home the accommodation with the dental appointment. Parents’ cooperation may appear as a limitation, if they are not able to carry on the training due to different reasons, like the lack of time or capacity [33].

According to Deli et al. [30], there are some important steps to improve the doctor-patient relationship and to construct the environment to which the child should adapt to:

- previsit parent consultation (the parent presents the medical history of the autistic child regarding general medical and dental problems and offers the doctor information related to child’s behavior. Doctors must teach parents how to prepare the child at home in order to better accommodate to the new environment of the dental office. Support materials could help and should be provided by the medical team),
- home preparation for both child (to familiarize with dental office environment, instruments, the need to sit, medical procedures) and parent,
- dental office preparation (establishing the management technique which suits the patient, informing and training the medical team),
- dental appointment (adapting medical behavior to patient’s characteristics and needs).

The management of dental interventions in children with disabilities targets oral health problems, but also the goal of avoiding a high level of anxiety and fear [34] – consequently, medical skills should be combined with psycho-pedagogical skills.

As ASD children are often difficult patients, operative procedures usually require general anesthesia for almost 40% of them. Although an uncooperative behavior is one of the main predictors for the use of GA in dental treatment [2], this modality presents a calculable risk for morbidity and mortality and most often is undertaken in special settings, where dental anesthesiologists are available [35]. Because of its associated risks, parents who choose GA can be emotionally overwhelmed, with very few of them considering it an acceptable technique - only 10%, according to the study of Marshall et al. [17]. Even though treating children with ASD may require the use of sedation, dental professionals should conduct an extensive history and consultation before administering drug therapy [29].

Sensory Adapted Dental Environment (SADE)

Cermak et al. [36], starting in their study from the assumption that children would be less anxious and exhibit decreased uncooperative behaviors if the noxious sensory characteristics of the dental environment could be reduced, showed the positive benefits of a sensory-adapted dental environment in children with ASD. As suggested by the authors, a SADE can potentially reduce a series of problematic behaviors in children with ASD and is feasible to implement.

Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH)

According to Mesibov and Shea [37], the core idea in TEACCH is structured teaching, based on four kinds of structures: a physical structure, a sequence of events, individual tasks, and a work/activity system. The use of the TEACCH model can enhance compliance with dental procedures and can help reduce stress and accompanying disruptive behavior. Using a TEACCH approach to facilitate a 10-component oral assessment in children with ASD, the study of Orellana et al. [38] found evidence for increased compliance with a full dental assessment.

Applied Behavioral Analysis (ABA)

Applied behavioral analysis is based on the principles of behavior through systematic
experimentation. ABA is a branch of psychology that centers on the analysis of human behavior and on its modification [39]. In shaping it (one of the major components of ABA), reinforcements are used until the desired behavior is acquired independently [30]. With this technique (specifically, a cycle of negative reinforcements) the child learns to sit on the dental chair by himself; sitting skills are a necessary step for the development of other skills, permitting various office treatments [40]. By using ABA, dentists can decrease the need for restraints and sedation, considered as intrusive procedures.

**Visual Pedagogy (VP)**

In order to familiarize ASD children with dental tools and procedures, visual pedagogy has been proven to be an efficient technique [41]. Using a set of coloring pictures, followed by simple and specific requests (for example, ‘open your mouth’), visual pedagogy is useful in increasing cooperation for dental visits.

Studies prove that the use of a visual schedule system helps children with ASD to complete more steps with lower rates of fear and behavioral distress during shorter periods of time allocated to the appointment [42]. The appointments must be scheduled weekly.

**7. RECOMMENDED PRACTICES FOR DENTAL PROFESSIONALS**

To inform the team about child’s medical (oral health state) and psychological (cognition, verbal, social skills, triggers and hyperactivity) conditions,
- To establish an interventional plan adapted to each child,
- To train parents how to prepare the child at home for the dental appointment,
- To modify the environment in order to reduce sensory triggers,
- To gradually accommodate the child with the environment,
- To use stories or visual support,
- To target both medical and psychological aspects, in order to diminish physical and psychological distress and to prevent fear of dentistry.

**8. CONCLUSIONS**

Given the increasing prevalence of children with ASD, it is very likely that pediatric dentists will have to treat these children for many years. Dentists may not be aware of the sensory processing difficulties of children with ASD. However, treating people with ASD implies awareness on the manifestations of the disorder and on its related features. As a result, dental professionals can achieve patient cooperation, which leads to enhanced dental care provision and improved dental visits. Taking into account the variability in symptomatology of the autistic disorders, practitioners should consider adjusting their therapeutic approach to the unique characteristics of each presenting child. It is important for dental professionals to train themselves for medical interventions in children with special needs and to construct individual experiences with patients for reducing anxiety and increasing adherence.

**References**