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VARIOUS TECHNIQUES OF ADAPTATION TO DENTAL TREATMENT OF CHILDREN WITH AUTISM SPECTRUM DISORDER

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Summary

Introduction. Autism is a severe and lifelong developmental disorder characterized by impaired social interaction and interpersonal communication, as well as characteristic repetitive patterns of interest and behavior. The purpose of this study is to point to the possibility of applying various techniques of adaptation of children with autism to dental interventions in order to maintain oral health.

Material and Methods. A multidisciplinary project was carried out by the Dental Clinic of Vojvodina, Special Education School “Dr. Milan Petrović” and the Autism Society of Novi Sad. The following education models were used in the project: behavior-oriented models, developmental strategies, therapy-based interventions, and combined interventions. The success rate of applied education models and adaptation of children with autism spectrum disorders to dental interventions was examined. The success criteria included the ability to make contact, communicate, cooperate, and perform dental treatment. Results. The multidisciplinary project included 20 active members the Autism Society of Novi Sad and 20 members of the Special Education School “Dr. Milan Petrović” day care program. The results of the study showed a 95% success rate of the most commonly used applied behavior analysis. The success rate of the communication oriented interventions was 90%, while therapy based interventions showed an 85% success rate. The combined interventions showed a 100% success rate.

Conclusion. Only integration of several methods, multidisciplinary cooperation and an individual approach to work with children with autism can lead to success in work and adaptation to dental interventions of persons with autism spectrum disorder.

Keywords: Pediatric Dentistry; Oral Health; Autism Spectrum Disorder; Child; Adaptation, Psychological; Interdisciplinary Communication; Patient Compliance; Psychological Techniques

Sažetak

Uvod. Autizam ili autistični poremećaj je ozbiljan i doživotni razvojni poremećaj koji karakteriše pogoršanu međusobnu socijalnu interakciju, međusobnu komunikaciju i karakteristične ponavljajuće obrasce interesa i ponašanja. Svrha ove studije jeste da se prikaže mogućnost primene različitih tehničkih i adaptacijskih menija sa poremećajima iz autističnog spektra na stomatološke intervencije u cilju očuvanja oralnog zdravlja. Materiał i metode. Ostvaren je multidisciplinarni projekt između Klinike za stomatologiju Vojvodine sa školom za specijalno obrazovanje „Dr. Milan Petrović” i Društva za podršku osobama sa autizmom grada Novog Sada. Klasifikacija edukacijskih modela rada korišćen je u projektu: models usmereni na ponašanje – bihevioralni pristup, razvojne strategije, terapijski bazirane intervencije i kombinovane intervencije. Ispitivana je uspešnost primene edukacijskih modela i adaptacije dece sa poremećajima iz autističnog spektra na stomatološke intervencije. Kriterijumi uspešnosti su mogućnost ostvarivanja kontakta, komunikacije, saradnje i vršenja stomatoloških intervencija. Rezultati. Multidisciplinarno pristupom je obuhvatin 20 aktivnih članova Društva za podršku osobama sa autizmom grada Novog Sada i 20 korisnika dnevnog boravka škole za specijalno obrazovanje „Dr. Milan Petrović”. Rezultat istraživanja pokazuje da je primenjena bihevioralna analiza ponašanja, kao najviše primjenjiv craving oblik rada, sa 95% uspešnosti. Uspešnost primene edukacijskih modela sa poremećajima iz autističnog spektra na stomatološke intervencije. Kriterijimi uspešnosti su mogućnost ostvarivanja kontakta, komunikacije, saradnje i vršenja stomatoloških intervencija. Zaključak. samo integracijom više pojedinačnih metoda, multidisciplinarnom saradnjom i individualnim pristupom u radu sa osobama sa poremećajem iz autističnog spektra možemo doći do uspeha u radu i prilagovanja na stomatološke intervencije.

Ključne reči: pedijatrijska stomatologija; oralno zdravlje; poremećaji autističnog spektra; dete; psihološka adaptacija; multidisciplinarna saradnja; saradljivost pacijenta; psihološke tehnike

Introduction

Autism or autism disorder (AD) is a severe and lifelong developmental disorder characterized by impaired social interaction and communication, as well as characteristic repetitive patterns of interest and behavior [1]. Autism is considered to be a severe developmental disorder occurring in early child-
Adaptation to Dental Treatment of Children with Autism

Material and Methods

Dental Clinic of Vojvodina, Special Education School “Dr. Milan Petrović” and the Autism Society of Novi Sad participated in this project. The team consisted of dental practitioners, pediatric and preventive dental consultants of the Dental Clinic of Vojvodina, 3rd and 4th year dentistry students of the Faculty of Medicine of the University of Novi Sad, special educators and psychologists of the Special Education School “Dr. Milan Petrović” day care program, and volunteers of the Autism Society of Novi Sad.

This multidisciplinary project included the following education models:

1. Behavioral approach
   
   Applied behavior analysis (ABA) is an approach with strong empirical foundations and represents the most empirically valued approach when treating autism [13]. It is based on exact interpretation of interaction between a previous variable (stimulus or order) and the consequence (reinforcement or reward), and the use of these pieces of information to systematically plan an object of desired learning and program of behavior change.

2. Developmental strategies
   
   Developmental social-pragmatic model (DSPM) is focused on initiation and spontaneity in communication and monitoring the child’s focus of attention and motivation. Developmental interventions are focused on the child’s ability to create positive and meaningful relationships with other people even when being constrained by ASDs. The aim is to upgrade the child’s current communication skills, even if it’s deemed unconventional, as well as to use more natural activities and events that support the child’s communication ability development [14].

3. Therapy based interventions
   
   a) Communication-oriented interventions. Picture exchange communication system (PECS) is a unique complementary method for learning effective communication. The PECS was originally developed for the use with pre-school autistic children, in children with PDD, and children with other social communication disorders. The PECS has changed and developed over time and today it is used for individuals of all ages (including adults), but it is also effective among children with a wide spectrum of communication disorders [15].

   b) Visual supports. Alternative and augmentative communication (AAC) is a term that encompasses communication methods that use supplementing or replacing speech or writing for those who have difficulties with producing and understanding spoken or written language. The AAC consists of unassisted communication that does not use tools but body language or assisted communication that uses external tools and consists of pictures and other aids. Children with autism have strong visual processing skills which make them excellent candidates for AAC [16]. The AAC system for this population actually started as PECS [17].

4. Combined interventions. Learning experiences and alternative program (LEAP) for preschoolers and parents is a model that involves children included in pre-school classrooms together with their typically developing peers from the very start. The program was designed to meet the education needs of both typical preschoolers and ASD.

Abbreviations

DSM-IV – Diagnostic and Statistical Manual of Mental Disorders
PDD – pervasive developmental disorder
ASD – autism spectrum disorder
AD – autism disorder
PDD-NOS – pervasive developmental disorder not otherwise specified
ABA – applied behavior analysis
DSPM – developmental social-pragmatic model
PECS – picture exchange communication system
AAC – alternative and augmentative communication
LEAP – learning experiences and alternative program
children in an integrated classroom environment. Peers are taught to aid the social and communicative behavior of ASD children. Families are also taught to apply behavioral strategies when interacting with the aforementioned children [14].

The first meeting with a dental practitioner, as an initial contact, took place at the Special Education School “Dr. Milan Petrović” day care program and the Autism Society of Novi Sad by applying a behavioral ABA approach. After a week of applying the development DSPM strategy, spontaneity in communication was initiated, while simultaneously monitoring the attention and motivation of ASD children. The next stage of adaptation included therapy based interventions, PECS and AAC, by communicating through pictures containing symbols of teeth and dental practices, oral hygiene tools, as well as photos of the Dental Clinic of Vojvodina. The following stage included the parental presence, and consisted of combined interventions - LEAP via an art workshop with a dental practitioner and teeth topics. After a gradual introduction, the next stage included the application of a behavioral approach - ABA, and consisted of tooth brushing at the day care program. After establishing contact and trust, the ASD children were examined at the Dental Clinic of Vojvodina. Since preventive prophylactic measures and diagnostics were conducted, an individual therapy was scheduled for each patient. The success criteria of the aforementioned methods were: success in establishing contact, initial communication, cooperation, workshop activities, and success in performing dental examination and intervention. Microsoft Excel 2010 was used to analyze the data on the success rate of applying various techniques for adaptation of ASD children to dental interventions.

**Results**

A two-month project included 20 active members of the Autism Society of Novi Sad and 20 members of the Special Education School “Dr. Milan Petrović” day care program. There were a significantly higher number of male ASD children compared to female children, i.e., 38 and 2, respectively. The participants included 20 members of the Special Education School “Dr. Milan Petrović” day care program, of which 1 member was female, and 19 were male, aged 17 – 21 years. Twenty members of the Autism Society of Novi Sad included 18 males and 2 females, aged 6 – 21 years.

**Graph 1.** indicates the success rate of ABA method used in the Special Education School “Dr. Milan Petrović” day care program and the Autism Society of Novi Sad during the first meeting of the ASD children and a dental practitioner, in which the success rate was 95%.

**Graph 2.** shows the success rate of the DSPM model used in both institutions which yielded a success rate of 90%. Communication was successfully initiated with all male children, while no communication was established with the female children. **Graph 3.** indicates an 85% success rate when applying communication based intervention or PECS and the AAC method. The LEAP model also yielded a 100% success rate, i.e. the technique of working with the family in the Autism Society of Novi Sad. In both institutions the ABA method yielded a 100% success rate, which means that all members actively participated in their individual tooth brushing training.

**Graph 4.** shows a 95% success rate during the first dental examination at the Dental Clinic of Vojvodina after the dental intervention adaptation techniques. **Graph 5.** indicates that 55% of children underwent successful preventive prophylactic measures including plaque removal, as well as supragingival and subgingival tooth decay treatment at the Dental Clinic of Vojvodina. In addition, 30% of children had a successful conservative treatment of their permanent teeth with decay after preventive prophylactic measures. As a result of inability to establish adequate cooperation and to perform dental interventions in outpatient conditions, 15% of children had dental treatment under general anesthesia.
Discussion

The main challenge for the dental team is how to build trust and establish communication with ASD persons [13, 18]. A prerequisite of a successful dental treatment is the patient’s consent and cooperation. Numerous behavioral methods of adaptation are used in pediatric dentistry. However, these types of methods alone are not enough when dealing with children with ASD. The success rate of greatly depends upon the cooperation with special educators, dental practitioners and parents of children with ASD. A bespoke prevention program offers appropriate education of family members of an ASD person, precise dental treatment and intervention schedule that ought to be proposed to the patient after evaluating the individual risk of tooth decay development, range of indicated dental treatment, as well as evaluation of the patient’s ability to participate in the program [12]. The first visit to a dental practitioner can also represent the first meaningful experience outside the family environment. One should aim to have this experience as pleasant as possible, without stress and traumatic experiences. The best course of action is to schedule the child’s first dental appointment when there is no need for an urgent dental intervention. Unfortunately, with ASD children this is rarely the case due to the child’s basic condition and the fact that initial dental appointments usually never take place. Parents often avoid scheduling a dental appointment for their child because of fear of uncooperative behavior [6–8]. Many studies on tooth decay in mentally challenged persons have shown that there is a higher prevalence of untreated or inadequately treated tooth decay compared to the general population, as well as a higher prevalence of oral diseases [12]. As a result of the aforementioned and the specifics of providing dental treatments to ASD children, only integration of several methods and individual approach to work with children with autism can lead to success in work and adaptation to dental interventions in order to maintain oral health. As for the literature review and existing research results, it can be concluded that ABA is the most commonly used method of work and yields the best results for treatment and work with persons with ASD. The ABA model includes several models and therefore leads to success when working with ASD persons. It is based on adaptation of the ASD children to the environment, bearing in mind their development level, skills, degree of motivation and interests. The ABA model is a comprehensive approach that shows progress in three basic developmental areas affected by the ASD: social development, intellectual functioning and communication. Patients with autism have difficulties in accepting changes in their environment, require preparation for them, need gradual continuity in accepting changes [19], and they can react very strongly to unexpected changes in their environment [20]. As a result, by applying communication based interventions or PECS and AAC method, children can gradually be prepared to a change in their environment, as well as an upcoming intervention. The use of these methods has proved to be successful and has yielded excellent results. Swallow [21] recommends a slow and gradual approach to persons with ASD, with the possibility to learn every step in advance, letting them know what will happen in the following stages. Previous research indicates various factors that can...
affect the degree of cooperation between a person with ASD and a dental practitioner, and these factors are the level of ASD, age and gender [22]. Our study showed that there are gender-related differences in cooperation as female children were not cooperative as male, so sometimes it was even impossible to establish communication. The two-month project was, therefore, based on the gradual adaptation of ASD persons by using ABA, DSPM, PECS, AAC, and finally LEAP offering a comprehensive education program for parents that can help in the real world and community [14].

Conclusion

The research results showed that due to the additional education, efforts of pediatric dental practitioners and a team of autism therapists, as well as the necessary and satisfactory cooperation with parents, a certain level of success was achieved. Success can be achieved only by integrating multiple methods, using multidisciplinary cooperation, and individual approach to work with children with autism spectrum disorder that can lead to adaptation to dental interventions.

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