Use of assistive technologies as a communication tool in the dental care of children with ASD: Integrative literature review

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Thaís Marinho Patriota[1], Andressa Joselma Santiago da Silva[2], Lívia Thamyris de Souza Silva Vasconcelos[3], Carlos Eduardo Nunes Ribeiro[4], Maria Lívia Alves Nogueira[5], Maria Luiza Lima Rocha[6], Edilyn Endy Ferreira dos Santos Andrade[7], Suellen Mariana Vieira Borba[8], Giovanna de Lima Silva[9], Tallita Silva de Assunção[10], Geysiane de Andrade Bernardino[11] and Rafaela Brito Vasconcelos[12]

ABSTRACT

Autism Spectrum Disorder (ASD) is a set of neurodevelopmental disorders, identified from deficits in communication and social interaction, as well as restricted and repetitive behavioral patterns. The dental management of ASD requires individualization and a deep understanding of the child's behavioral profile, in which he makes use of several management techniques specific to pediatric dentistry. The lack of utensils and resources for specific care of these patients is a problem. The present study aimed to perform a narrative review of the literature regarding assistive technologies (ATs) as a tool for communication between dental

[1] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: thaismpatriota@gmail.com
[2] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: andressa_santhiagoo@hotmail.com
[3] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: thamyris-souza@hotmail.com
[4] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: carlose.nunesribeiro@gmail.com
[5] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: livianogueiraa2@gmail.com
[6] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: marialuizalr7@gmail.com
[7] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: edilynsantos88@gmail.com
[8] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: suellenmarianav00@gmail.com
[9] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: limagiovanna346@gmail.com
[10] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: talli90@icloud.com
[11] Undergraduate student in Dentistry
Institution: Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: geysiane.abernardino@gmail.com
[12] Specialist in Pediatric Dentistry
Institution: University of Pernambuco (UPE), Brazilian University Center (UNIBRA) Address: Recife, Pernambuco, Brazil
E-mail: rafabvasconcelos@hotmail.com

surgeon and patient. Searches were used through the Virtual Health Library - VHL PubMed, SciElo, Lilacs and VHL databases, using the following descriptors: "Autism Spectrum Disorder", "Pediatric Dentistry", "Communication Accessibility" and "Dental Technology" and their counterparts in English and Spanish, within the period of the last 5 years. Additionally, the 2019 Guide for Oral Health Care for People with Disabilities, from the Ministry of Health, was consulted. AT ranges from a simple, low-tech device, such as a magnifying glass, to a complex high-tech device, such as a computerized communication system. The PEC's system, Picture Exchange Communication System, is a promising and very useful tool for the communication of the professional and his patient, especially non-verbal ones. There are also highly complex technologies, such as applications that facilitate communication. ED emerge as communication facilitators for people with disabilities or who have limitations in their communication with the aim of increasing independence, improving interaction and communication when used in the care of patients with ASD. Although it needs more studies in this area, assistive technologies are resources that help in the patient's comfort and communication and that, if well worked by the dentist, can offer a successful treatment.

Keywords: Autism spectrum disorder, Pediatric dentistry, Assistive technology, Social inclusion, People with disabilities.

INTRODUCTION

Autism Spectrum Disorder is a set of neurodevelopmental disorders, identified from evident deficits in social communication and social interaction and restricted patterns and repetitions in behavior and activities (Cortês, Albuquerque, 2020 apud Medeiros da Silva *et al.*, 2021, p 13).

The signs of ASD have intensities ranging from mild to severe in the domains of social communication and restrictive and repetitive behaviors instead of constituting distinct disorders (DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS, 2013 apud DA

SILVA *et al.*, 2021, p 15). According to the DSM-5 Booklet, for the diagnosis of ASD (2023) there was a standardization of global characteristics, making the diagnostic criteria homogeneous, thus facilitating the identification of autism. The following document brings the new concept of the spectrum, with the fusion of Asperger's Disorder and Pervasive Developmental Disorder, for ASD - Autism Spectrum Disorder. The signs, which were previously diagnosed separately, are a single continuum of impairments with mild to severe identities in the communication domains and restricted, repetitive behaviors.

For a long time ASD was considered rare, however, in the last century there has been a significant increase in diagnoses. (Like 2020; Almeida 2020 apud Bezerra; Assisi; Santos, 2023 p. 13157). For several current studies, autism prevails in 1 in 44 children and is present in all racial, ethnic, and socioeconomic groups. (Chanin 2023 apud Bezerra; Assisi; Santos, 2023 p. 13157).

Satisfactory dental management for a child with ASD requires individualization and an in-depth understanding of the behavioral profile of ASD, encompassing various techniques and, in addition, specific management of pediatric dentistry is used (Curado, Vieira and Leite, 2018 apud Martins, 2020, p. 12).

Children with ASD present a challenge for professionals during dental treatment, mainly due to lack of communication, socialization difficulties, great dependence on parents or caregivers and increased fear and anxiety, which leads to behaviors that dentists need to have a greater management, following an appropriate protocol. (Elmore *et al*., 2016; Myhren *et al*., 2023 apud Bezerra *et al*., 2023, p 3).

Thus, the lack of utensils for specific care of these patients is a problem in the daily life of the population. Assistive technology (AT) are resources and devices whose purpose is to maintain or improve an individual's function and independence to facilitate social participation and execution of all life functions and activities, contributing to general well-being and quality of life. (Faria de Moraes; Maia Silveira; Amado De Oliveira, 2019, p. 2)

In this context, this article aims to carry out an integrative review of the literature on the role of assistive technologies (ATs) as a tool for communication in the dental care of children with ASD.

METHODOLOGY

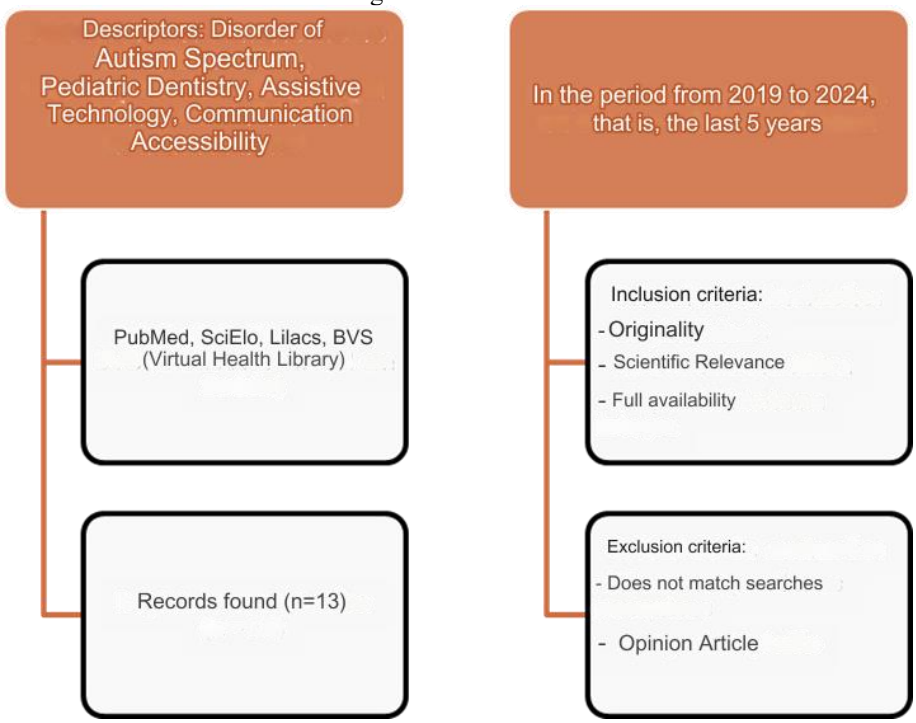
Searches were carried out through the VHL (Virtual Health Library), PubMed, LILACS and SciElo databases using the descriptors "Autism Spectrum Disorder", "Pediatric Dentistry", "Communication Accessibility" and "Assistive Technology" and the same correspondents in English and Spanish.

To select the articles to compose this work, inclusion criteria were used, such as articles in Portuguese, English, and Spanish that had relevant aspects of the main focus of the work within the period from 2019 to 2024, excluding abstracts, letters to the reader, articles that did not present full texts, and articles that did not address the main theme of the work. In addition, the 2019 Guide for Oral Health Care for People with Disabilities of the Ministry of Health was consulted to be part of this literature review.

RESULTS

According to the methodology cited for the search for information, 13 articles were selected from the PubMed, SciElo, Lilacs and VHL (Virtual Health Library) databases. In the course of the development of this integrative review, the following inclusion and exclusion criteria were used, as specified in the flowchart in Figure 1.

Figure 1. Flow chart



Source: Prepared by the authors.

DENTAL CARE FOR PATIENTS WITH ASD

The Ministry of Health (MS) advocates that all people with disabilities have equal rights in SUS care and services in their basic and specific health needs, which involve medical and dental care (BRASIL, 2013 apud Coimbra *et al.*, 2020, p. 94300). Regarding the oral health of patients with ASD, it is expected that in these patients the risk of caries, periodontal disease and malocclusions will be greater, since they have motor difficulties and also have lower facial muscle tone. In addition, caregivers often offer soft and sweet foods (Fonseca., 2018; Zink *et al.,* 2018 apud Araújo *et al*., 2021, p 4).

The author Delli (2013 apud Silva *et al.*, 2021) points out that the biggest challenge of dental treatment is the clinical characteristics of patients with ASD, such as exacerbated sensorimotor perception, attention problems, anxiety, emotional control, difficulty in understanding, and hyposensitivity or indifference to pain.

Through conditioning based on communication guidelines, trust can be established and the necessary cooperation can be built for the success of the consultation. To this end, health professionals must issue short, clear and simple commands, maintaining continuous communication during all consultations (Chandrashekhar *et al.*, 2018 apud Bezerra; Assisi; Santos, 2023 p. 13161).

The objective of dental management of patients with ASD is to increase their independence, improving interaction and communication, as well as providing assistance to caregivers. The management techniques used are similar to those of pediatric dentistry, such as: saying, show-doing, positive reinforcement, distraction, desensitization and modeling (Gandhi; Klein, 2014; Nelson *et al*., 2017 apud Santos Ramos Costa; Pereira Rocha, 2024, p. 233). In view of the barriers encountered by the professional in the dental care of children with TEA, five important points The studies observed: each patient has specific needs; communication is paramount; Specific techniques healthy Essential; incompatibility between need and resources and personal appreciation for work (Reis *et al*., 2022 apud Bezerra; Assisi; Santos, 2023, p. 13159).

ASSISTIVE TECHNOLOGIES AND COMMUNICATION DURING DENTAL CARE

PEC's System and Technological Devices

Assistive technology includes a wide range of tools, from a simple, low-tech device such as a magnifying glass to a complex high-tech device such as a computerized communication system. (Faria de Moraes; Maia Silveira; Amado De Oliveira, 2019, p. 2)

Thus, Assistive Technology (AT) is not a topic restricted to science and technology, health, industry, or education. It is a comprehensive concept, constituting a key element for the promotion of Human Rights, through which people with disabilities have the opportunity to achieve their

autonomy and independence in all aspects of their lives (BRASIL, 2009 apud Faria De Moraes; Maia Silveira; Amado De Oliveira, 2019, p. 3).

Studies show that communication by figures has been presented as a promising intervention method (Ganz *et al*., 2012 apud BRASIL, 2019, p 90). An example of this is the study by Zink *et al*. (2016), which adapted a communication facilitator for individuals who have severe communication difficulties, such as ASD, through the use of figures adapted to dentistry, between the user and the professional during dental treatment, thus facilitating care in an outpatient environment and minimizing the need to use physical restraint. (BRASIL, 2019, p 90)

Image exchange communication system by device: Some patients may have difficulty learning new things or articulate some wants and needs, which makes it necessary to use assistive communicative devices. An example is the Smart/Scan 32 Pro, a complementary device that can help these patients communicate (Chandrashekhar *et al*., 2018 apud Bezerra; Assisi; Santos, 2023, p. 13162). The PEC's System (Image Exchange Communication System) consists of an image book that allows the patient to express feelings, observations and desires visually. As the patient grows, the book evolves and more words and images are added in order to increase the ability to communicate between health care provider and patient. PEC's is indicated for non-verbal patients, with the objective of facilitating dental treatment and requiring repeated instructions for visual learners, as its adaptation improves severe speech impairments and reduces behavioral problems (Meharwade; Chandrashekha, 2018 apud Bezerra; Assisi; Santos, 2023, p. 13161).

Although still little used in dentistry, technological health resources have been shown to be effective options, which can result in improved quality of life, health promotion, prevention of disabilities and injuries, influencing practices related to rehabilitation and social inclusion of these people (Caldas Jr, França, 2013 apud Faria De Moraes; Maia Silveira; Amado De Oliveira, 2019, p.3).

The difficulty in dental treatment for people with ASD, especially children, is described in the literature, however, the adaptations to make oral hygiene possible are poorly found in the literature. Thus, alternative communication and the use of structured materials are viable possibilities for professionals and families of people with ASD in this process of facilitating oral hygiene. (Zink *et al*., 2019, p. 220).

Zink *et at* (2019) point out in their field research that oral hygiene guidance through the use of alternative communication and structured materials should be presented early to children with ASD. Patients with ASD also showed the need for support from parents and/or caregivers for correct oral hygiene, not being totally independent, although 80% of them accepted the activity. Instruction and educational activities must be present in the daily clinic to favor the prevention of diseases in people on the autistic spectrum.

DISCUSSIONS

From the bibliographic survey obtained in this integrative literature review, it was possible to observe the need for individualized care of patients with ASD by dental surgeons, as well as the use of assistive technologies (ATs) as a tool to improve dentist-patient communication.

Dental professionals are considered able to provide care to patients with ASD, as long as they have knowledge, understanding of their limitations, dedication and patience to perform the procedures (Da Costa Sant´ana *et al*., 2017 apud COIMBRA *et al.*, 2020, p.94301).

From this perspective, it is understood that Assistive Technologies are not only highly complex devices, but resources that help in the patient's comfort and communication and that, if well worked by the dentist, can offer a successful treatment. It is important to note that in some cases, the patient with ASD may have difficulty communicating, socializing, language, even fear and anxiety. It is at this point that AT emerges as a facilitator of communication in clinical care.

Based on the present literature review, several authors state that AT are still little used in dentistry, however, they have shown to be excellent options for improving the quality of life of patients and families, and their relationship with dental care.

CONCLUSION

It can be concluded that the use of Assistive Technologies is extremely important for the dental care of patients with ASD. Although studies on AT as a facilitating tool for dental care are incipient, the studies reviewed in this article point to a promising future. The PEC's system (Figure Exchange System) has gained prominence, configuring itself as one of the most cited ATs in the literature for the effective dental management of ASD.

Finally, further studies are needed to address the impacts of the application of AT during dental treatment. In this way, dental students and professionals will be able to have access to new materials, and consequently establish/create new resources, aiming to improve the care of these patients, as well as a more inclusive society.

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