

Oral Health Assessment of a Group of Children with Autism Disorder

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Objective: The aim of this research was to determine the oral status of a group of children with autism. **Study design:** An observational transversal study was carried out in 96 pediatric patients between the ages of 2 and 16 years old with a diagnosis of autism. The patients were assessed to determine the presence of caries with Index Caries (WHO criteria) and debris and calculus with the Simplified Oral Hygiene Index, as well as the type of diet they followed. **Results:** It was established that 41.7% of the patients had caries, with the result of an index of DMFT= 0.96 and dmft =2.41. In terms of the periodontal health 59.4% suffered from calculus. The OHI-S was 3.4. **Conclusions:** Children with autism exhibited a higher caries prevalence in primary teeth than in permanent. They also presented poor hygiene and an extensive presence of calculus.

Key Words: Autism, Caries Index, Simplified Oral Hygiene Index.

INTRODUCTION

Autism is a serious and complex disorder with a biological base of the development of the brain, which was first described in 1943 by Kanner. In the last 50 years, autism has been defined as the most severe neuro-psychiatric disorder in childhood. The main characteristics of autism are associated to socialization problems, communication deficit, repetitive, stereotyped behavior, and cognitive inflexibility^{1,2}.

Autism has a prevalence of 1 case for every 150 children, representing over a 6,000% increase with respect to the last few decades, which is why it has become a matter of public health in many countries. It is more predominant among males, with a 4:1 rate^{2,3}.

Manifestations of autism start on the first year of life, but 20% of the parents report that the psychomotor development is normal during the first two years, and so diagnosis is generally established around the third year^{3,4}.

The etiology of autism is still not clear, but it is usually classified as primary or idiopathic autism, which has a non-specific genetic base, predominant in males, and accompanied by mental retardation in 70% of the cases; and secondary or syndromic autism, which presents some neurological conditions, in many cases with a genetic base⁴.

The oral health of these patients also presents some particular characteristics. Although there does not seem to be any oral manifestations specific to autism, certain conditions may appear due to behaviors related to autism, such as communication limitations, personal negligence, self-injurious behavior, eating habits, effects of medication, resistance to oral care, and hyposensitivity to pain⁵.

Few studies related to mouth health of autistic children have been published. However, the available studies show that oral health in autistic children is not worse than in healthy control groups^{2,5}. Several authors have reported the presence of caries in autistic children. Nevertheless, the indexes are usually not as high, considering all the predisposing factors these children have⁵.

In spite of these conditions which favor the development of caries, many authors have reported that there is not a higher index in autistic children. Rai *et al*⁶, after analyzing 101 patients, determined that there was no significant statistical difference in caries indexes of autistic children compared to the control group.

The aim of this study was to determine the oral status of a group of patients with autism.

MATERIALS AND METHOD

An observational, transversal study was carried out with 96 pediatric patients, diagnosed with autism and that attended the dentist's office specialized in children with special needs, located in the city of Caracas. Among the inclusion criteria, all patients whose parents or guardians had signed an informed consent accepting the dental evaluation, were included, as well as all the patients that have a diagnosis of mild or moderate autism. Patients with severe autism, convulsions associated to the disorder and gastro esophageal reflux, were excluded. Ethical approval for the study was obtained from the Bioethics Committee of the School of Dentistry of the Santa Maria University. The age group ranged between 2 and 16 years old, with

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a mean of 7.08 ± 2.57 . Distribution in terms of gender was 80 male patients (83.3%), and 16 (16.7%) females. Once the sample was selected, the medical records of each patient were checked, taking note of the habits and their following or not a physician recommended diet: gluten-casein and sugar free. All patients were examined by one single operator, previously calibrated with the help of a mirror and explorer under artificial light, evaluating for the presence of caries, plaque, and calculus.

For caries diagnosis, World Health Organization Criteria was used. Representing the average number of cariously affected and dentally treated teeth in the population, DMFT index revealed decayed, missing and filled teeth in the permanent dentition. The dmft index was used for the same purpose in deciduous teeth (d = decay in deciduous teeth; D = decay in permanent teeth), extractions (M=missing tooth in permanent dentition) and fillings (f =filling in deciduous tooth; F = filling in permanent tooth).

The OHI-S index (simplified oral hygiene index) Greene & Vermillion, 1964 (7) is composed of the combined Debris Index and Calculus index, each of these index is in turn based on 12 numerical determinations representing the amount of debris or calculus found on the buccal and lingual surfaces of each of three segments of each dental arch. The OHI-S index for each patient was calculated by dividing the total sum with the number of groups.

Gingival status was assessed with a clinical exam. Visual inspection of generalized presence of plaque was considered as a positive result. Generalized inflammation of the gingival was considered as gingivitis.

The statistical analysis was made with SPSS software, version 17.0.

RESULTS

In this study 96 autistic patients were evaluated. It was determined that 41.7% of the patients had caries, with an index result of DMFT= 0.96 and dmft =2.41. The remaining 58.3% did not have any clinically evident carious lesion.

In terms of the periodontal health, it was observed that 16.7% (16 patients) of the sample did not have any clinical signs of periodontal disease, unlike the 83.3% that was diagnosed with gingivitis, and 59.41% of the total sample suffered from calculus. The Simplified Oral Hygiene Index was 3.4.

In reference to the age of the patients and the presence of caries, it was observed that in the group of 2 to 6 year-old patients, 35.5% of the children (16 patients) had caries. In the 7 to 11 year-old group, 46.6% had caries (21 patients), and in the third age group between 12 to 16 years, 50% was diagnosed with caries (3 patients) (Table 1).

Table 1. Presence of Caries according to age group.

		Caries		Total
		Present	Absent	
Age	2-6 years	16	29	45
	7-11 years	21	24	45
	12-16 years	3	3	6
Total		40	56	96

It was also determined that 62.5% (60) of the patients followed a gluten, casein and sugar free diet, while 37.5% (36 patients) did not. When relating the diet to the presence of caries, it was observed that 33.3% (20) of the patients who follow the diet had caries. On the other hand, 56.5 % (20) of the children that do not follow the diet also present caries. However, when applying the chi-square test, it was determined that there is no statistical significance between the diet of the patients and the presence of caries (p=0.10) (table 2).

Table 2. Presence of caries in relation to the diet.

		Caries		Total
		Present	Absent	
Diet	with diet	20	40	60
	Without diet	20	16	36
Total		40	56	96

DISCUSSION

This transversal study suggests that autism is not a risk factor for the development of dental caries among Venezuelan children between the ages of 2 and 16 years old. Even though, as described, autistic children have a preference for soft food, which usually makes them more prone to dental caries. Additionally, behavioral disorders generally make oral hygiene and dental care more complex in these patients ^{2,8}.

This study determined that 41.7% of autistic patients had caries. These results match those of Marshall *et al* ⁹, which after evaluating 99 children diagnosed with autism in the United States, concluded that 40% presented new carious lesions, and 65% had a history of caries and with Du¹⁰ who determined that 37% of a population of children with autism had caries. Vajawat *et al* ¹¹ evaluated 117 autistic patients and 126 healthy individuals and concluded that the prevalence of caries was significantly lower in autistic patients. DeMattei⁵ also conducted a study to evaluate the oral conditions of a group of autistic children, and determined that 21% had caries. Similar results were obtained by Chan *et al* ¹² who evaluated 196 autistic patients and concluded that only 26% had caries. Other authors, such as Jaber ¹³, who studied a sample of 61 autistic children, concluded that 77% of the autistic patients presented caries, compared to 46% of healthy patients in the control group. Similar results were obtained by Namal ², after evaluating 62 autistic children in Istanbul, Turkey, and concluded that 41.9% was caries free, and 58.1% had some caries experience.

Age is considered to be an important factor that affects the development of caries. Older patients often present more caries ². Nevertheless, in this research caries index was higher in younger children. In other words, primary teeth were more affected by caries than permanent ones. Loo *et al* ¹⁴ evaluated 395 autistic patients and 386 healthy controls, and determined that the autistic patients showed lower DMFT indexes more frequently, when compared to healthy patients. Lowe *et al* ¹⁵ evaluated 28 autistic patients, and 20 controls in Denmark, and determined that in temporary teeth, autistic patients showed a higher caries index. However, there was no significant statistical difference in permanent dentition between the two groups. Similar results were obtained by Murshid *et al* ¹⁶

who determined in twenty autistic children that the DMFT was 2.75 and the dmft was 3.1. These results are in contrast to those by Jaber¹³, who got a dmft = 0.8±0.2 and a DMFT = 1.6±0.64 (9). Likewise, Bassoukou *et al*¹⁷ reported a dmft = 2.00 ± 2.83 in autistic patients and 1.79 ± 3.07 in the control group.

After evaluating the gingival status of the patients, it was observed that 83.3% presented gingivitis. Also, 59.4% showed presence of calculus. These results are higher than those obtained by DeMattei *et al*⁵, who after evaluating 39 autistic children concluded that 62% suffered from gingivitis. Other authors, such as Murshid *et al*¹⁵ evaluated 20 children with autism and concluded that all the patients had mild generalized gingivitis. Similar results were obtained by Jaber¹¹ who concluded that 97% of the autistic patients evaluated had gingivitis, which was generalized in 78% of the examined children or localized in 22% of the cases. In contrast to these findings, Du *et al*¹⁰ concluded that children with autism had lower plaque index scores and better periodontal health.

Children with autism generally present a challenge to the dentist and dental care. Even though they can have lower caries prevalence; a significant percentage of the autistic patients do not collaborate with the treatment, and so it becomes necessary to put them under general anesthesia to carry out the dental treatment¹³.

CONCLUSIONS

Autism has become a disorder with a high prevalence among children. Just like the rest of the special-needs patients, they have special characteristics associated that could influence their oral health. In spite of all the risk factors that these children are exposed to, this research, as well as others made by different authors, has proposed that caries indexes are not higher when compared to control groups. For this reason, conducting additional research in the area is necessary, in order to determine if the behaviors and autism the inherent characteristics of predispose the patients to changes in their oral health, and if there is any protective factor, possibly in the saliva, that is counteracting the risk factors, and generating low cariogenic indexes.

REFERENCES

1. Landrigan P. What cause autism? Exploring the environmental contribution. *Current Opinion in Pediatrics* 22:1-7, 2010.
2. Namal N, Vehit HE, Koksal S. Do autistic children have higher levels of caries? A cross-sectional study in Turkish children. *J Indian Soc Pedod Prev Dent* 25(2):97-102, 2007.
3. Varela-González DM, Ruiz-García M, Vela-Amieva M, Munive-Baez L, Hernández-Antunez BG. Conceptos Actuales sobre la etiología del Autismo. *Acta Pediatr Mex* 32(4):213-22, 2011.
4. Artigas-Pallarés J, Gabau-Vila E, Guitart-Feliubadaló M. El autismo sindrónico: I. Aspectos Generales. *Rev Neurol* 40(1):143-9, 2005.
5. DeMattei R, Cuvo A, Maurizio S. Oral assessment of children with an autism spectrum disorder. *J Dent Hyg* 81(3):65, 2007.
6. Rai Kavita, Hegde Amitha M, Jose Nijo. Salivary antioxidants and oral health in children with autism. *ARCH ORAL BIOL* 57 (8): 1116-1120, 2012.
7. Greene J, Vermillion J. The simplified Oral Hygiene Index. *J Amer Dent Assoc.* 68:7-13, 1964.
8. Shapira J, Mann J, Tamari I, Mester R, Knobler H, Yoeli Y, Newbrun E. Oral health status and dental needs of an autistic population of children and young adults. *Spec Care Dentist* 9(2): 38-41, 1989.
9. Marshall J, Sheller B, Mancl L. Caries-risk assessment and caries status of children with autism. *Pediatr Dent*, 32(1), 69-75, 2010.
10. Du RY, Yiu CK, King NM, Wong VC, McGrath CP. Oral health among preschool children with autism spectrum disorders: A case-control study. *Autism* 19(6): 746-51, 2015.
11. Vajawat M. Deepika PC. Comparative evaluation of oral hygiene practices and oral health status in autistic and normal individuals. *J Int Soc Prev Community Dent* 2(2): 58–63, 2012.
12. Chan DFY, Chan SHY, So HK, Li AM, Ng RCM, Tsang N. (2014). Dental Health of Preschool Children with Autism Spectrum Disorder in Hong Kong. *HK J Paediatr* 19(3): 161-8, 2014.
13. Jaber MA. Dental caries experience, oral health status and treatment needs of dental patients with autism. *J Appl Oral Sc*, 19 (3): 212-217, 2011.
14. Loo CY, Graham RM.; HUGHES, Christopher V. The caries experience and behavior of dental patients with autism spectrum disorder. *J Am Dent Assoc* 139 (11): 1518-1524, 2008.
15. Lowe O, Lindemann R: Assessment of the autistic patient's dental needs and ability to undergo dental examination. *ASDC J Dent Child* 3:29-35, 1985.
16. Murshid, E. Z. Oral health status, dental needs, habits and behavioral attitude towards dental treatment of a group of autistic children in Riyadh, Saudi Arabia. *Saudi Dental Journal*, 17, 3, 2005.
17. Bassoukou IH, Nicolau J, Dos Santos MT. Saliva flow rate, buffer capacity, and pH of autistic individuals. *Clin Oral Invest* 13: 23-7, 2009.