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ORIGINAL ARTICLE

Oral Condition of Adolescents who Participated in an Oral Health Program During the First Decade of Life

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ABSTRACT

Objective: To evaluate the oral health of adolescents who participated in an oral health preventive program during the first decade of life. **Material and Methods:** For the evaluation of dental caries and gingival condition, DMFT and Community Periodontal Index were used, both recommended by the World Health Organization. To verify the occurrence of dental fluorosis, the Dean index was used. **Results:** Data collection was obtained from 252 patients aged 12 to 16 years. The average DMFT index was 1.14; in relation to the gingival condition, the index of healthy gingival tissue prevailed and the average of this value was 84%, with code 0 being more registered in tooth 11, code 1, more frequently in teeth 16/17 and 36/37 and for last, code 2, in tooth 31 most frequently. Dean's index showed a percentage of 89% of patients without clinical signs of dental fluorosis. **Conclusion:** Adolescents participating in an oral health preventive program in the first decade of life exhibited very satisfactory results regarding the prevention of caries disease, healthy periodontal condition and reduced prevalence of dental fluorosis.

Keywords: Preventive Dentistry; Dental Caries; Oral Health; Preventive Health Services.

Introduction

Throughout most of the twentieth century, the philosophy of the dental approach was predominantly curative, mainly because there were no preventive programs for early childhood patients. They claimed that the care of these patients was not necessary as long as they did not have any disease, justifying the transitional dentition, in addition to the difficulties faced by inappropriate behavior, immaturity and the difficulty of understanding and communication inherent to children in early childhood [1,2].

Researches, books and international guides strengthened the recommendations to parents to make the child's first visit to the dentist during the first year of life or with the eruption of the first deciduous tooth in the oral cavity [3-5]. In addition, Abanto et al. [6] demonstrated that in early childhood, determining and acting on risk factors for caries disease can increase the effectiveness of preventive approaches.

The untreated dental caries in primary teeth corresponded to the 10th most prevalent condition in the world, affecting about 621 million children, according to the Global Burden of Disease, thus representing a public health challenge in most countries. Consequently, untreated caries on permanent teeth have proved to be the most prevalent condition worldwide, affecting approximately 3.9 billion people, including children aged 5 years and older and adults [7,8].

Since the emergence of preventive programs for early childhood, few studies have assessed their likely effects in the long term, considering that their educational and preventive guidelines act on children, which may influence oral health in adolescence [4,9-11]. Therefore, an important issue for public health would be the possible contribution of dental care in childhood to the prevention of oral diseases in adolescence. Therefore, this study aimed to assess the oral health of adolescents who participated in a dental assistance program during the first decade of life, considering the aspects of caries prevention, gingival health and dental fluorosis.

Material and Methods

Ethical Clearance and Design

The study was designed based on clinical records of the educational and preventive oral health program implemented by the School of Dentistry of Araçatuba, São Paulo State University (FOA/UNESP, Brazil). The study was submitted and approved by the Ethics Committee in Local Research (Resolution #01 of 06/13/1998 of the National Health Council) of FOA/UNESP. (#22352718.7.0000.5420) in accordance with the Declaration of Helsinki, and following the Council for International Organizations of Medical Sciences (CIOMS) guidelines regarding the use of clinical records for research purposes.

Participants and Data Collection

The study was carried out in the city of Araçatuba, located in the northwest of the state of São Paulo, Brazil, with 195 thousand inhabitants, with an average annual temperature of 22.8ºC, with water fluoridation carried out for more than 50 years with a fluoride concentration around 0.07ppm [12]. The School of Dentistry of Araçatuba develops an Educational and Preventive Oral Health Program (EPOHP) aimed at children that is divided into two phases: the first is called baby clinic (BC), patients enter during the first year of life and remain until they complete five years old. Then, accompanied by the parents, they receive educational and preventive care that consists of guidelines on oral hygiene and adherence to a non-cariogenic diet. Clinical care consists of oral hygiene and topical fluoride application. Patients are treated in this format following three times a year. In the second phase, called prevention clinic (PC), children from 5 years of age remain in the program until they reach 10 years of age and are followed four times a year. In clinical consultations, they receive guidance on oral

hygiene and diet appropriate to their age, and clinical care consists of professional oral prophylaxis and topical fluoride application.

To obtain the sample, in 2018, 1691 medical records of patients who entered the EPOHP between 2002 and 2006 were evaluated. Of these, medical records of patients who completed their participation in the EPOHP at the age of ten were selected. Medical records of patients who did not complete care at BC or PC during the first decade of life were excluded from the analysis.

The adolescents whose medical records were selected were scheduled to attend, together with the legal guardian, the Discipline of Pediatric Dentistry at School of Dentistry of Araçatuba, São Paulo State University. Participation in the research was explained to the legal guardian for the adolescent, which was signed after the participation agreement.

Adolescent's Oral Examination

The clinical examination was performed in a dental chair and included the following assessments: prevalence of dental caries, gingival condition and occurrence of dental fluorosis. Prior to these clinical evaluations, patients received professional+ oral prophylaxis using a Robson brush and pumice/water paste. After the teeth were clean and dry with the aid of a mouth mirror, CPI-probe and artificial lighting, the exams were performed.

Dental Caries

For the verification of dental caries, the DMFT index was used. The clinical examination to assess dental caries was performed in 252 patients aged 12 to 16 years, using the DMFT index and the codes and criteria used were those established by the World Health Organization, 1997 [13].

Community Periodontal Index

The community periodontal index (CPI), WHO [13] was obtained by clinically examining six points on each of the ten index teeth (11, 16 and 17, 26 and 27, 31, 36 and 37, 46 and 47), and classifying each sextant in the mouth as healthy (score 0); presentation of gingival bleeding on probing (score 1); or dental calculus (score 2). Based on this index, the prevalence of gingival bleeding was calculated, considering adolescents who had at least one sextant with score 1. Correspondingly, the prevalence of dental calculus refers to the manifestation of at least one sextant with score 2.

Dental Fluorosis

The occurrence of dental fluorosis in patients participating in the study was assessed using the index recommended by the WHO, which is based on the Dean index [14]. Although all teeth are examined, the individual condition is assessed considering only the two most affected teeth. If the most affected teeth are not similarly compromised, the value of the least affected teeth will be recorded.

Calibration

All clinical evaluations that comprised this research (dental caries, periodontal index and fluorosis) were conducted jointly by two examiners (a research professor and a graduate student). In addition, the professor provided the student with theoretical guidance on the indexes used in a 4-hour period. The calibration between

both consisted of clinical evaluation of 40 patients in the same age group of the research, first by the professor and then by the student.

Statistical Analysis

The Kappa test was performed in relation to the inter and intra-examiner evaluation. The data obtained from all tests were recorded in a specific and individual form for each patient, tabulated and analyzed in Microsoft Excell® 2003. Tables with the relative and absolute frequencies of all analyzed data were made for descriptive statistics.

Results

Data collection was obtained from 252 patients aged 12 to 16 years, of both genders who met the study inclusion criteria. These 252 adolescents had a mean age of 13.5 years. The sample examined was homogeneous in terms of gender, with 111 (44%) male patients and 141 (56%) female.

The Kappa value found in the evaluations for dental caries, periodontal index and fluorosis among the examiners was, respectively: 0.88, 0.83 and 0.72. In the intra-examiner analysis, Kappa values were 0.90, 089 and 0.86, respectively.

Regarding the oral condition, the average DMFT was 1.14 (Table 1). There was a frequency of 193 patients (76.58%) with DMFT between 0 and 1, expressing a low prevalence of caries among the patients evaluated (Table 2).

Table 1. DMFT index according to the number of decayed, missing and filled teeth.

Healthy N (%)	Decayed N (%)	Filled N (%)	Missing N (%)	DMFT
6426 (25.50)	86 (0.34)	201 (0.79)	1 (0.003)	288 (1.14)

Table 2. Frequency and percentage of patients according to the DMFT index.

DMFT	N	%
0	156	61.9
1	37	14.7
2	20	7.9
3	9	2.8
4	18	7.1
5	3	1.2
6	2	0.8
7	2	0.8
8	1	0.4
9	2	0.8
10	2	0.8
15	1	0.4
16	1	0.4
Total	252	100.0

As for the gingival condition, determined by CPI, it was observed that among 1445 teeth evaluated, 84% had healthy gingival tissue (score 0), with tooth 11 mostly exhibiting this result. On the other hand, gingival bleeding (score 1) was observed in 13% of evaluated teeth, being observed more frequently in teeth 16 and 17 and 36 and 37. The presence of calculus (score 2) occurred only in 3% of evaluated teeth and tooth 31 was the most affected (Figure 1).

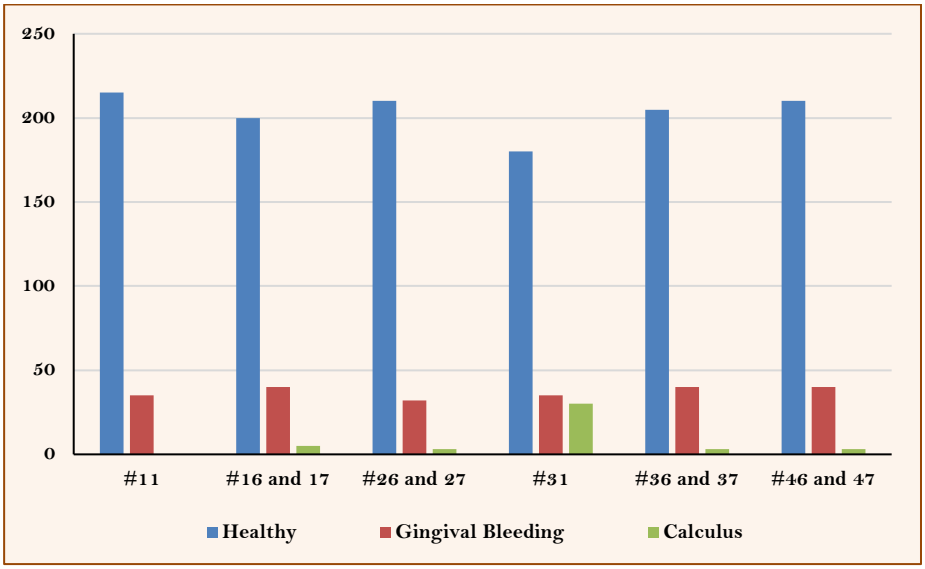

Figure 1. Gingival condition determined by the CPI according to the groups of teeth evaluated.

Dental fluorosis, assessed according to Dean's index, recorded a percentage of 89% of patients whose clinical appearance on the dental surface did not present with fluorosis (grade 0). The remaining 11% of patients diagnosed with fluorosis were classified as questionable (8%) and very mild (3%) (Table 3).

Table 3. Number and percentage of adolescents in the sample according to enamel condition for dental fluorosis.

Fluorosis [Code]	N	%
Normal [0]	224	89.0
Questionable [1]	20	8.0
Very mild [2]	8	3.0
Mild [3]	0	0.0
Moderate [4]	0	0.0
Severe [5]	0	0.0
Total	252	100.0

Discussion

This study showed results obtained in adolescents, who during the first ten years of life, participated in an educational and preventive oral health program based on periodic visits from the first year to the end of the first decade of life. The satisfactory results found strengthen the effectiveness of preventive programs with characteristics of periodic patient visits based on guidelines on oral hygiene and non-cariogenic diet and clinical follow-up. The main limitation of this work was the lack of a comparative evaluation with another group of children. Even so, it is possible to consider that the results found are satisfactory based on findings in the literature.

The DMFT index observed in adolescents was 1.14, which according to the WHO, is considered very low. It is also noteworthy that for 193 patients in the sample (76.5%), the DMFT ranged between 0 and 1. Considering the goals of the Global Goals for Oral Health for 2020, in which adolescents at 12 years old should present a DMFT index below 1.5 [7,15], the adolescents participating in the EPOHP showed excellent results.

Intense dental care with an educational and preventive approach applied since early childhood can improve oral health and, consequently, systemic health, resulting in individual and collective benefits [16,17]. Some studies present promising panoramic results, but still worrisome concerning the prevention of caries

disease [18,19]. However, there is a need for further studies in the literature presenting results from the application of EPOHP with proposals similar to this study [20]. In addition, studies have shown that children who had dental care in childhood, when their parents were motivated to practice better oral health care, were less likely to have emergency curative consultations [21,22].

The educational practices in oral health for parents, besides being able to generate prevention in their children, contribute to self-care behavior. Conversely, patients with low levels of oral health education find it difficult to understand health instructions or the importance of preventive dental care procedures [23].

Despite the multifactorial aspect of the etiology of dental caries, preventive oral health programs should prioritize biofilm control and dietary guidelines for reducing the prevalence of disease [24], especially in early childhood when hygiene and dietary habits are being established and may last until adulthood. Preventive oral health programs with better rates of prevention of dental caries were those obtained as a strategy for the improvement in quality of biofilm control of patients [20]. These results reinforce the importance that, during all consultations in the EPOHP, oral hygiene instruction in children, guidance on diet and oral habits are emphasized as important aspects of preventing tooth decay.

Parents oriented with their children from the first years of life on the establishment of healthy oral habits start to perform them more naturally and grow up incorporating them into their daily routine. A study in adolescents points to the importance of dental care services promoting a significant improvement in the gingival health conditions of patients in this age group [25].

Both caries and periodontal disease are associated with the presence of dental biofilm, in which the metabolic activities of the microbiota can cause gradual demineralization of dental enamel and also cause gingivitis that can progress to aggressive forms of periodontal disease, especially in adulthood [24]. We believe that the measures adopted in the EPOHP aimed at preventing tooth decay, especially the continuous incentive for tooth brushing and flossing, both acting on the mechanical control of biofilm, collaborated for the best gingival health conditions displayed by patients in our study. When used frequently and correctly, these measures contribute to maintaining normal gingival health status [26,27].

Due to the application of EPOHP during the first decade of life, gingival problems in childhood, when present, are diagnosed early and with prompt intervention. We believe that these actions may have contributed to the occurrence of satisfactory results in adolescence. In our study, periodontal condition showed satisfactory results, where 84% of adolescents had gingival condition considered healthy.

Concerning dental fluorosis, this research showed a significant percentage (89%) of fluorosis-free patients, and the remainder mostly exhibited a questionable degree of fluorosis (10%), according to Dean's classification. A national oral health survey showed 16.7% of Brazilian adolescents aged 12 years had fluorosis [28]. A review article found, in urban areas in Brazil, the predominance of "very mild" and "mild" degrees of fluorosis, with no functional impairments [29].

In our study, we believe that the high percentage of patients without occurrence of fluorosis is due to the guidance provided to parents during consultations in BC that recommends the use of fluoride-free toothpaste in children between one and three years old. Even when necessary in this age group, due to caries activity, toothpaste with a low concentration of fluoride is recommended for periods of use as long as the need lasts. In this age group (1 to 3 years old), there is enamel mineralization of incisors and first permanent molars and the child is still unable to expectorate after brushing, and therefore the tooth is more subject to such changes [30]. Another study compared children between zero and three years old who participated in an oral health program and their parents received advice on oral health. These children had a lower frequency of fluorosis between 8 and

12 years of age compared to the control group [22]. However, frequent and continuous studies are necessary to verify the maintenance of low percentages of fluorosis shown in this research, without losing sight of the beneficial action of the presence of fluoride.

Conclusion

When oral health care is initiated in childhood can provide good results in adolescence in relation to the prevention of dental caries, healthy gingival condition and low frequency of dental fluorosis.

Authors' Contributions

JCPA	https://orcid.org/0009-0006-5727-1049	Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation and Project Administration.
BCG	https://orcid.org/0000-0002-6701-8673	Conceptualization, Methodology and Writing - Review and Editing.
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All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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