

A dental caries preventive program applied to children aged 5 to 8 years attending since the first year of age at the Baby Clinic of the Araçatuba Dental School, Brazil

Programa de prevenção aplicado em crianças de 5 a 8 anos de idade, atendidos desde o primeiro ano de vida na Bebê-Clínica da Faculdade de Odontologia de Araçatuba, Brasil

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Resumo

Objetivo: Este trabalho avaliou um programa de prevenção aplicado em crianças de 5 a 8 anos de idade considerando como fatores a manutenção da saúde bucal, a relação entre experiência prévia e atual de cárie dentária e relação entre a ocorrência de cárie dentária e a frequência às consultas de retorno. **Material e método:** Foram realizados exames clínicos intrabucais e radiografias interproximais em 171 pacientes e a partir de seus prontuários obtivemos informações sobre idade, gênero, a experiência anterior de cárie e frequência às consultas de retorno. O tratamento estatístico utilizado foi o Teste de McNemar em nível de significância de 1%. **Resultado:** Os resultados dos exames clínicos e radiográficos mostraram que a maioria das crianças participantes do programa apresentava dentes hígidos (77,2 e 84,8% respectivamente). **Conclusão:** A estratégia preventiva exerceu influência positiva sobre a manutenção da saúde bucal nas crianças examinadas. A experiência prévia de cárie e a ausência às consultas de retorno influenciaram a condição clínica bucal das crianças durante a participação no programa preventivo.

Descritores: Cárie dentária; prevenção & controle; criança; saúde bucal.

Abstract

Objective: Tooth decay is one of the more common diseases of childhood. Several studies recommend that early preventive measures must be implemented since the first years of life and continue throughout childhood and adolescence. The aim of the this study was to present results of a preventive dental program considering oral health maintenance, dental caries experience and the prevalence of dental caries relation with follow-up compliance visits. **Material and method:** Intraoral and interproximal radiographic exams were performed on 171 patients participants of a preventive dental program. Data regarding age, gender, previous caries experience and the frequency at which the patients attended return visits were obtained from the records. The data were analyzed statistically by the McNemar test, with the level of significance set at 1%. **Result:** Clinical and radiographic examination revealed that most children participating in the program had sound teeth (77.2 and 84.8%, respectively). The past dental history of the dental caries from patients included in this study showed statistical relevance when associated with the present dental caries experience and a statistical relationship was found from the absence of compliance to clinical visits and the dental caries presence. **Conclusion:** The preventive strategy had a positive influence on oral health maintenance in the children examined. Previous caries experience and the lack of compliance with return visits influenced the clinical oral condition of the children during participation in the preventive program.

Descriptors: Dental caries; prevention & control; child; oral health.

INTRODUCTION

The decline in the prevalence of dental caries reported in epidemiological studies is intimately related to the application of community and individual preventive measures that emphasize guidance regarding oral hygiene habits, diet and rational use of fluoride^{1,2}. The goal of oral health education is to improve knowledge, which may lead to adoption of favorable oral health behaviors that contribute to better oral health. In addition, the education of the patient and constant action of the professional are inherent components of an oral health maintenance program, resulting in a reduction in the prevalence of dental caries.

Most preventive strategies published in the literature are based on the mechanical removal of bacterial plaque either through professional prophylaxis or tooth brushing by the individuals themselves³⁻⁶. In addition, it has been speculated that, in the last decade, caries experience in the primary dentition has ceased to decline⁷⁻⁹.

Dental care of children at an early stage (0 to 3 years) gives priority to the maintenance of oral health through educational and preventive measures and results from the dental requirements of this age group⁵. In Brazil, studies have shown that the possibility of preventing dental caries can reach 96% during the first year, decreasing to 72% after 2 years, and that treatment based on the determination and control of risk factors leads to more extensive and economic dental care¹⁰.

The search for an ideal preventive protocol which would require a minimum financial resources, labor and time is of the utmost importance within the present context of dentistry. Several preventive strategies have been applied and evaluated in order to achieve the objectives proposed by the programs, most of them using the prevalence of dental caries as an assessment instrument^{11,12}. Besides, information regarding noncavitated carious lesion in very young children, provide important additional components of understanding the caries process in infants and toddlers^{13,14}.

The aim of this study was to present results of a preventive dental program considering oral health maintenance, the relationship between dental caries experience during early infancy and later and the prevalence of dental caries relation with follow-up compliance visits.

MATERIAL AND METHOD

The study followed the norms of the Ethics Committee on Human Research and was carried out at the Preventive Clinic of the Department of Pediatric Dentistry, Araçatuba Dental School, Brazil. All patients of this study previously participated in the so-called Baby Clinic program, which attends children aged 6 to 48 months¹⁴. At the end of this program, the patients were referred to the Preventive Clinic to continue receiving preventive care and remained under dental supervision up to the age of 8 years.

The dental care provided at this clinic consists of professional prophylaxis, followed by intraoral clinical examination and topical application of 1.23% acidulated fluoride gel. The patients are seen every two months in March, May, July, September and November by last-year undergraduate dentistry students. Application of sealant to the occlusal surfaces of deciduous and permanent teeth and interproximal radiography do not constitute routine procedures.

A total of 171 patients aged 5 to 8 years participated in the study. Information regarding age, gender and clinical data including previous caries experience and the frequency at which the patient attended return visits was obtained from the records. Current data regarding the presence or absence of dental caries were obtained by clinical and radiographic examination performed by the researcher. The clinical conditions of the teeth considered in this study and their respective codes are shown in Table 1.

After professional prophylaxis, washing and drying, the teeth were submitted to clinical examination with a clinical mirror and an exploratory probe. Interproximal radiographs (bitewing technique) were obtained for the diagnosis of caries lesions on the proximal surfaces of posterior teeth. Both, the clinical and radiographic exams, were performed by the authors of this study.

The McNemar test was used for statistical analysis, with the level of significance set at 1%.

RESULT

Distribution of the patients according to gender revealed 59.6% males and 40.4% females. The mean age of the children upon clinical examination was 6 years.

Table 2 revealed a high percentage of patients with sound teeth, 77.2% according to intraoral clinical examination and 84.8% according to interproximal radiographic examination.

This present study observed a number of 88 surfaces affected by dental caries, more than a half (62 surfaces) presenting in deciduous teeth. Analysis of the deciduous teeth affected by dental caries showed a predominance of caries lesions in the first molars, with their distal surface being the most susceptible. The lower first permanent molars were more affected than the upper ones, with the buccal surface more frequently presenting caries lesions, followed by the occlusal surface. The proximal surfaces were the most affected surfaces (39 caries lesions) observed on this study followed closely by the occlusal surface (32 caries lesions).

The dental history of the patients included in this study showed statistical relevance when associated with the present dental caries experience (Table 3).

Table 1. Codes and specifications of clinical conditions considered in this study

Code	Specification
ST	Sound tooth – surfaces free of dental caries
ECWC	Surface(s) showing enamel caries without cavitation - white spot lesion
ECC	Surface(s) showing enamel caries with cavitation
DENC	Surface(s) presenting dentinal caries with cavitation(s)
SEL	Sealed occlusal surface
SR	Satisfactory restoration
RRR	Restoration requiring replacement

Table 2. Number and percentage of clinically and radiographically examined children distributed according to clinical dental condition

	Clinical exam		Radiographic exam	
	N	%	N	%
ST	132	77.2	145	84.8
ECWC	11	6.4	0	0.0
ECC	4	2.3	2	1.2
DENC	6	3.5	11	6.4
SR	9	5.3	8	4.7
RRR	5	2.9	5	2.9
SEL	4	2.3	0	0.0
Total	171	100.0	171	100.0

Table 4 demonstrates the compliance of patients with the program, with 60% of the children rigorously attending the return visits and a statistical relationship between the lack of compliance with return visits and the presence of dental caries.

DISCUSSION

The high percentage of patients with sound teeth (Table 2) indicates the positive influence of this type of program on oral health maintenance among the participating children. Although not as positive as the results reported by Axelsson, Lindhe¹⁵ our findings are highly satisfactory and superior to those reported by Kerebel et al.¹⁶, partly due to the dental care provided during the first year of life of the child at the Baby Clinic.

Caries prevention in 3- to 6-year-old children focused on the control of bacterial plaque performed by the individuals themselves and not by a professional, even when accompanied by collective activities, yields results different from those obtained in the present study. A period of five weeks of bacterial plaque accumulation on the dental surface is sufficient to provoke visible demineralization. An interval of one year for professional prophylaxis can be very long considering, for example, the proximal surface¹⁷.

Table 3. Number and percentage of children examined at the Prevention Clinic in relation to their previous caries experience at the Baby Clinic

Present dental caries experience	Caries experience at Baby – Clinic				Total	
	Caries free		Presenting caries		N	%
	N	%	N	%		
Caries free	105	61.4	24	14.1	129	75.5
Presenting caries	30	17.5	12	7.0	42	24.5
Total	135	79.0	36	21.0	171	100.0

McNemar Test = 72.34 p value = 0.0000%.

Table 4. Number and percentage of children examined in relation to the number of return visits missed and the consequent diagnosis

Diagnosis	Absent in clinic				Total	
	Absent		Present		N	%
	N	%	N	%		
Caries free	31	18.1	98	57.4	129	75.4
Presenting caries	37	21.6	5	2.9	42	24.6
Total	68	39.7	103	60.3	171	100.0

McNemar Test = 17.36 p value = 0.0031%.

The distinct results shown in Table 2 regarding representative values obtained for children with and without caries lesions among clinical and radiographic exam, indicate the need for a combination of diagnostic methods in the detection of dental caries¹⁸⁻²⁰. However, the indication for interproximal radiography at equal time intervals for all patients in the absence of previous clinical examination and without knowledge about the history of the patient is no longer necessary. Thus, the indication for radiographic exam should also be individualized¹⁹.

The detection of caries lesions without cavitation is currently considered to be a diagnostic priority in cariology first due to the reversible aspect of the initial process of dental demineralization and second because the velocity of dental surface demineralization is much lower as a result of the universal use of fluoride products²¹.

The predominance of caries lesions in deciduous teeth, particularly in the first molars and their distal surface indicates caution regarding hygiene of the interproximal region of these teeth²⁰. Maybe the difficult of parents to flossing this area in children of this age group, is the reason for the results obtained.

In the present study, the buccal surface of the lower first permanent molars was more affected by caries lesions, followed by the occlusal surface, due to its morphology. The reasons for this greater involvement of the lower molars are that they erupt before the upper molars in the oral cavity and their occlusal and buccal surfaces anatomically favor the development of dental caries. The small number of permanent molars affected by dental caries observed in the present study, together with the data of

Table 2 which indicate a small number of sealed teeth in the clinic, emphasize the importance of bacterial plaque removal in the prevention of dental caries in these teeth in combination with the various method of fluoride application^{17,22,23}.

Since sealant application is not a routine procedure at the Preventive Clinic, the greater susceptibility of the occlusal surface of the permanent molars indicates the need for finding a balance between the indication or not of pit and fissure sealing. This indication should be focused on the assessment of the occlusal surface and the risk of the patient to develop dental caries. The occurrence of caries lesions on the proximal surfaces, clearly demonstrating the need for individualization of the cases in which radiography should be indicated.

One way to individualize preventive dental care is to study the dental caries experience of the child during early infancy (0 to 3 years), which can reveal a possible risk for the development of new caries lesion in the permanent dentition, as confirmed in the present study^{24,25}. The dental history of the patients included in this study showed statistical relevance when associated with the present dental caries experience (Table 3). The results of this table demonstrate that patients experiencing caries during the Baby Clinic program (6 to 36 months of age) tended to present caries in the Preventive Clinic. These patients and their parents

deserve special attention in terms of encouragement of oral health care and the interval between return visits should be shorter than the currently proposed one. The same applies to patients without dental caries lesions, whose return intervals can be gradually increased.

Each child should attend five visits per year. The compliance of patients with the program was high (60%). It was observed that a statistical relationship exists from the absence of return to consultations and the presence of dental caries (Table 4). Absence of the patient in one or more visits may damage oral health maintenance.

CONCLUSION

The present results led us to conclude that dental care provided at the Preventive Clinic had a positive influence on oral health maintenance. A direct relationship was observed between dental caries experienced during care at the Baby Clinic and at the Preventive Clinic, as well as patient compliance has a positive influence on oral health maintenance. Both dental caries experience and patient compliance can be used as an instrument for the individualization of patient care.

REFERENCES

- Marthaler TM, O'Mullane DM, Vrbic V. The prevalence of dental caries in Europe 1990-95. *Caries Res.* 1996; 30: 237-55. PMID:8773416. <http://dx.doi.org/10.1159/000262332>
- Oral Health Unit. World Health Organization. Oral diseases: prevention is better than cure. World health day – 7 April 1994; Oral health for a Healthy life. Geneva: WHO; 1994.
- Frencken JE, Borsum-Andersson K, Makoni F, Moyana F, Mwashaenyi S, Mulder J. Effectiveness of an oral health education programme in primary schools in Zimbabwe after 3.5 years. *Community Dent Oral Epidemiol.* 2001; 29:253-9. PMID:11515638. <http://dx.doi.org/10.1034/j.1600-0528.2001.290403.x>
- Hausen H, Kärkkäinen S, Seppä L. Application of the high-risk strategy to control dental caries. *Community Dent Oral Epidemiol.* 2000; 28:26-34. PMID:10634681. <http://dx.doi.org/10.1034/j.1600-0528.2000.280104.x>
- Melhado FL, Cunha RF, Nery RS. Influence of dental care for infants on caries prevalence: a comparative study. *J Dent Child.* 2003; 70:120-3.
- Worthington HV, Hill KB, Mooney J, Hamilton FA, Blinkhom AS. A cluster randomized controlled trial of a dental health education program for 10-year-old children. *J Public Health Dent.* 2001; 61:22-7. PMID:11317600. <http://dx.doi.org/10.1111/j.1752-7325.2001.tb03351.x>
- Truin GJ, van't Hof MA, Kalsbeek H, Frencken JE, König KG. Secular trends of caries prevalence in 6 and 12-year-old Dutch children. *Community Dent Oral Epidemiol.* 1993; 24:249-52. PMID:8222596. <http://dx.doi.org/10.1111/j.1600-0528.1993.tb00769.x>
- Burt BA. Trends in caries prevalence in North American children. *Int Dent J.* 1994; 44:403-12. PMID:7814108.
- Truin GJ, König KG, Bronkhorst EM, Frankenmolem F, Mulder J, van't Hof MA. Time trends in caries experience of 6-and 12-year-old children of different socioeconomic status in The Hague. *Caries Res.* 1998; 32:1-4. PMID:9438564. <http://dx.doi.org/10.1159/000016422>
- Mattos-Graner RO, Rontani RM, Gavião MB, Bocatto HA. Caries prevalence in 6- to 36-month-old Brazilian children. *Community Dent Health.* 1996; 13:96-8. PMID:8763140.
- Brambilla E, Toselli A, Felloni A, Gagliani M, Malerba A, Strohmenger L. The effect of biannual applications of amine fluoride solution on caries incidence in permanent first molars: a 5-year study. *Int J Paediatr Dent.* 1997; 7: 9-14. <http://dx.doi.org/10.1111/j.1365-263X.1997.tb00266.x>
- Bravo M, Baca P, Llodra JC, Estrella O. A 24-month study comparing sealant and fluoride varnish in caries reduction on different permanent first molar surfaces. *J Public Health Dent.* 1997; 57:184-6. PMID:9383759. <http://dx.doi.org/10.1111/j.1752-7325.1997.tb02972.x>
- Kast LM, Drury TF, Horowitz AM, Beltran E. An evaluation of NHANES III estimates of early childhood caries. *J Public Health Dent.* 1999; 59: 198-200. PMID:10649592. <http://dx.doi.org/10.1111/j.1752-7325.1999.tb03269.x>
- Cunha RF, Delbem AC, Percinoto C, Saito TE. Dentistry for babies: a preventive protocol. *J Dent Child.* 2000; 67: 89-92. PMID:10826041.
- Axelsson P, Lindhe J. Effect of oral hygiene instruction and professional toothcleaning on caries and gingivitis in schoolchildren. *Community Dent Oral Epidemiol.* 1981; 9: 251-5. PMID:6955123. <http://dx.doi.org/10.1111/j.1600-0528.1981.tb00340.x>

16. Kerebel LM, Le Cabellec MT, Daculsi G, Kerebel B. Report on caries reduction in French schoolchildren 3 years after the introduction of a preventive program. *Community Dent Oral Epidemiol.* 1985; 13: 201-4. PMID:3930137. <http://dx.doi.org/10.1111/j.1600-0528.1985.tb01902.x>
17. Zimmer S, Bizhang M, Seemann R, Witzke S, Roulet JF. The effect of a preventive program, including the application of low-concentration fluoride varnish, on caries control in high-risk children. *Clin Oral Investig.* 2001; 5: 40-4. PMID:11355097. <http://dx.doi.org/10.1007/s007840000091>
18. Sköld UM, Klock B, Lindvall AM. Differences in caries recording with and without bitewing radiographs. *Swed Dent J.* 1997; 21: 69-75. PMID:9291554.
19. Nowak AJ, Miller JW. High-yield pedodontic radiology. *Gen Dent.* 1985; 33: 45-7. PMID:3156062.
20. Allison PJ, Schwartz S. Interproximal contact points and proximal caries in posterior primary teeth. *Pediatr Dent.* 2003; 25: 334-40. PMID:3156062.
21. Featherstone JD. Dental caries: a dynamic disease process. *Aust Dent J.* 2008; 53: 286-9. PMID:18782377. <http://dx.doi.org/10.1111/j.1834-7819.2008.00064.x>
22. Carvalho JC, Ekstrand KR, Thylstrup A. Results after 1 year of non – operative occlusal caries treatment of erupting permanent first molars. *Community Dent Oral Epidemiol.* 1991; 19:23-8. PMID:2019085. <http://dx.doi.org/10.1111/j.1600-0528.1991.tb00099.x>
23. Zimmer S, Robke FJ, Roulet JF. Caries prevention with fluoride varnish in a socially deprived community. *Community Dent Oral Epidemiol.* 1999; 27:103-8. PMID:10226719. <http://dx.doi.org/10.1111/j.1600-0528.1999.tb01998.x>
24. Holt RD. The pattern of caries in a group of 5-year-old children and in the same cohort at 9 years of age. *Community Dent Health.* 1995; 12:93-9. PMID:7648418.
25. Raadal M, Espelid I. Caries prevalence in primary teeth as a predictor of early fissure caries in permanent first molars. *Community Dent Oral Epidemiol.* 1992; 20:30-4. PMID:1547609. <http://dx.doi.org/10.1111/j.1600-0528.1992.tb00669.x>

CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

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