The effect of supervised tooth cleansing every second week on dental caries in Danish school children

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The purpose of the present study was to determine the effect of a program of regular plaque control carried out by a group of school children, supervised and assisted by dental personnel.
Approximately 200 children 5–13 years of age were randomly assigned to two groups. Children in the experimental group performed supervised toothbrushing every second week during the schoolyear, using a disclosing solution. Following this, a disclosing solution was reapplied and the remaining plaque removed by dental personnel. Both groups participated in fortnightly fluoride rinses, regular toothbrushing instruction and various educational activities.
Mean dental caries increment at the precavitation level during the 2-year experimental period was 19 per cent lower in the experimental group than in the control group. At the cavitation level the difference was 17 per cent. None of these differences were statistically significant.
The conclusion of the present study was that only limited effect of regular removal of dental plaque as performed by school children could be demonstrated.

Keywords: Plaque; prevention

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A number of recent controlled clinical trials have demonstrated that improvement in dental health can be obtained by preventive programs which comprise frequent removal of dental plaque by professionals. The effect on dental caries in these studies ranges from a very marked effect (2) to more moderate effects (1, 3, 4).

One modification of the original procedure described by Axelsson & Lindhe (2) would be to reduce the amount of professional time needed. However, studies in which the removal of dental plaque was performed daily by the study-subjects themselves have failed to show any significant effect on dental caries increment (6, 7). The purpose of the present study was to determine the effect of a program of regular plaque control carried out by a group of school children supervised and assisted by dental personnel.

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MATERIAL AND METHODS

The initial study group comprised 201 children 5–13 years of age attending the same public school in Hvidovre, a municipality in the environment of Copenhagen. All children were examined by the same dentist (H.O.P.) using the methods developed for the Danish Child Dental Service (5). Bitewing radiographs were used for the posterior teeth. After the initial examination the children were randomly assigned to two groups. Both groups participated in the regular preventive program, which consisted of fortnightly fluoride rinses in school, regular toothbrushing instructions and other educational activities. The fluoride content of the drinking water was approximately 0.35 ppm F.

The experimental group performed regular tooth cleansing every second week during the school-year. At each session all children were given a disclosing solution and asked to remove as much of the disclosed plaque as possible. Following this, a disclosing solution was again applied and the remaining plaque removed by dental personnel using a sodium fluoride containing polishing paste on a rubber cup and dental floss and tooth-picks. The control-group had no special instructions in oral hygiene.

After 2 years all children still available for the test were reexamined by the same dentist who performed the base-line examination.

Dental caries was diagnosed at the precavitation level (D_1MFS) as well as at the cavitation level (D_2MFS). Incidence of dental caries was computed as net caries increment and differences between groups tested by analysis of covariance with baseline DMFS as covariate using a standard statistical program package (8).

Table 1 shows the distribution of children according to age at the start of the study. Since no statistically significant differences in distribution of children according to age could be demonstrated, all ages were combined in the following analyses.

Table 1. *Distribution of children according to age at the start of the study. Only children completing two years of study are included*

	Age in years									
	5	6	7	8	9	10	11	12	13	Total
Experimental	2	10	10	11	14	5	8	5	3	68
Control	5	12	12	6	10	12	10	4	2	73

$\chi^2 = 7.034$, d.f. = 8, $P > 0.05$

RESULTS

Table 2 shows the number of erupted surfaces and the baseline DMFS for all children examined at the initial examination and for those children completing the two year study period. A slightly higher prevalence of dental caries at the baseline examination is noted in the entire group as compared to those children present at the end of the study.

Table 3 shows that baseline DMFS was higher in the control group than in the experimental group. This was most pronounced at the precavitation level, but not statistically significant at neither the precavitation level, nor the cavitation level.

Mean net caries increment during the study period on permanent surfaces which were erupted at the start of the study was lower in the experimental group than in the control group (Table 4). These differences were however not statistically significant except at the precavitation level (D_1MFS) for bucco-lingual surfaces on incisors and cuspids and on all teeth combined. Finally, Table 5 shows, that dental caries increment on teeth erupting during the study was slightly, but not statistically significantly lower for the experimental than for the control group.

Table 2. *Number of erupted surfaces and DMFS at baseline for all children examined at baseline and for children completing two years of study ($\bar{X}$ ± S.D.)*

	Number of children	Erupted permanent surfaces	D_1MFS	D_2MFS
All children examined at baseline examination	201	58.02 ± 31.86	7.24 ± 6.03	4.64 ± 4.43
Children completing two years of study	141	56.57 ± 30.53	7.04 ± 5.93	4.45 ± 4.30

Table 3. *Mean number of erupted permanent tooth surfaces and DMFS at the baseline examination ($\bar{X}$ ± S.D.)*

Group	Number of children	Erupted permanent surfaces	D_1MFS	D_2MFS
Experimental	68	57.29 ± 32.14	6.24 ± 4.91	4.12 ± 3.81
Control	73	55.90 ± 29.17	7.79 ± 6.69	4.77 ± 4.72

Table 4. *Mean net caries increment according to type of tooth surface on permanent teeth erupted at the start of the study ($\bar{X}$ ± S.D.)*

		D_1MFS		D_2MFS	
		Experimental	Control	Experimental	Control
Incisors and cuspids	Proximal	0.25 ± 0.85	0.20 ± 0.96	0.16 ± 0.56	0.30 ± 1.00
	Bucco-lingual	0.12** ± 0.59	0.52 ± 1.21	0.13 ± 0.57	0.27 ± 1.18
Bicuspids and molars	Occlusal	0.90 ± 1.60	0.49 ± 1.26	0.74 ± 1.02	0.73 ± 1.17
	Proximal	0.38 ± 0.99	0.55 ± 1.78	0.10 ± 0.58	0.15 ± 0.78
	Bucco-lingual	0.78 ± 1.33	1.15 ± 1.66	0.31 ± 0.67	0.30 ± 0.68
All teeth	Proximal	0.63 ± 1.47	0.84 ± 2.11	0.27 ± 0.92	0.45 ± 1.42
	Bucco-lingual	0.90** ± 1.47	1.67 ± 2.14	0.44 ± 0.90	0.58 ± 1.32
All teeth	All surfaces	2.43 ± 2.90	3.00 ± 3.95	1.44 ± 1.96	1.75 ± 2.59

** $P < 0.01$

Table 5. *Mean caries increment on teeth erupting during the study ($\bar{X}$ ± S.D.)*

	D_1MFS	D_2MFS
Experimental	1.49 ± 2.23	0.56 ± 1.35
Control	1.89 ± 3.19	0.68 ± 1.39

DISCUSSION

The present study has failed to show any statistically significant effect of the tooth cleansing on increment of dental caries over a 2-year study period. Furthermore the effect was of relatively low magnitude and probably of no clinical significance. This apparent contrast to some of the earliest studies by Axelsson & Lindhe (2) could be explained in a number of ways. First of all, the caries increment in the present population seems lower than that in the Swedish study (2). This is possibly due to an effect of the regular preventive program in which both groups participated. It seems fair to conclude that in populations with relatively low caries increments, it seems difficult for the regular tooth cleansing to confer additional benefits. Secondly, the close cooperation required from the study-subjects proved difficult to maintain during the entire study-period. This resulted in an irregular attendance to the program for some children and actual drop-out of the program for other children. In the present communication, it was decided to include all children originally assigned to the experimental group in spite of different attendance patterns. This was done in order to evaluate the effect under conditions comparable to those found, where such programs would be performed on a routine basis. It should be added, that when only the regular attenders were included in the experimental group, the effect was slightly more marked, but only statistically significant at the precavitation level for buccal-lingual surfaces.

Finally, the program in the present study only emphasized one of the factors included in the study by Axelsson & Lindhe (2), the regular removal of dental plaque. It is uncertain to which extent the results would have been changed, if the other factors had also been emphasized.

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