

A Comparative Study of Caries Experience in Adventist and Other Children

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IN A STUDY of dental diseases in Seventh Day Adventist families during 1957-59, it was noted that the children of all ages had less dental caries than normally would be expected. The children examined were at eight Adventist camps located in different parts of the United States. However, the findings did not show the usual geographic differences brought out in previous studies (1,2). The children's means for decayed, missing, or filled (DMF) teeth were uniformly low.

Recently Downs, Dunn, and Richie (3) reported that Adventist children in both Grand Junction and Denver, Colo., had less dental caries than other children residing in these two cities.

Methods

The present study was undertaken to investigate further the caries experience of Adventist and non-Adventist children under comparable conditions. Prince Georges and Montgomery Counties, Md., were selected principally because of the concentration of Adventists near Takoma Park, Md., the church's international headquarters. There are six Adventist schools in this area with an approximate enrollment of 1,200 students in grades 1 through 12. In this investigation only children 6 through 15 years of age were included.

The control group, part of the sample being observed in the fluoridation study in Prince

Georges and Montgomery Counties, was composed of white children from six public schools in the two counties. The children selected had resided continuously in the area since birth and had not received topical fluoride applications or other caries-inhibitory agents (4-6). Both the Adventist and the public schools are in the zone served by the Washington Suburban Sanitary Commission, which began fluoridating its water in December 1951.

All examinations were made by the author with mirror and explorer under adequate light. "Catches" were not counted as carious lesions in the absence of other indications of caries.

During January and February 1959 approximately 3,000 public school children were examined. Of this group, 1,438 aged 6 through 15 years met the requirements of the control group. Dental examinations were completed in five of the Adventist schools during May 1959, and in the sixth during October 1959. The number of years the child had been a Seventh Day Adventist, as well as the continuity of residence, was determined.

Only 290 of 887 children in Adventist schools could be classified as lifetime Adventists with continuous residence in the study area. Approximately 10 percent could not qualify because they either were not Adventist or had not been Adventist all of their lives. The remainder were eliminated for failing to meet the residence requirement or because they had received topical fluoride applications. No attempt was made to determine the complete history of type of water consumed by the non-continuous residents.

On statistical analysis, no differences were

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found among the groups examined in the six Adventist schools with respect to their dental caries experience. Therefore, they have been combined for comparison with the control group. Likewise, no differences were found among the six public school groups.

The sample from the Adventist children had a mean age of 10.27 years; that from public schools, 11.09 years (table 1). Each group was about equally divided between male and female.

Findings

The mean number of teeth in eruption for the public school pupils did not vary greatly from the mean number for the continuous resident lifetime Adventist children. The variation was less than a quarter of a tooth per child for five age groups and approached a full tooth for the 9- and 11-year-olds. The Adventist students had the higher mean number of erupted teeth for most ages.

The level of professional care was somewhat higher among the Adventist children. Unmet needs, that is, decayed teeth, plus teeth indicated for extraction, made up only 8.2 percent of the Adventist's total DMF mean. Filled teeth contributed 89.0 percent. For the public school children, the unmet needs accounted for 22.6 percent of the total DMF and filled teeth 70.3 percent.

Table 1. Distribution by age and sex of continuous resident Adventist and public school children, Prince Georges and Montgomery Counties, Md.

Age last birth-day (years)	Lifetime Adventist children		Public school children	
	Male	Female	Male	Female
6.....	16	16	74	68
7.....	19	21	70	83
8.....	21	16	83	83
9.....	17	20	63	48
10.....	10	24	53	38
11.....	13	12	27	33
12.....	19	11	113	105
13.....	17	14	85	123
14.....	4	5	110	107
15.....	5	10	39	33
Total....	141	149	717	721

Table 2. Mean number of DMF teeth for continuous resident Adventist and public school children, Prince Georges and Montgomery Counties, Md.

Age last birth-day (years)	Lifetime Adventist children		Public school children	
	Number examined	Mean number of DMF teeth	Number examined	Mean number of DMF teeth
6.....	32	0.09	142	0.15
7.....	40	.10	153	.23
8.....	37	.57	166	.81
9.....	37	1.16	111	1.31
10.....	34	1.26	91	2.04
11.....	25	1.40	60	2.27
12.....	30	¹ 2.23	218	3.61
13.....	31	¹ 2.87	208	4.86
14.....	9	5.44	217	5.91
15.....	15	5.27	72	6.92
Total....	290	² 1.49	1,438	2.93

¹ The mean is significantly different at $P=.001$ level.

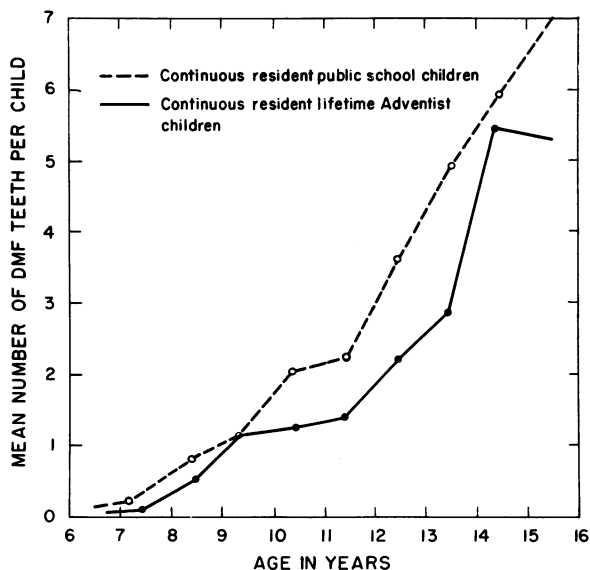
² Adjustment for differences in age distribution, using distribution of public school children as a standard, produces a mean of 2.30 DMF teeth.

A comparison of the mean number of DMF teeth for the continuous resident lifetime Adventist children and the public school continuous residents shows a striking similarity for both groups in the ages 6 through 9 years (table 2 and the figure). The Adventist group ages 10-13 years appears to have experienced less dental caries than its public school counterpart.

When adjusted for differences in the frequency distribution of the age groups of Adventist and public school children, the overall DMF mean of the continuous resident lifetime Adventist was raised from 1.49 teeth to 2.30 teeth. The overall DMF mean for the continuous resident public school children was 2.93 teeth.

Because the Adventist children were examined later in 1959 than the public school children, they had the advantage of a few additional months of fluoride exposure. To evaluate this additional benefit, the reduction in DMF teeth for the continuous resident public school children examined in 1959 was computed on a monthly basis. Then, for the Adventist children examined in May and October, adjust-

Caries experience of Adventist and public school children examined in Prince Georges and Montgomery Counties, Md.



ments of 3 and 10 months, respectively, were made. This correction raised the mean DMF teeth of the Adventist students slightly but not importantly. For example, the observed mean number of DMF teeth for the 12-year-old Adventist was raised from 2.23 teeth to 2.34 teeth.

Relatively more Adventist than public school children were caries free. Again, the difference between the groups is more pronounced for children 10 years of age and older (table 3).

Discussion

The mean number of DMF teeth for the continuous resident lifetime Adventist might be expected to approximate closely the mean of the public school continuous resident children. This expectation holds true for ages 6 through 9 years, the age groups which would benefit most from 7 years of fluoridation. For these ages the DMF curve for the Adventist is slightly but not importantly lower than that for the public school children. From age 10 through 14 years, there is a more noticeable discrepancy between the recorded caries experience of these groups. The differences in DMF means of continuous resident Adventists and public school children are significant for ages 12 and 13 years ($P = .001$).

Apparent differences in the DMF means of children who are erupting or have recently erupted their premolars and second molars should be interpreted with caution. DMF means are influenced by the length of time teeth are at risk of attack. In this study because eruption was accelerated in most age groups of Adventist children, the tendency would be to raise the DMF mean slightly.

One explanation of these apparent differences is that there is some aspect of the Adventist way of life which inhibits caries attack but is made imperceptible by the effect of fluoride ingestion. Assuming that the difference in the DMF means of Adventist and public school

Table 3. Proportions of caries-free continuous resident Adventist and public school children, Prince Georges and Montgomery Counties, Md.

Age last birthday (years)	Lifetime Adventist children			Public school children		
	Number examined	Caries-free		Number examined	Caries-free	
		Number	Percent		Number	Percent
6	32	29	90.6	142	132	93.0
7	40	37	92.5	153	123	80.4
8	37	26	70.3	166	105	63.2
9	37	19	51.4	111	52	46.8
10	34	18	52.9	91	30	33.0
11	25	13	52.0	60	18	30.0
12	30	16	53.0	218	30	13.8
13	31	8	25.8	208	13	6.2
14	9	0	0.0	217	6	2.8
15	15	2	13.3	72	2	2.8
Total	290	168	57.9	1,438	554	37.7

children is a real one, we can estimate from table 2 that portion which is not accounted for by fluoride ingestion. For ages 10, 11, 12, and 13 years, this difference is approximately 40 percent. The differences between the mean DMF of these four age groups of Adventist children and their public school cohorts examined in the 1952 prefluoridation baseline study are 59.2, 68.1, 55.0, and 53.5 percent, respectively, and are not unlike the difference expected with lifetime consumption of fluoridated water (6). The failure of the 14-year-old Adventist children to show a marked difference may be a reflection of the small number of examinees at this age.

The findings in this study suggest that if there is a caries-inhibitory factor in the Adventist way of life, it is active in children 10 years of age and older. Because the mean DMF was lower than expected for children of all ages examined at the Adventist camps, there is reason to suspect that such a factor would act at an earlier age. In this study the mean DMF of the younger Adventist children who have received the maximum benefit of fluoridation is similar but not appreciably lower than that of their public school cohorts, suggesting that the Adventist way of life may offer a type of protection against dental caries not unlike that of fluoride ingestion.

Downs, Dunn, and Richie (3) in their report of caries experience of Adventists and non-Adventists in Colorado suggest that the lower rate among the Adventists might result from their educational program which discourages the excessive use of sweets and snacking between meals.

Clarification

In "Bovine Mastitis," *Public Health Reports*, October 1960, page 972, statement No. 2 under "*Disposition of Mastitic Mammary Secretions*," has been revised for clarification.

The recommendation should read: "Discard from market milk supply for at least 72 hours from last infusion all mammary secretions of any cow which has had one or more quarters infused with antibiotics."

Summary and Conclusions

During 1959, the caries experience of 290 Seventh Day Adventist children living continuously in Prince Georges and Montgomery Counties, Md., was compared with that of 1,438 continuous resident public school children of the same area. At certain ages, there are unexplained differences, favorable to the Adventist, in the mean number of DMF teeth.

Further investigation of a possible caries inhibitory factor in the Adventist way of life seems indicated. Because in this study fluoridation may have made the inhibitory factor imperceptible, it would be desirable to select for study an area where caries attack is not influenced by the ingestion of waterborne fluoride.

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