

# An Analysis of the Caries Experience of 285 Cleft Palate Children

AUBREY M. LAUTERSTEIN, D.D.S.  
MARK MENDELSON, D.D.S.

*Chicago, Illinois*

To our knowledge no evidence is available concerning caries experience of cleft palate individuals. Malposed, malformed, maloccluded, missing, and supernumerary teeth appear more frequently in cleft palate children than in noncleft children (3, 6). Food entrapment and its prolonged retention upon the surface of malposed teeth is generally considered a predisposing cause for tooth decay (2). In the orthodontic and prosthetic treatment of the cleft palate child, additional food entrapment conditions are created.

Toverud and others (7) have estimated that the average American child at age nine has about seven teeth already decayed, missing, or filled; that is, a child of that age has DMF dental caries index of seven (the mean number of decayed, missing, or filled teeth). It would be of interest to compare this DMF index for noncleft children with that for cleft palate children.

Unfortunately there are considerable difficulties in making this comparison. Assessment of dental caries is a quasi-objective matter based upon the criteria of the individual dental examiner. Two equally competent dental examiners may disagree about what constitutes a carious lesion. They may examine the same group of individuals and yet vary considerably in their caries findings. Each examiner is reliable, nevertheless, according to his own criteria; that is, he can examine the same group of individuals several times and repeatedly arrive at an identical caries index (4). It is important therefore to recognize that valid comparisons of the caries experience between two groups of individuals should be made by the same examiner or by examiners who are in firm agreement on their criteria. Furthermore, two groups to be compared in a caries experience study should not only be equally matched by sex, age, and number, but also by their fluoridation history. It is apparent that two groups, one being fluoridated and the other not but equally matched in

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all other respects, would probably have considerable differences in their caries index.

The caries index of cleft palate children is best compared to a noncleft group having a closely similar fluoridation history. The noncleft siblings of cleft palate children provide the best control group for this sort of caries experience comparison. This is not always easy to provide since the cleft palate child often comes from a considerable distance to the cleft palate center and usually comes without his normal siblings. Consequently the caries indexes of the noncleft siblings are difficult to obtain.

A common epidemiologic finding concerning dental caries of normal children is bilateral distribution of the carious lesions within their dental arches. Volker (8) reports that in 75% of the normal children in which dental caries occur in a posterior tooth, the comparable tooth on the opposite side of the arch will also be involved. He also extends this generalization and states that in four out of five of these cases the caries will be distributed bilaterally on the same surfaces of the teeth. Losee (5) found upon examination of over 6000 mesial and occlusal tooth surfaces of hundreds of individuals that 78% of the tooth surfaces demonstrated bilateral distribution of dental caries. Bilaterality of tooth decay has also been demonstrated in experimental animals. Barr (1) observed that 75% of male and female white rats had symmetrical tooth decay.

Against this background of information, this investigation was designed to answer the following six questions.

- a) Does the caries index of a cleft palate group of children vary significantly from a noncleft group?
- b) Do cleft palate children demonstrate a similar degree of bilaterality of tooth decay distribution reported for noncleft individuals?
- c) Does the distribution of caries in the dental arches of the cleft palate child vary with the type of palatal cleft?
- d) Does the maxillary dental arch of cleft palate children have a greater caries index than their mandibular dental arch?
- e) Does the manner of treatment (prosthetic, orthodontic, or surgical) alter the caries experience of cleft palate children?
- f) Do cleft palate children who have been drinking fluoridated water have a lower caries index than cleft palate children whose drinking water was not fluoridated?

### **Method and Material**

Two hundred and eighty-five children with five types of cleft palate (left and right unilateral clefts, bilateral clefts, isolated clefts, and submucous clefts) were given dental examinations. One examiner (A.M.L.) using dental mirror, explorer (dental pie), intraoral x-ray techniques, and a dental operating light examined each child and with the aid of an assistant recorded the findings on standardized oral examination forms. The general characteristics of this cleft palate group are

TABLE 1. Description of experimental subject group, according to cleft type, sex, race, type of management, and whether water was fluoridated (criterion was whether child drank fluoridated water for at least five weeks of his life).

	<i>Cleft Type</i>										<i>Total</i>
	<i>Sub-mucous</i>		<i>Bilateral</i>		<i>Left Unilateral</i>		<i>Right Unilateral</i>		<i>Isolated</i>		
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	
Males.....	17	12.3	24	17.4	34	24.6	26	18.9	37	26.8	138
White.....	17	13.7	24	19.3	33	26.6	25	20.1	25	20.1	124
Negro.....	0	00.0	0	00.0	1	7.1	1	7.1	12	85.0	14
Females.....	21	14.2	14	9.5	21	14.2	17	11.0	74	50.3	147
White.....	16	13.3	12	10.0	20	16.6	16	13.3	56	46.6	120
Negro.....	5	18.5	2	7.4	1	3.7	1	3.7	18	66.6	27
Speech Appliance.....	3	4.4	9	13.4	13	19.4	11	16.4	31	46.3	67
Surgery.....	3	2.1	26	18.4	40	28.3	29	20.5	43	30.5	141
Orthodontic.....	0	00.0	4	18.2	7	31.8	3	13.6	8	36.4	22
Fluoridated.....	15	12.1	18	14.6	23	18.6	20	16.2	47	38.2	123
Nonfluoridated.....	23	14.1	20	12.3	32	19.7	23	14.1	64	38.5	162
Mean Age.....	8.5		7.4		6.8		9.0		8.6		8.5

described in Table 1. The majority of subjects were white and had surgically repaired palates. The mean age of the group was 8.5 years (SD, 2.1); the subjects showed a mean of 21.2 teeth present on examination (SD, 2.0).

Mean number of teeth and mean number of surfaces which were decayed, missing, or filled were determined for each cleft type group. Mean DMF teeth and surface indexes were determined for maxillary and mandibular dental arch and the quadrant of each arch (Table 2).

The caries experience of the cleft palate children was also compared with that of 300 white, noncleft children (not siblings of the cleft group) selected from the author's (A.M.L.) pedodontic practice (Table 3). The same dentist examined both the cleft and noncleft groups.

To determine whether there were any significant differences in the caries experience among the five classes, the various mean caries indexes of the cleft classes were analyzed by one-way analysis of variance.

Bilaterality of caries was expressed by determining the percentage of children in each cleft class having symmetrical tooth and tooth surface decay within the posterior teeth of each dental arch.

**Findings**

The dental caries experience of these 285 cleft palate children did not differ markedly from the 300 noncleft children. The mean DMF tooth index for all cleft children was 8.01 (Table 2), compared with 7.45 DMF tooth index for the noncleft children (Table 4). The mean DMF surface

TABLE 2. Caries experience of cleft palate group according to cleft type, full mouth, maxillary, mandibular, and according to tooth DMF and surface DMF.

Class	Full Mouth	Mean Number of Teeth DMF						Full Mouth	Mean Number of DMF Surfaces					
		Maxilla			Mandible				Maxilla			Mandible		
		Total	Right	Left	Total	Right	Left		Total	Right	Left	Total	Right	Left
Submucous	8.55	4.53	2.37	2.16	4.03	2.00	2.03	15.87	8.55	4.34	4.21	7.32	3.61	5.65
Isolated	8.68	4.40	2.14	2.26	4.27	2.14	2.13	15.04	7.69	3.65	4.05	7.34	3.60	3.75
Bilateral	6.95	3.66	1.82	1.84	3.29	1.61	1.68	11.50	5.84	2.97	2.87	5.65	3.03	2.63
Right Unilateral	7.65	4.23	2.16	2.07	3.42	1.69	1.72	12.72	7.07	3.37	3.70	5.65	2.42	3.23
Left Unilateral	8.24	4.18	2.03	2.16	4.05	2.00	2.05	15.40	8.22	3.96	4.25	7.19	3.71	3.48
Total	8.01	4.2			3.8			14.10	7.45			6.63		

TABLE 3. Caries experience of a group of 300 noncleft children.

Mean number of teeth present . . . . .	22 (SD, 3.1)
Mean age (years) . . . . .	9 (SD, 2.0)
Males . . . . .	125
Females . . . . .	175
Number subjects who lived all their lives in fluoridated area . . .	240
Number subjects who lived three years or less in fluoridated areas	60

TABLE 4. Comparison of tooth DMF and surface DMF indexes for 285 cleft palate children, 300 noncleft children, and norm (interpolated from data reported by Toverud and Finn).

	Cleft Palate Children	Noncleft Control Group	Norm
Tooth DMF Index . . . . .	8.01	7.45	7.0-8.0
Surface DMF Index . . . . .	14.10	13.30	

index for the cleft palate group was 14.10 (Table 2) as compared to 13.3 for the noncleft group (Table 4).

The cleft palate children exhibited a degree of bilaterality of tooth decay distribution that was very similar to the noncleft individuals described by Losee and Volker (5, 8). A total of 72% of the cleft palate children demonstrated bilateral distribution of tooth decay while 69% of the cleft palate children demonstrated bilateral distribution of tooth surface decay. These percentages were very close to the figure of 75% bilaterality found by Losee and Volker in noncleft children.

The distribution of caries in both dental arches of the cleft palate children did not vary markedly according to the type of cleft (Table 2).

The mean DMF tooth index for the five cleft classes ranged between 8.68 to 6.95. The mean DMF tooth surface index ranged between 15.87 to 11.50.

The DMF tooth and tooth surface index of the maxillary dental arch of the cleft palate children did not differ significantly from the mandibular dental arch (Table 2). The mean DMF maxillary tooth index for all cleft classes was 4.2 as compared to 3.8 for their mandibular arch.

The manner of treatment or the type of cleft present did not alter the caries experience of these cleft palate children. This is supported by the fact that one-way analysis of variance of the mean caries indexes revealed no significant caries differences among the five cleft classes.

The cleft palate children in this study coming from fluoridated areas (Table 1) had an average of 2.01 less decayed teeth than their cleft palate peers coming from non-fluoridated areas.

### **Discussion**

The many variables relating to caries experience of any group of individuals create serious problems for the 'statistical purist' when selecting control and experimental groups. These problems existed in this study as well. The validity of our conclusions reported herein would be enhanced by a study of larger numbers of children and admittedly a more adequate control group. Nevertheless, the data presented in this study strongly indicate that the cleft palate deformity with its comingling of nasal and oral flora, altered tongue posture, malposed teeth, and occasional therapeutic appliances did not significantly alter the caries experience of the children studied. Neither the bilateral distribution of carious lesions nor the caries indexes were different from the noncleft control group or the 8 to 9 year old noncleft groups reported by Toverud and Finn. The three groups of children have a DMF tooth index of 8.0, 7.4, 7.0-8.0 respectively (Table 4). This variation of one DMF tooth is clinically insignificant. It is not reasonable to explain this small variation as a difference peculiar to the caries mechanism of the cleft palate children. It appears that this minor difference can best be explained by saying it is merely the normal range of variations usually found among groups with a common disease rate.

One-way analysis of variance of the mean caries of the cleft palate children revealed no significant differences among the five cleft classes. Consequently, the type of cleft, its method of treatment, and the presence or absence of fluoride in the drinking water of these children did not produce significant differences in the caries experience of any one particular type of cleft group.

### **Summary**

In this study of caries experience the cleft palate child was used as his own control. The caries indexes of the child's maxillary arch were com-

pared to his mandibular arch and his left dental quadrant to his comparable right dental quadrant. Such comparisons revealed little or no Difference between the number of carious lesions in the maxillary teeth of the left or right side of the child's palatal cleft or between his maxillary and mandibular teeth. Further, the cleft palate children studied did not experience a DMF index significantly greater than their noncleft peer groups.

*University of Illinois  
Research and Educational Hospitals  
840 South Wood Street  
Chicago 12, Illinois*

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