

Characteristics and backgrounds of children with "nursing caries"

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Abstract

A profile for children with "nursing caries" may be important in targeting preventive measures. Consecutive children age 3 1/2 years or less and presenting for dental care were considered. Several significant differences were found between those children with carious incisors and caries-free children. Almost all children (95%) with incisor lesions slept with the bottle or were put to bed with it until they fell asleep. Parents of children with carious incisors were less likely to have attended college — but were more likely to be pessimistic about their own dentition, be obese, be reluctant to say "no" to the child, and be unaware of the cariogenic potential of sleeping with milk or other sweet liquid. However, 40% of parents of children with incisor lesions did indicate a previous awareness of potential cariogenicity. The majority (89%) had attempted substitution of water, but in 68% of these cases the child rejected it. Children with carious incisors were more likely to have a significant medical condition and to have a Class II canine relationship; they were less likely to have a digital habit or use a pacifier. Hypoplastic defects may have an appearance similar to that of nursing caries: the ones in this study were associated with premature birth.

Nursing caries, or nursing bottle caries, has been described as a pattern of dental caries involving the primary maxillary incisors, followed by the maxillary and mandibular first molars.¹ Etiology has been shown to be a sleeping infant or toddler nursing with a bottle. Few studies, however, have explored the backgrounds surrounding the children with this problem.

The association of bottle nursing during sleep and the distinct pattern of dental caries was suggested many years ago.²⁻⁶ Studies and clinical reports in the meantime have supported this association.⁶⁻⁹ The association of breast feeding and the clinical manifestation of nursing caries has also been suggested.^{10,11}

Dental caries beginning in the hypoplastic defects

gives an appearance similar to that of nursing caries. This pattern is distinguished in early stages by symmetrical defects of the primary incisors.¹²⁻¹⁴ The defects follow the horizontal lines of enamel formation. The reason for selective destruction of the maxillary incisors is unclear. Etiology for the defect has been hypothesized as a vitamin A deficiency.¹³ Premature birth has also been shown to have an association with hypoplasia and may be an accentuation of the neonatal line.¹⁵⁻¹⁷

The purpose of this study is to examine the social, medical, and nursing backgrounds of children presenting with carious incisors as compared to caries-free children.

Methods and Materials

The study site was the pediatric dentistry clinic in a medical center in Morgantown, West Virginia, a predominately rural setting with no towns exceeding 50,000 population. Prospective patients for the predoctoral program and faculty practice passed through a central screening point.

Subject selection was based on age and dental criteria. Children age 3 1/2 years or less and presenting for a dental examination were considered. Each caries-free child was examined and confirmed by two dentists using mirror and explorer. Radiographs were not a criterion for inclusion, since biting radiographs were frequently not taken. Children were excluded from the caries-free group if either parent had an occupation associated with dentistry. Inclusion in the study was based on dental caries pattern, and not nursing history. Children were included in the incisor caries group if three incisors had carious lesions which had progressed beyond the white spot state to cavitation. Children with enamel hypoplastic defects with no carious component to the lesion were photographed and interviewed but not included in the study. Children with cleft lip or palate were excluded. All interviews with parents of children with

incisor lesions and 16 of 20 interviews with parents of caries-free children were done by the author (four interviews with parents of caries-free children were done by a dental assistant).

The sequence of events for subjects was as follows: parents of consecutive children presenting for dental care over a period of approximately one year and fulfilling the dental criteria were presented with a consent form and interviewed. Intraoral photographs were secured for all children with three incisor lesions. Subjects were not pair matched. Age and sex distribution are shown in Table 1.

The interview consisted of objective questions. Most questions were answered as "Yes" or "No" or with a number ranking. One question on awareness of cariogenicity was included and was worded, "Were you aware before you noticed the cavities that if the child slept with the bottle it might cause cavities of the upper front teeth?" In three questions, the parent gave a rating of 1-10 ("On a scale of 1-10, how active would you say your child is — with 10 being very active?"). These questions related to the parents' perception of the child's general level of activity, the child's level of curiosity, and the parents own ability to say "No" to the child when they thought necessary.

One item of data involved rating by health professionals. Ratings were recorded separately by two health professionals. Choices for mother's physique rating were: slender, normal, a few pounds overweight, plump, or obese. Agreement occurred 94% of the time. In no instance did the raters differ by more than one interval.

For determination of fluoride ingestion status, parents were asked to identify their water supply.

Town and city water supplies were checked in a listing provided by the respective State Health Departments. Well water supplies in Appalachia have been shown to be deficient in fluoride.¹⁸ Medical histories were taken. A significant medical problem was designated if, during the first year of life, the child had been hospitalized for surgery, had a hospital stay of more than two days, required regular outpatient care, or was taking regular medication. The chi-square test was used for statistical analysis.¹⁹

Results

Demographic data for families are shown in Table 1. No significant differences were found for marital status, number of children in the family, parent ages, race, or water fluoridation status. Parents of caries-free children were more likely to have attended college than parents of children with incisor caries (for mothers, $X^2 = 10.3$, $p < 0.01$; for fathers, $X^2 = 15.3$; $p < 0.01$).

Demographic data for children as reported by parents are shown in Table 2. No significant differences were found for age, sex distribution, frequency of supervision by another adult, or sibling rank. Children with incisor lesions were more likely to have a significant medical condition than caries-free children ($X^2 = 6.82$, $p < 0.01$). Examples of these conditions included heart condition, bowel obstruction requiring surgery, asthma, seizures, Histiocytosis X, premature birth, hydrocephalus, etc. (Figure 1). Nursing caries children averaged 2.2 hospitalizations and 13 days in the hospital. When asked about awareness of the potential cariogenicity of sleeping with the bottle, a common response was,

Table 1. Demographic data of family.

		<i>Carious Incisors</i>		<i>Caries-Free</i>	
		Number	Percent	Number	Percent
	Marital status	41	87	19	95
	— married number of children in family (mean)	1.8		1.9	
	Ages (mean)				
	Mother	26	—	29	—
	Father	29	—	31	—
	Race				
	White	43	91	18	90
	Black	2	4	2	10
	Other	2	4	—	—
	Attended College				
	Mother	11	24**	14	70
	Father	10	22**	16	80
	Fluoridated Water	29	63	15	75

	<i>Cariou Incisors</i>		<i>Caries-Free</i>	
	Number	Percent	Number	Percent
Age (mean)	2.8	—	2.9	—
Sex				
Male	24	51	11	55
Female	23	49	9	45
Child frequently supervised by another adult	21	45	5	25
Significant medical condition	19	40**	1	5
Sibling rank (mean)	1.4	—	1.6	—

**X² > 6.64, p < 0.01

Table 2. Demographic data of children as reported by parents.

“But (the child) has been through so much and should have something to enjoy.”

Dental information as reported by parents are reported in Table 3. The average age when parents first noticed one or more lesions was 22 months. Several parents presented for care due to “a chip in the tooth.” With a frequent pattern of lingual caries at an acute stage, the lesions were probably difficult



Figure 1. Photograph of a child with Histiocytosis X and nursing caries as an example of the association of a child with a significant medical problem and this caries pattern.

to see. Only one parent said the teeth appeared carious at the time of emergence. In this instance, the parent reported only breast feeding, and the appearance had a circular pattern compatible with hypoplasia. Almost all (38 of 39) parents of children with incisor lesions accepted the offer to have the teeth restored. In eight instances, the incisors were judged as nonrestorable. Caries-free children were more likely to have a pacifier or digital sucking habit

than children with carious incisors ($X^2 = 7.95, p < 0.01$). Parents of caries-free children were more likely to predict that they would have “most of their own teeth beyond age 65” ($X^2 = 5.44, p < 0.05$).

Nursing habits of children as reported by parents are shown in Table 4. Ninety-six percent of children with incisor caries had either slept with the bottle overnight or for naps, or had the bottle removed after going to sleep with it. Although none of the caries-free children slept overnight with the bottle, 45% had the bottle removed after falling asleep. A variety of liquids besides milk were reported, most commonly fruit juices or a sweetened beverage. Parents of caries-free children were more likely to be aware of potential cariogenicity of sleeping with the bottle ($X^2 = 9.6, p < 0.01$). However, 40% of the children with incisor lesions were also aware of this potential. The majority of parents in this group (81%) had attempted substitution with water, but most of these (68%) were unsuccessful. Several instances were reported where other children slept with the bottle, but with no incisor lesions.

Child activity levels as rated by parents are reported in Table 5. No significant differences were found for parent ratings of general activity or curiosity of the child, with 40% or more rating their child a 10 on a scale of 1-10. Parents of caries-free children

	<i>Cariou Incisors</i>		<i>Caries-Free</i>	
	Number	Percent	Number	Percent
Age first saw cavities (mean no. months)	22	—	—	—
Pacifier or digit habit	7	23**	12	60
Restorative care				
Accepted	38	81		
Rejected	1	2		
Nonrestorable	8	17		
Predicted longevity of parents Dentition beyond age 65	18	38*	14	70

*X² > 3.84, p < 0.05

**X² > 6.64, p < 0.01

		<i>Carious Incisors</i>		<i>Caries-Free</i>		
		Number	Percent	Number	Percent	
Table 4. Nursing habits of children as reported by parents.	Nursing habits: naps/overnight	31	66	0	0	
	To sleep then remove	14	30	9	45	
	Breast fed	2	4	11	55	
	Aware of cariogenicity of liquid in bottle	19	40**	15	85	
	Substitution of water attempted	38	81	7	35	
	Rejected	26	68	2	29	
	Siblings slept with bottle	10	48	2	15	
	Caries of primary incisors	2	—	1	—	
			**X ² > 6.64, p < 0.01			

were more likely to give a high rating (greater than 6 on a scale of 10) to their ability to say "No" to the child when they thought necessary (X² = 7.2, p < 0.01).

Mothers' physiques as rated by health professionals are reported in Table 6. No significant differences were found in rating parents' physique between the two groups (X² = 3.0, n.s.). However, if children with medical problems are eliminated from both groups, children with incisor lesions were more likely to have a parent rated as "obese" or "plump" (X² = 4.0, p < 0.05).

only of excessive nursing but of excessive sweets. It is further suggested that the habit of excessive nursing is associated with the oral gratification of the sweet-tasting liquid and the need for sucking. This statement is derived from the high percentage of parents that attempted substitution of water but had it rejected by the child.

Differences between "nursing caries" and caries-free children may be useful in identifying circumstances contributing to the disease pattern. Results of this study and those of Dilley et al.⁹ are similar in several regards: intact families, mode of

		<i>Carious Incisors</i>		<i>Caries-Free</i>	
		Number	Percent	Number	Percent
Table 5. Child activity levels as rated by parents.	Rating scales of 1-10				
	Child active				
	≤9	25	52	12	60
	10	22	48	8	40
	Child Curious				
	≤9	22	48	11	55
	10	25	52	9	45
Difficulty saying "No" to child					
>6	22	47**	16	80	
		**X ² > 6.64, p < 0.01			

Dental data for children are shown in Table 7. The caries pattern was predominately on the lingual, labial, and interproximal surfaces of the maxillary incisors and the occlusal surfaces of first molars (Figures 2-4). Nursing caries children were more likely to have a Class II canine relationship (X² = 4.0, p < 0.05). Children with hypoplastic incisors showed a spectrum ranging from absence of enamel to rough enamel surface (but hard to an excavator) to carious enamel (Figure 5). None had carious lesions of the molars. All of the children in Figure 5 were premature infants.

Discussion

The association of night or naptime nursing and the distinct pattern of caries involving primary incisors is reinforced by the results of this study. While milk was the most common liquid, the variety of liquids usually involved suggests a pattern not

two children, lack of significance for sibling rank, time spent away from parents, absence of digital habits, and lack of a clear pattern for fluoridation status.

Two factors — a significant medical condition and parental obesity — have not previously been reported as having an association with nursing caries. These need to be studied in other locations and in other settings. Although results are statistically significant, the numbers reported here are relatively small. The association of nursing caries with a significant medical condition may have a straightforward explanation: parental concern for the child's misfortune is demonstrated by providing satisfaction in another way (this follows from the finding that 40% knew the potential cariogenicity of the nursing habit). Parental obesity associated with the caries pattern is a more difficult factor to explain. Perhaps it relates to control of personal restrictions: parents who have dif-

Table 6. Mother's physique as rated by health professionals.

	<i>Cariou Incisors</i>		<i>Caries-Free</i>	
	Number	Percent	Number	Percent
Physique: plump or obese	13	28	1	5
Excluding parents of children with medical problems	10	36*	1	5

* $X^2 > 3.84, p < 0.05$

Cariou tooth surfaces for children with incisor lesions.

Table 7. Dental data for children.	<i>Molar Occlusal Surfaces</i>				<i>Maxillary Incisors</i>							
	<u>d</u>		<u>d̄</u>		Lingual		Labial		Interprox.		Incisal	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
	18	44	11	31	28	65	31	74	30	71	17	41
	Canine Classification						<i>Cariou Incisors</i>		<i>Caries-Free</i>			
					I		21	57	11	85		
					II		16	43*	1	7.5		
					III		0	0	1	7.5		

* $X^2 > 3.84, p < 0.05$

difficulty restricting their own diets may not restrict nursing for the child. This hypothesis is supported by nursing caries children's parents reporting less ability to say "No".

The nursing caries group differs from a high caries group in a previous study which emphasized numerous and large interproximal molar lesions and excluded children with incisor lesions.²⁰ The main differences were in family size and birth order. Nursing caries children came from smaller families and did not tend to come from a lower birth order.

Preventive measures may be better directed from the information found here and in similar studies. It is disconcerting that so many parents of carious children had already been informed of the potential hazard from excessive nursing. Simply providing that information may not be enough. Early identification of potential victims and reinforcement of preventive measures may be necessary.

Some cases of hypoplastic defects are difficult to distinguish from caries resulting from excessive nursing. This is especially true where dental caries is secondary to the hypoplastic defect. The distinguish-



Figure 2. Example of decay pattern from a child in the "nursing caries" group.

ing feature is the circumferential appearance of the defect along lines of enamel formation. The association with premature birth is of potential significance.¹⁵⁻¹⁷

Conclusion

Backgrounds of children with incisor lesions in a medical center dental clinic revealed several trends, but a definitive profile remains incomplete. Parental concern is evident but it is suggested that nursing bottle caries is a problem of overindulgence or lack of parental restraint rather than one of neglect.

(references, page 224)

Figure 3. (a & b) Sequential photographs showing caries progression over six weeks.

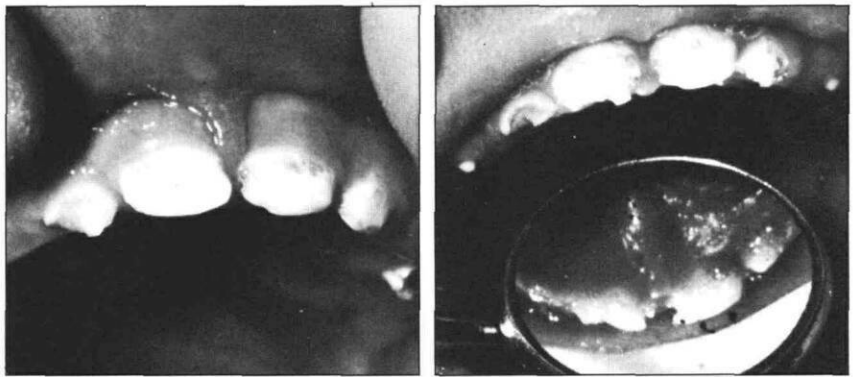


Figure 4. (a & b) Photographs of child who engaged in extensive bottle nursing while awake but did not sleep with the bottle. Incisor lesions are small compared to molar lesions.

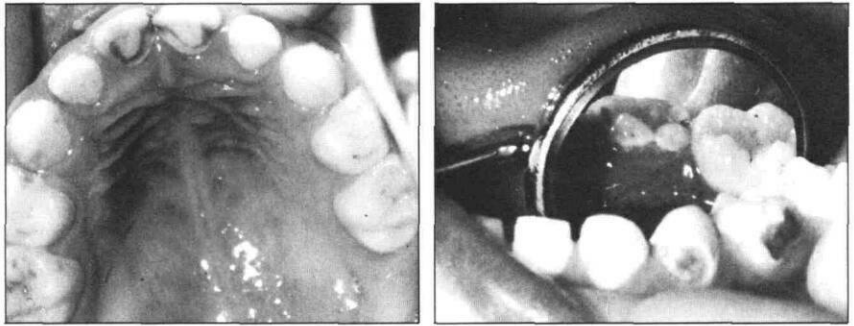
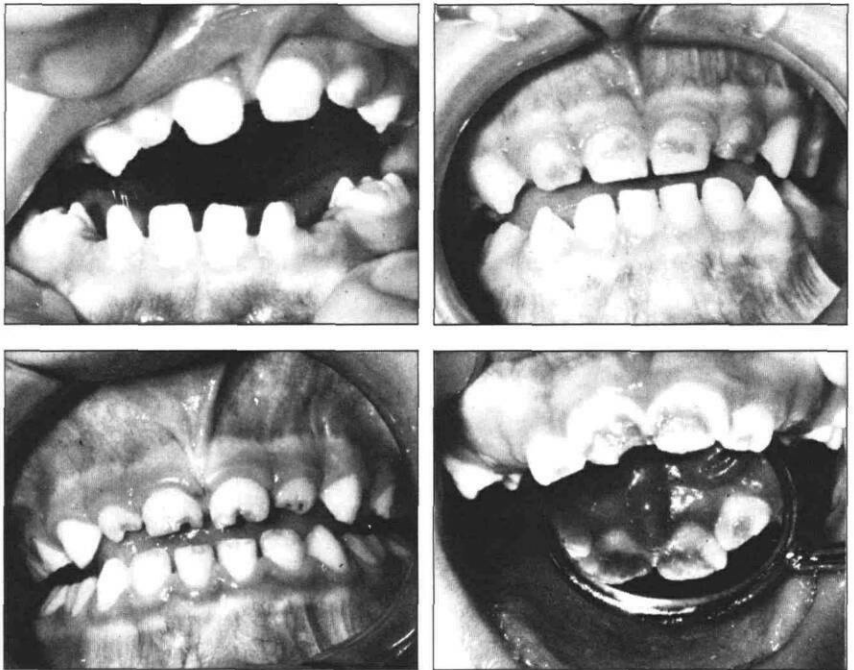


Figure 5. Photographs of children with hypoplastic incisors ranging from absence of enamel (a), to horizontal defects (b), to incisal defects of upper and lower incisors (c), to circular defects of the incisors and secondary decay (d). The appearance is similar in some ways to that seen in children with "nursing caries." All of these children experienced premature birth.



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Quotable Quote

Although I am a clinical pharmacologist, in principle, I am against medicines; we ought not to need them. In theory, nobody in his right mind takes into his body foreign chemicals (that are not nutrients) unless he has no option. But in real life we know it is very different. The great Sir William Osler, Professor of Medicine successively at universities in Canada (McGill), the United States (Philadelphia, John Hopkins), and at Oxford, wrote in 1894: "But know also, man has an inborn craving for medicine . . . It is really one of the most serious difficulties with which we have to contend".

From: Laurence, D. R. Medicines then and now. *Nature* 293:13-15, September 3, 1981.