Oral pH, Strep. mutans, and dmft concordance among siblings in the same households

Van Tang, DMD, Christine Chiao, DMD, MPH, Keri Discepolo, DMD, MPH
Department of Pediatric Dentistry, Boston University Henry M. Goldman School of Dental Medicine, Boston, MA

Boston University Henry M. Goldman School of Dental Medicine

Background

Early Childhood Caries (ECC) is defined as the presence of one or more carious teeth, missing teeth due to caries, or filled tooth surfaces in any primary tooth in children under six years old[1]. Dietary, environmental factors, genetic factors play an essential role in caries prevention or accelerate the development of dental caries at an early age.[1] Early oral microbiota in the newborn is similar to the mother's oral cavity; yet the microbiomes become more diverse and significantly influenced by the external environment. [2] Similarly, the composition of the oral microbiomes in monozygotic and dizygotic twins were found similar when they were young and become less similar as they became older. The prevalence of ECC among twins was reported to be 15% among children from 25-36 months. [3]

The objective of this study was to evaluate the oral pH, dmft, and *Strep. mutans* among biological siblings aged 6-71 months from the same household and identify the risk factors associated with ECC.

Materials and Methods

Study population:

- The study was conducted on sibling pairs who were seen at BU Pediatric Dental clinic between January 3rd, 2023, to March 15th, 2023.
- Patients were included if they were: biological siblings under age 6, presented to their appointment with their legal guardian, and at least one sibling was diagnosed with or without ECC.
- A total of 14 eligible subjects participated in the study.

Data collection and analysis:

- Salivary samples were collected before a dental cleaning to assess the pH and *S. mutans* scores using One Step: pH Saliva and Urine and CariScreen: Caries Susceptibility Testing Swab.
- Clinical exam and radiographs were used to calculate for dmft scores.
- During the visits, parents/caregivers also answered a study questionnaire to assess oral hygiene habits, infant breast-and bottle-feeding practices, choices of foods and drinks, access to dental care, Fluoride exposure and frequent oral exam.

Results

Variables	Children with ECC N= 8	Children without ECC N= 6
Feeding practices		
Breast fed	2	0
Bottle fed	5	5
Milk/Breast milk before bed		
Yes	4	4
No	3	1
Parents/caregiver brushes child's teeth		
Yes	7	3
No	0	2
Brush with Fluoride toothpaste		
Yes	6	4
No	1	1
Brushing frequency		
1 time/day	0	0
At least 2x/day	7	5
Flossing		
Yes	2	1
No	5	4
First dental visit		
Before first birthday	2	0
Between 1-2 years	1	3
After 2 yeas	4	2
Juice consumption		
Less than 1 cup/day	0	2
More than 1 cup/day	7	3
Fast food frequency/week		
1-2 times/week	4	3
More than 3 times/week	3	1

Table 1. Influence of various factors in sibling pairs with and without ECC

Table 2. Clinical findings

	Characteristics	Mean	SD
Gender	Male	57.1% (N=8)	
	Female	42.9 % (N=6)	
Age (years)		4.1	1.03
pH		7.9	4.8
Strep. mutans		5702.9	2885.6
dmft		5.57	5.53

Results

	Concordance		Discordance		Total	
	N	%	N	%	N	%
dmft	5	57.1	2	42.9	7	100
pH	3	42.8	4	57.2	7	100
Strep. mutans	2	28.5	5	71.5	7	100

Table 3. This table represents the concordance of dmft, pH and Strep. mutans among the sibling pairs. Both siblings are counted as one concordance pair if they do or do not have ECC, pH, and *Strep. mutans* score difference between them is less than 0.5 and 500, respectively.

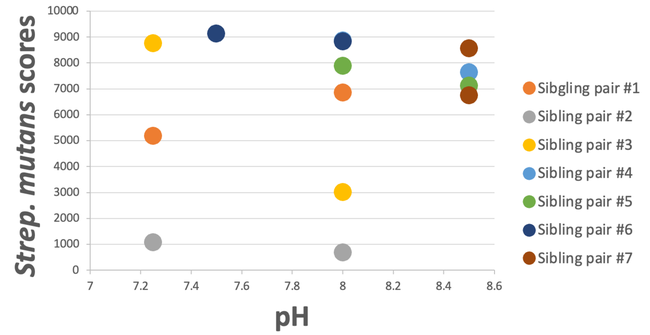

Figure 1. This figure represents the pH and Strep. mutan scores among 7 pairs of siblings

Discussion

- The CariScreen: Caries Susceptibility Testing Swab has a sensitivity of 92.86% and gives a score ranging from 0 to 9999. Patients with a score below 1500 have a low risk for caries, while scores above 1500 indicate moderate to high risk. [4] In our study, only one sibling pair had scores below 1100. Our study population was very susceptible to dental caries.
- Higher scores of *Strep. mutans* were correlated with higher dmft scores.
- The mean pH was 7.9. None of the sibling pairs had their salivary pH below the critical pH.
- 3 sibling pairs in which both siblings had ECC.
- Consuming fast-food more than 3 times/week, more than 2 cups of juice/day, and no flossing and delaying the first dental visit after 2 years of age were common risk factors associated with ECC among the children in this study.
- Our study had certain limitations that may have influenced our results extensively. The major limitation was a small sample size, in addition to the survey questionnaire, which was only available in English and had precluded the participation of non-English speaking families.

Conclusions

- High prevalence of ECC among 7 pairs of siblings.
- High concordance percentage of dmft showed both siblings have developed ECC.
- Common risk factors associated with ECC in this study included frequent fast-food/week, excessive juice consumption, inadequate flossing at home and delayed first dental visit until 2 years.
- Siblings are more likely to develop ECC when they live in the same households and share daily dietary and oral hygiene habits.

References