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# To the importance of bottle-feeding habits for the transmission of mutans streptococci from mothers to infants and their caries status among German families

Language: English

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04.07.-07.07.2001 48th Annual Congress of the European Organization for Caries Research Graz, Austria

#### **Aims and Methods**

Children are susceptible to infection by mutans streptococci (MS) between the ages of 1.5 and 3 years. The aim of the present study was to investigate those factors that could be correlated with MS transmission among German children aged 30 months.

- A questionnaire concerning the nutrition history and childhood nursing practice was completed by 155 mothers.
- The dental caries status (dmft) of 155 children was examined.
- The salivary MS of the children and their mothers were determined by Dentocult® SM strip mutans (Orion Diagnostica) (fig.1).



Fig. 1: Sampling of salivary mutans streptococci in children and their mothers by Dentocult® SM Strip Mutans

- Two isolates were picked from spatulas from 34 mother-infant-pairs. 128 isolates were identified as MS (fig. 2).
- Bacteriocine-fingerprinting was performed for all strains (n=128)

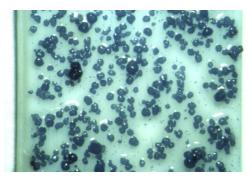


Fig. 2: Macrocolonies of mutans streptococci Fig. 3 Bacteriocinon the plastic spatula of Dentocult® SM Strip Mutans



Fingerprintig of mutans streptococci (strains of one mother and their child by inhibition zones against one indicator strain)

- Indicator strains were used:
  - S. sanguis (n = 3) S. oralis (n = 4)
  - S. gordonii (n = 1) S. mitis (n = 1)
  - S. salivarius (n = 1)

#### Results

- A graphical model (TETRAD III) was used for statistical analyses (p-value of 0.05 were considered statistically significant (fig. 4).
- It was apparent that MS and dmfs formed a separate set with the highest significance (phi 0.346).
- The caries decay of the children was registered at a mean dmft of  $0.6 \pm 2.0$ .
- Higher scores of MS correlated significantly with higher caries decay (Spearman's correlation coefficient 0.32712, X<sup>2</sup>-test p 0.0001).
- In children the upper incicors showed significant frequent decay (X²-test p 0.0001). 15% of the children had developed early childhood caries (fig. 5).
- A positive correlation could be found between high salivary MS counts in children and bottle-feeding at night (X<sup>2</sup>-test p 0.003) (fig. 4, 6).
- 65% of the mothers and 24% of the children harboured high MS counts (scores SM 2 and 3). The levels of mothers of children with and without MS were not significantly different (X<sup>2</sup>-test 0.741)
- 59% of the strains of the mother and 53% of the strains of children produced bacteriocins. S. sanguis, S. oralis, S. gordonii, S. mitis and S. salivarius were usually inhibited (fig. 7 and 8, tab. 1).
- 41% of mother-infant-pairs harboured bacteriocin producing strains. 10 profiles could be estimated for S. mutans and 3 for S. sobrinus. Furthermore, in the half of mother-infant-pairs strains with identical fingerprints could be determined (tab. 2, 3).

# Conclusion

The data suggest that bottle-feeding, especially at night, may support the fidelity of MS transmission from mothers to infant and that bottle-feeding at night may contribute to a higher caries rate.

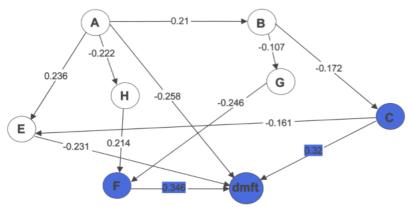


Fig. 4: Multifactorial Analyses Variables

# **Variables**

- A: Education of the mothers (1=at least class 10; 0=lower education)
- B: Occupation of the mothers (1=working; 0=no working)
- C: The child has the bottle at night (1=yes; 0=no)
- $dmft: Caries\ index\ of\ deciduous\ teeth\ (0=healthy;\ 1=carious,\ to\ summarize\ d-,\ m-,\ and\ f-components)$
- E: Visible plaque at anterior teeth (1=yes; 2=no)
- F: Scores of mutans streptococci (1=high; 0=low)
- G: Regular supervision of toothbrushing by the mothers of the children and additional toothbrushing (1=yes; 0=no)
- H: Cariogenicity of meals (1=cariogenic; 0=no cariogenic)

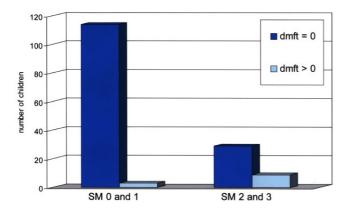


Fig. 5: Caries status of upper incisors and MS scores (n = 155 children)

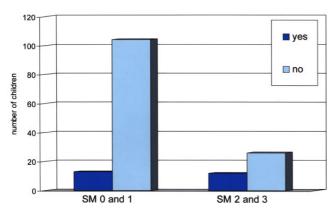


Fig. 6 Nursing bottle at night and MS scores (n = 155 children, p 0.003~s)

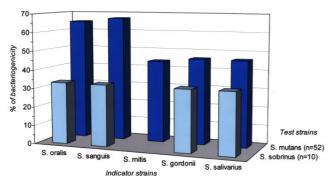


Fig. 7 Bacteriocinogeny of MS strains of mothers against indicator strains  $% \left( 1\right) =\left( 1\right) \left( 1\right) +\left( 1\right) \left( 1\right) \left( 1\right) +\left( 1\right) \left( 1$ 

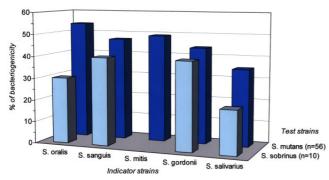


Fig. 8 Bacteriocinogeny of MS strains of infants against indicator strains

	Test strains	Indicato	r strains								
		S. sangu	ıis		S. oralis				S. mitis	S. gordonii	S. salivarius
		OMZ 9S	HG 1473	HG 1475	HG 1290	HG 1601	NS 30	NS 9	OMZ 8	HG 295	OMZ 47
MOTHERS	S. mutans $(n = 5 \text{ of } 52)$	21 ± 6	20 ± 6	17 ± 4	18 ± 5	19 ± 5	17 ± 4	20 ± 5	18 ± 4	14 ± 3	14 ± 2
	S. sobrinus $(n = 3 \text{ of } 10)$	-	20 ± 1	26 ± 3	20 ± 0	-	22 ± 1	20 ± 1	-	16 ± 1	16 ± 2
INFANTS	S. mutans (n = 31 of 56)	18 ± 5	18 ± 6	18 ± 6	16 ± 3	15 ± 3	18 ± 5	16 ± 4	17 ± 6	14 ± 2	16 ± 3
	S. sobrinus $(n = 4 \text{ of } 10)$	11 ± 0	16 ± 4	22 ± 7	23 ± 3	-	22 ± 2	21 ± 1	-	14 ± 3	18 ± 0

Table 1: Diameter of inhibition zones (x ±S D, mm) of indicator strains of oral streptococci by MS strains of mothers and infants

The median of 100 macrocolonies were determined with mean of  $7.6 \pm 0.5$  mm around the macrocolonies indicated the presence of bacteriocines

Profile	Indicator	strains				
		S. sanguis	S. oralis	S. gordonii	S. mitis	S. salivarius
S. mutans						
I	(n = 34)	+	+	+	+	+
II	(n = 8)	+	+	+	+	
III	(n = 6)	+	+		+	+
IV	(n = 4)	+	+	+		+
V	(n = 1)	+	+	+		
VI	(n = 7)	+	+			
VII	(n = 1)	+				
VIII	(n = 2)		+	+	+	
IX	(n = 1)	+	+		+	
X	(n = 2)		+			
S. sobrinus						
XI	(n = 5)	+	+	+		+
XII	(n = 1)	+	+	+		
XIII	(n = 1)	+		+		

Table 2: Profiles of bacteriocinogeny of strains of S. mutans and S. sobrinus of 14 mother-infants-pairs

	MOTHER	S								
	I	II	III	IV	V	VI	VII	VIII	IX	XII
INFANTS										
I	6			1						
II						2				
III	$(1)^1$		1 (1)		1 (13)					
IV									1 (31)	
V										
VI										
VII	1									
VIII						1 (13)				
IX	1 (33)	1 (33)								
XII										

Table 3: Identical profiles of bacteriocinogeny between MS strains of 14 mother-infant-pairs

# Literature

- Kneist S, Scharff S, de Soet JJ, van Loveren C, Stößer L: Bacteriocin production by human strains of mutans and oral streptococci. Caries Research 2000, 34, S. 308
- Rupf S, Merte K, Eschrisch K, Stößer L, Kneist S: Peroxidase reaction as a parameter for discrimination of Streptococcus mutans and Streptococcus sobrinus. Caries Research 2001, 35, S. 258-264

This Poster was submitted by PD Dr. rer.nat.habil.Susanne Kneist.

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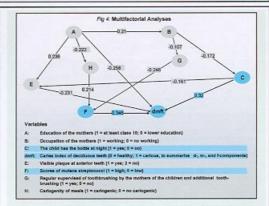
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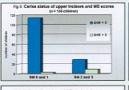
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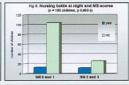
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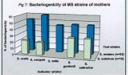
#### CONCLUSION

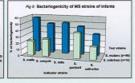
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	918	+				
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R.	910	+	+			
N.	911.5	. +	+	+		
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100	9+5	+				
	0.75		+	+		
B.	0.15					
1	0-5		. 4			
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100	845		4-			
220	Sec. 25.	141				

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