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The mode of delivery and presence of Streptococcus mutans in the saliva of newborns – preliminary results

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Introduction

Dental caries is considered to be an infectious and transmissible disease. Dental caries can occur very shortly after tooth eruption in infants and toddlers – early childhood caries (Fig. 1). Streptococcus mutans (SM) plays a major role in the etiology of dental caries in humans therefore an acquisition and transmission of SM have received an extensive attention.
Within 24 hours after birth the oropharynx of the newborns becomes rapidly colonized with bacteria. An early flora is composed of Staphylococcus epidermidis, Streptococcus viridans, gram negative bacilli and a small group of variable transient microbes.
SM is transmitted to the oral cavity of the children more frequently from the saliva of the mother who infects the child during her care, especially if herself does not keep an adequate oral hygiene, caries in her oral cavity are not treated, suffers from present periodontal diseases and neglects the basic hygiene rules. SM requires a non – shedding surface for colonization but recent studies confirmed its presence in the mouth of pre – dentate infants. In these infants SM can create colonies which adhere to the tongue mucosa, or can occure freely in the saliva.

Factors affecting an initial aquisition of SM in infants are:
- high maternal SM levels
- active caries in mother
- low birthweight infant
- pathologic conditions in oral cavity of infants (clefts, cysts)
- early tooth eruption
- low salivary IgA
- enamel defects
- mode of delivery

Purpose

The aim of our study was to find correlation between mode of delivery and amount of SM in newborns' oral cavity.

Material and Methods

A total number of 49 newborns (26 boys and 23 girls) was randomly enrolled in this study. 29 newborns were delivered vaginally – group A and 20 by Caesarean section – group B (Graph 1).

Complications of pregnancy, mode of delivery, gestational age, birthweight, health status and amount of SM in saliva were registered in newborns. Dentocult SM Strip Mutans test, Orion Diagnostica (Fig. 2) was used to detect SM in saliva. The method is based on the use of a selective culture broth and the adherence and growth of SM on the test strip. Samples of saliva were collected from tongue with the test strip (Fig. 3) and upper and lower alveolar mucosa with microbrushes (Fig. 4). The samples were incubated 48 hours in temperature 37° C. For evaluation of SM amounts in incubated samples we used own scale developed for predentate children (Fig. 5a, b, c, d). We confirmed questionable findings with conventional techniques used in microbiological laboratory. Findings in group A and B were compared using Student's t-test and chi-square test for statistical analysis.

Fig. 1: Early childhood caries

Fig. 2: Dentocult SM Strip mutans test (Orion Diagnostica)

Fig. 3: Collection of saliva with test strip from tongue

Fig. 4: Collection of saliva with microbrush from alveolar mucosa

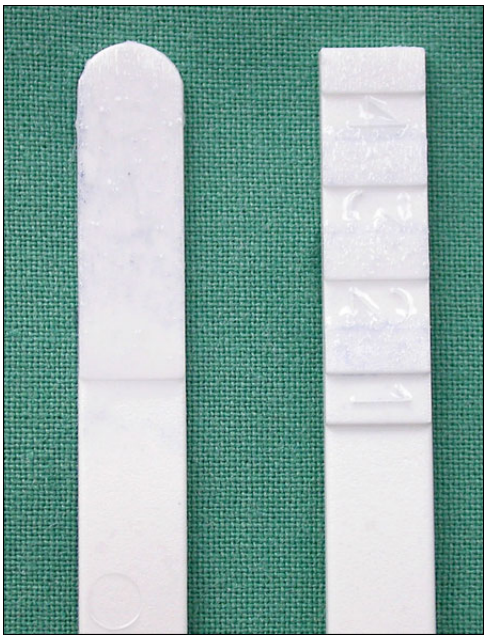


Fig. 5a: Own scale of SM colonization of newborns (degree 0)

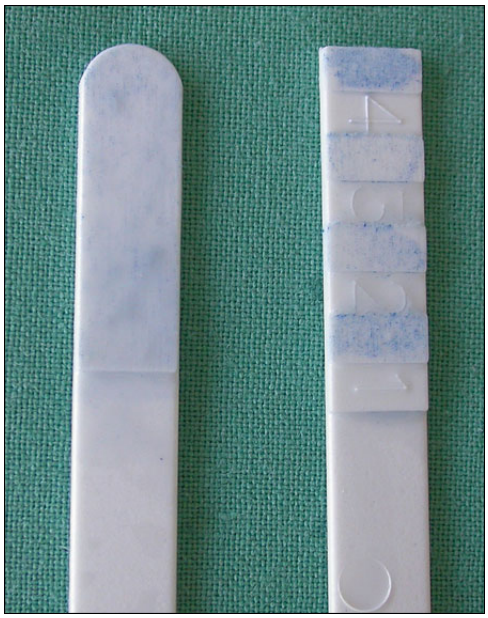


Fig. 5b: Own scale of SM colonization in saliva of newborns (degree 1)

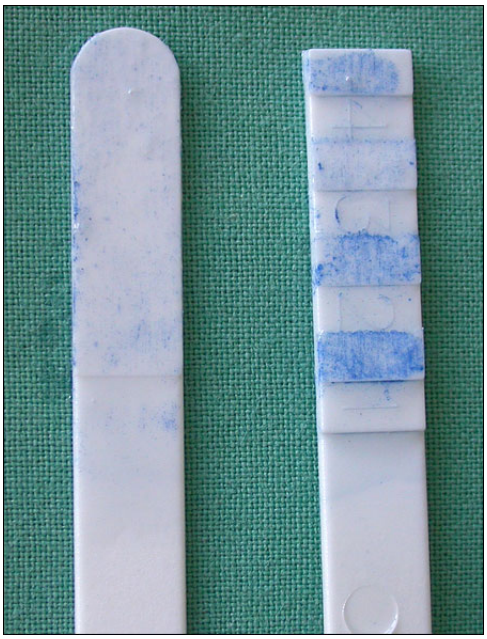


Fig. 5c: Own scale of SM colonization in saliva of newborns (degree 2)

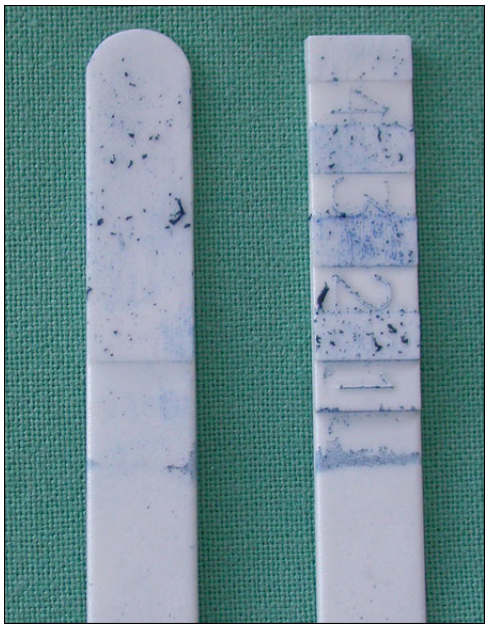
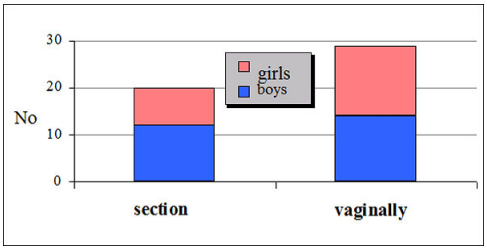


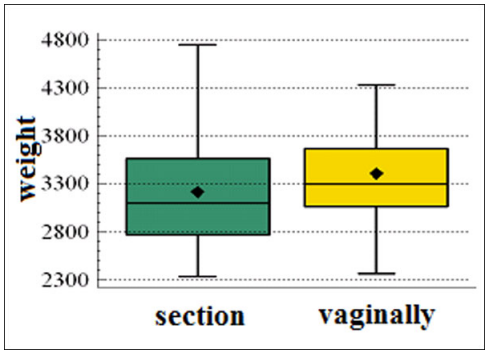
Fig. 5d: Own scale of SM colonization in saliva of newborns (degree 3)

Results

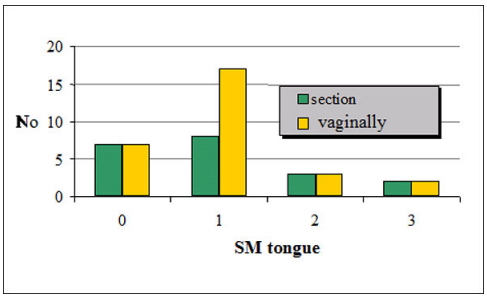
All 49 newborns have had physiologic conditions in their oral cavity. SM was detected in saliva obtained from tongue mucosa in 35 newborns (71 %) and from maxillary and mandibular alveolar mucosa in 39 newborns (79 %). Significant statistical differences were not observed between group A and B including birthweight and amount of SM from tongue and alveolar mucosa (Graf 2 and Graf 3a, b).



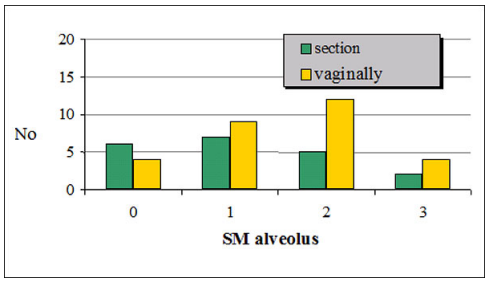
Graph 1: Number of newborns delivered with Caesarean section and vaginally



Graph 2: Birth - weight of newborns delivered with Caesarean section and vaginally



Graph 3a: Grade of SM colonization in newborns



Graph 3b: Grade of SM colonization in newborns

Discusion

Recent studies have shown that SM can colonize the mouth of predentate infants. In our study we found SM in saliva obtained from tongue and lower and upper alveolar mucosa of 2 days old newborns. We supposed vertical transmission of microbes from mother's saliva very shortly after birth.

Literature

1. Berkovitz R. J. Causes, Treatment and Prevention of Early Childhood Caries: A Microbiologic Perspective. J Can Dent Assoc 2003; 69 (5): 304-307.

2. Li Y. et al. Mode of Delivery and other maternal Factors Influence the Acquisition of Streptococcus mutans in Infants. J Dent Res 2005; 84 (9): 806-811.
3. Ramalingam L. Messer L. B. Early Childhood Caries: An Update. Singapore Dent J 2004; 26 (1): 21 - 29.
4. Tanaba Y. et al. Screening Method for Cariogenic Bacteria in Infants and Toddlers. IADR/AADR/CADR 82 nd General Session, March 10.-13. 2004, Honolulu.
5. Wan A.K.L. et al. Oral colonization of Streptococcus mutans in six - month - old predentate infants. J Dent Res 2001; 80 (12): 2060-2065.

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This Poster was submitted by Vlasta Merglová.

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Poster Faksimile:

THE MODE OF DELIVERY AND PRESENCE OF STREPTOCOCCUS MUTANS IN THE SALIVA OF NEWBORNS – PRELIMINARY RESULTS

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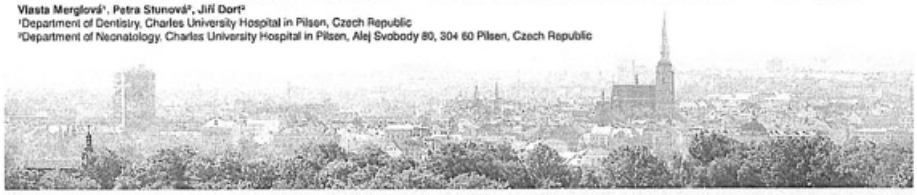

Introduction

Dental caries is considered as an infectious and transmissible disease. Dental caries can occur very shortly after tooth eruption in infants and toddlers – early childhood caries (Fig. 1). Streptococcus mutans (SM) plays a major role in the etiology of dental caries in humans therefore an acquisition and transmission of SM have received an extensive attention.
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Purpose

The aim of our study was to find correlation between mode of delivery and amount of SM in newborns' oral cavity.

Material

A total number of 49 newborns (26 boys and 23 girls) was randomly enrolled in this study. 29 newborns were delivered vaginally – group A and 20 by Caesarean section – group B (Tab.1 and Graph 1).

Methods

Complications of pregnancy, mode of delivery, gestational age, birthweight, health status and amount of SM in saliva were registered in newborns. Dentocult SM Strip Mutans test, Orion Diagnostica™ (Fig. 2) was used to detect SM in saliva. The method is based on the use of a selective culture broth and the adherence and growth of SM on the test strip. Samples of saliva were collected from tongue with the test strip (Fig. 3) and from upper and lower alveolar mucosa with microbrushes (Fig. 4). The samples were incubated 48 hours in temperature 37 ° C. For evaluation of SM amount in incubated samples we used own scale developed for predentate children (Fig. 5). We confirmed questionable findings with conventional techniques used in microbiologic laboratory. Findings in group A and B were compared using Student's t- test and chi – square test for statistical analysis.

Results

All 49 newborns have had physiologic conditions in their oral cavity. SM was detected in saliva obtained from tongue mucosa in 35 newborns (71 %) and from maxillary and mandibular alveolar mucosa in 39 newborns (79 %). Significant statistical differences were not observed between group A and B including birthweight and amount of SM in saliva from tongue and alveolar mucosa (Tab. 2 and Graph 2., Tab. 3 and Graph 3a,b).

Discussion

Recent studies have shown that SM can colonize the mouth of predentate infants. In our study we found SM in saliva obtained from the tongue and lower and upper alveolar mucosa of two-days old newborns. We supposed vertical transmission of microbes from mother's saliva very shortly after birth.

Conclusion

Our preliminary results both confirm colonization of the oral mucosa with SM in newborns early after birth and do not confirm the hypothesis that vaginal delivery in contrast to Caesarean section delivery may prevent oral cavity colonization with SM by exposing newborns to other bacteria early.

Literature

1. Berkowitz R. J. Causes, Treatment and Prevention of Early Childhood Caries: A Microbiologic Perspective. J Can Dent Assoc 2003; 69 (5): 304 – 307.
2. Li Y. et al. Mode of Delivery and other maternal Factors Influence the Acquisition of Streptococcus mutans in Infants. J Dent Res 2005; 84 (9): 806 -811.
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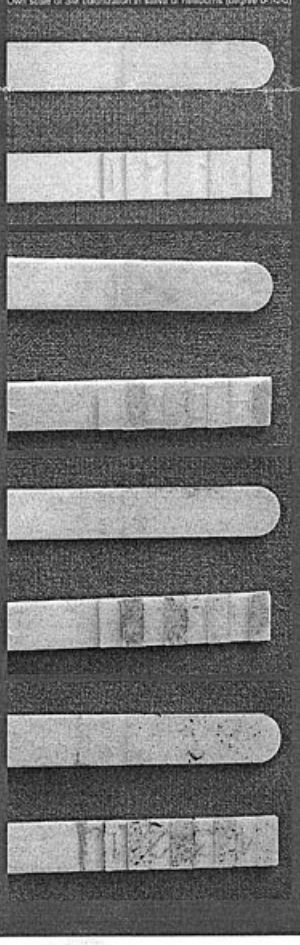
Fig. 1 Early childhood caries

Fig. 2 Dentocult SM Strip Mutans test (Orion Diagnostica™)

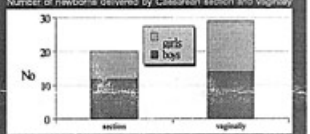
Fig. 3 Collection of saliva with test strip from tongue

Fig. 4 Collection of saliva with microbrush from alveolar mucosa

Fig. 5
Own scale of SM colonization in saliva of newborns (degree 0-1-2-3)

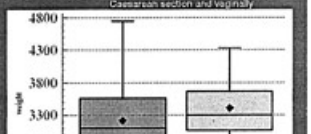


Tab 1 and Graph 1
Number of newborns delivered by Caesarean section and vaginally



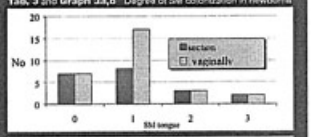
Mode of delivery	Caesarean section	vaginally
boys	12 (60%)	14 (48%)
girls	8 (40%)	15 (52%)
total	20 (100%)	29 (100%)

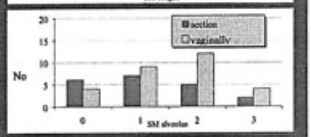
Tab. 2 and Graph 2 Birthweight of newborns delivered with Caesarean section and vaginally



Mode of delivery		Caesarean section	vaginally
Number of newborns		20	29
weight	min	2340	2200
	max	4750	4330
	mean	3214	3400
	SD	588.8	471.7
	p-value	0,23	

Tab. 3 and Graph 3a,b Degree of SM colonization in newborns





Mode of delivery	SM tongue section	SM tongue vaginally	SM alveolus section	SM alveolus vaginally
Number of newborns	20	29	20	29
min	0	0	0	0
max	3	3	3	3
mean	1	1	1,15	1,55
SD	0,97	0,8	0,99	0,91
p-value	0,44		0,15	