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*Caries intensity, salivary Streptococcus mutans
and Lactobacillus counts in 12-year-old children*

Intensywność próchnicy, liczebność *Streptococcus mutans*
i *Lactobacillus* w ślinie u 12-letnich dzieci

The presence of *Streptococcus mutans* and *Lactobacillus* in oral cavity is an essential factor in dental caries aetiopathogenesis. The quantitative determination of these two cariogenic microorganisms in saliva makes it possible to determine the direction of preventive measures in a given population.

The aim of this study was the evaluation of the intensity of dental caries and the occurrence of *Streptococcus mutans* and *Lactobacillus* in stimulated saliva in 12-year-olds from the Lublin region.

MATERIAL AND METHODS

The clinical and bacteriological examination was performed in 90 healthy 12-year-olds, 44 of them living in the big city and 46 in a small town of Lublin region. The region the examined children came from has negligible fluoride in the community water supply.

In the clinical examination permanent dentition of the examined population was assessed using the mean DMFT and the mean DMFS. The clinical examination was carried out using mirror and dental explorer, in artificial light.

In the bacteriological examination the number of *Streptococcus mutans* and *Lactobacillus* colonies in stimulated saliva was determined on the basis of Dentocult SM-Strip mutans and Dentocult LB Vivadent tests, following the producer's instructions. The subjects were sampled prior to the dental examination. Sampling and clinical examination were made at the school dental office.

RESULTS AND DISCUSSION

Dental caries intensity expressed in mean value of DMFT in the examined population of 12-year-olds amount to 4.46. Depending on the region of habitation, the mean DMFT value was a little

bit lower in a big town than in a smaller one and totalled correspondingly 4.43 and 4.49. In the examined population the average number of teeth extracted due to caries was low and totalled 0.01. The average number of teeth surfaces affected by caries (DMFS) totalled 5.62.

Salivary *Streptococcus mutans* was present in 94.44% of the children. The corresponding value for *Lactobacillus* was 100%. The quantitative distribution of the two microorganisms in the examined children's saliva is given in Tables 1 and 2.

Table 1. Distribution of *Streptococcus mutans* in saliva among the children

<i>Streptococcus</i>	No. of children
*nd	5 (5.55%)
$10^3 - 10^5$ CFU/ml	23 (25.55%)
$10^6 - 10^6$ CFU/ml	44 (48.90%)
$>10^6$ CFU/ml	18 (20.00%)
Total	90

*nd –non–detectable growth ($< 10^3$ CFU/ml saliva)

Table 2. Distribution of *Lactobacillus* in saliva among the children

<i>Lactobacillus</i>	No. of children
*nd	–
10^3 CFU/ml	10 (11.11%)
10^4 CFU/ml	16 (17.78%)
10^5 CFU/ml	39 (43.33%)
10^6 CFU/ml	25 (27.78%)
Total	90

*nd –non–detectable growth ($< 10^3$ CFU/ml saliva)

Streptococcus mutans was not detected in 5 children (5.55%) and the number of colonies coming to $10^3 - 10^5$ CFU per ml of saliva was observed in 23 children (25.55%). The majority exhibited high occurrence of the colonies: in 44 (48.90%) in range $10^5 - 10^6$ CFU per ml, and in 18 (20,00%) the highest value – above 10^6 CFU per ml of saliva. The presence of *Lactobacillus* was detected in all the

examined children. A high number of bacterial colonies was observed in the majority of the examined children: in 39 (43.33%) – 10^5 CFU per ml of saliva, and in 25 (27.78%) – 10^6 CFU per ml of saliva.

The distribution of mean values for DMFT and DMFS among children with different *Streptococcus mutans* and *Lactobacillus* counts is presented in Tables 3 and 4.

Table 3. Caries intensity and salivary *Streptococcus mutans* counts among the children

Mean value	<i>Streptococcus mutans</i>				Total
	*nd	$10^3 - 10^5$ CFU/ml	$10^5 - 10^6$ CFU/ml	$> 10^6$ CFU/ml	
DMFT	2.60	3.24	5.25	6.75	4.46
DMFS	2.80	3.77	7.67	8.23	5.62
No. of children	5	23	44	18	90

*nd –non-detectable growth ($< 10^3$ CFU/ml saliva)

Table 4. Caries intensity and salivary *Lactobacillus* counts among the children

Mean value	<i>Lactobacillus</i>					Total
	*nd	10^3	10^4	10^5	10^6	
DMFT	–	1.70	3.66	5.69	6.79	4.46
DMFS	–	1.90	4.81	7.04	8.73	5.62
No. of children	–	10	16	39	26	90

*nd –non-detectable growth ($< 10^3$ CFU/ml saliva)

In the examined group of children higher levels of *Streptococcus mutans* and *Lactobacillus* in saliva accompanied higher mean values of DMFT and DMFS. Bibliographical data show the dependence between the number of *Streptococcus mutans* and *Lactobacillus* colonies and the dental caries intensity (2, 4, 5, 8, 11, 13).

The salivary level of *Streptococcus mutans* is one of the criteria allowing for the evaluation of patient's exposure to dental caries and incorporating appropriate preventive measures (1, 6, 9, 10, 15, 16). The evaluation of *Lactobacillus* number corresponding to the amount of carbohydrates consumed and the presence of areas of microbial retention on teeth comprise an additional data, which may have an influence on the subsequent clinical procedures. The quantitative determination of *Streptococcus mutans* and *Lactobacillus* colonies makes it possible to distinguish caries high-risk group and introducing preventive programs within this group as well as their efficiency evaluation (3, 7, 12, 14).

CONCLUSIONS

1. The presence of *Streptococcus mutans* was detected in most children's saliva (94.44%), and the presence of *Lactobacillus* was detected in all children.

2. The percentage of the examined children with the highest number of *Streptococcus mutans* and *Lactobacillus* colonies in saliva pointing to high risk of caries development amounted correspondingly to: 20.00% and 27.78%.

3. High levels of *Streptococcus mutans* and *Lactobacillus* occurrence in stimulated saliva was accompanied by greater caries intensity.

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STRESZCZENIE

Dokonano oceny intensywności próchnicy oraz liczebności kolonii bakterii *Streptococcus mutans* i *Lactobacillus* w ślinie stymulowanej u 90 dzieci w wieku 12 lat. Przeprowadzono badanie kliniczne i bakteriologiczne. Stan uzębienia oceniono za pomocą średniej liczby PUW i PUWp. Określono liczbę kolonii bakterii *Streptococcus mutans* i *Lactobacillus* na podstawie testów Dentocult SM-strip mutans i Dentocult LB. Średnia liczba PUW w badanej grupie dzieci wynosiła 4,46, zaś średnia liczba PUWp 5,62. Występowanie bakterii *Streptococcus mutans* obserwowano u 94,44%, a bakterii *Lactobacillus* u wszystkich badanych dzieci. Stwierdzono większą intensywność próchnicy u dzieci z wysoką liczebnością kolonii bakterii *Streptococcus mutans* i *Lactobacillus* w ślinie stymulowanej.

