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The Role of Mineralization of Mixed Saliva in the Health of the Oral Cavity and the Influence of the Cariousness of the Teeth

Mirsalihova Firuza Lukmonovna
DSc, Docent, Tashkent State Dental Institute, Department of children's therapeutic stomatology

Burkhanova Aziza Abduganiyevna
Master of the 1st course at the Department of Children's Therapeutic Dentistry in Tashkent State Dental Institute

Abstract: The purpose of our study was to study the peculiarities of the biophysical properties and the mineralizing potential of the oral fluid in children during the period of destructing permanent teeth.

Mixed saliva performs a mineralizing function only under the condition of neutral or weakly alkaline pH value when it is oversaturated with calcium and phosphorus ions. Therefore, the physical properties of mixed saliva have a significant impact on the homeostasis of solid teeth tissues. In modern literature, work devoted to the study of the mineralizing potential and biophysical characteristics of saliva in children, contradictory.

The obtained data on the violation of the mineralizing composition and biophysical properties of the oral fluid during the period of destructing permanent teeth testifies to the appropriateness of the appointment of these ages of both the ex- and endogenous prevention of the caries of the teeth immediately after their rubberization.

Keywords: children, dental caries, saliva, mineralization, enamel resistance test.

Introduction

Relevance. Regarding to modern concepts carious process develops as a result of a complex interaction of general and local factors, which are implemented in the system "organism - saliva - enamel structure" [2,4,8,9]. Among the strong local risk factors for caries, cariogenic microflora in addition, include violation of the composition and properties of oral liquid. Mineralizing properties of oral fluid determined resistance caries dental hard tissues after their eruption, providing the enamel maturation process [2,5,8,9]. Mixed saliva performs mineralizing function only if a neutral or slightly alkaline pH, when it is oversaturated with calcium and phosphorus ions. Respectively, the physical properties of mixed saliva considerable affect the homeostasis of hard tooth tissue [2,8,9]. However, in modern scientific works devoted to the study of potential mineralizing and biophysical characteristics of saliva in children is controversial [2,3,6,7], and are very limited in the Republic of Uzbekistan.

Purpose of the study. To characterize the biophysical properties and mineralizing potential oral fluid in children during a dentition.

Material and methods. To achieve the objectives there were examined 90 children of school ages in the primary school number 42 situated Shaykhantahur district of Tashkent. Children age

7 to 12 years. This age period was chosen as the most vulnerable to dental caries, in the period of mixed dentition and dentition.

We have carried out inspection of the features of the biophysical properties of the mixed saliva in this age: the pH and buffering capacity of the oral fluid, the viscosity and the rate of secretion was studied using a test kit «Saliva-check Buffer» (GC).

Mineralizing potential of mixed saliva (MPU) has been studied by the method of PA Leus (1977). Caries tooth enamel has been studied using the FER test method VR Okushko, LI Kosarev IK Lutsk (1983).

Determination mineralizing potential of saliva (MPU)

The material for crystallographic studies was taken from the oral fluid of school pupils, which was collected on an empty stomach. Oral liquid was applied on a glass slide in a drop of 1 ml 18-25 ^{o}C and dried at a temperature in the horizontal position. Investigation of the structure of saliva samples was performed using an optical microscope.

Results and discussion. The evaluation results of the study mineralizing potential of saliva (MPS) carried out by the method of PA Leus (1977) estimate the character drawing.

1 ball-placers randomly distributed irregularly shaped structures

2 points - a fine line grid over the entire field of view

3 points, the individual crystals of irregular shape on a grid background and clumps

4 points - a medium-sized tree-like crystals

5 points - clearly large, like karkon fern or crystal structure.

MPS assessed value on the following parameters:

0-1 3,1-4,0 very low high

1.1-2.0 low 4,1-5 very high

2,1-3 satisfactory

MPS (PA Leus, 1977) also gives an indication of the oral fluid saturation of trace elements [4.12].

Sets the type of microcrystallisation in oral fluid. 1-type matched saliva rich in trace elements and is an elongated prismatic crystal structures, often with radial orientation. 2 type - consistent with the average level of micronutrients saturated saliva and looked like isometric located fragments of crystals without a clear orientation.

3-type matched saliva oral fluid poor micronutrients - scattered small isolated fragments of non-oriented crystals.

The children also performed a standard dental examination and assess the state of hard tissue of teeth, etc. with enamel resistance test (TER) and mineralized potential of saliva (IPU).

TER - Test (Okushko VR, LI Kosarev, Lutsk IK, 1983) evaluated the stability of tooth enamel to acid attack. Therefore, the method of the central incisor of the upper jaw was purified from the soft plaque 1% H2O2 solution was dried with a dry cotton swab. In the middle of the vestibular surface of the tool for 2-3 seconds pipetted mordant acid 1.5-2.5 mm in diameter. etchant then removes dry cotton swab and stained with 2% methylene blue solution. Dye rented a dry cotton swab the deleting movements, completely taking off the enamel surface. Etched portion is painted in blue color of varying intensity. To evaluate the intensity of staining was used a 10-point scale typographical tint of blue from 1.0 to 10.0 points color intensity.

If the color intensity from 1.0 to 3.0 children surveyed are at high caries (HCR) group, painting 4-5 moderate (RBM), the color of 6-7 points lower (LCR), the color of more than 8 points - very low (VLCR), the maximum risk of caries.

In assessing the results of the study FER test set that out of 90 students surveyed in only 18 (20%) of children set a high level of KR tooth enamel (WRC), the remaining 82 (80.0%) children had a different level of the CD. So in 24 (26.7%) patients were identified moderate KR (RBM) in 27 (30.0%) lower the Kyrgyz Republic (LCR) and 21 (23.3%) children is very low Raman (VLCR) (Table. 1).

(Table. 1).

Index of TER-test

Number of examined children	HCR		NCR		LCR		VLCR	
	abs	%	abs	%	abs	%	abs	%
90	18	20,0	21	23,3	27	30	24	26,7

Analysis of the data table shows that the majority of children studied (56.7%) have a low or very low resistance of teeth to acid exposure that forecasts about the development of multiple dental caries. When the study results MPS study in primary school children found that in children with SRS tooth enamel in 50.0% of cases had a high level of MEA and 11.1% had a very high level of the IPU, the remaining 38.9% satisfactory. Children with low or very low MPS absent.

In the study of the Ministry of Railways in the second RBM children, as shown by the table number 2 was dominated by students with mild MPS level - 71.4%, the lowest MPS is set at 19.0%, the highest level was observed in only 9.9%. Students with very high and very low levels of MPS no.

Children with LCR tooth enamel in 51.8% of cases diagnosed MPS low in 25.9% of cases satisfactory. In 22.2% of cases registered with the Ministry of Railways is very low. High or very high MPS is detected.

The frequency of the level of the IPU in children, depending on the tooth enamel caries

Table2

Index of TER	1group, n=18 HCR		2 group, n=21 NCR		3 group, n=27 LCR		4 group, n=24 VLCR	
Level MPS	abs	%	abs	%	abs	%	abs	%
Very low, 0-1	-	-	-	-	6	22,2	9	37,5
Low, 1,1-2	-	-	4	19,0	14	51,8	12	50,0
Satisfactory, 2,1-3	7	38,9	15	71,4	7	25,9	3	12,5
High, 3,1-4	9	50,0	2	9,9	-	-	-	-
Very high, 4,1-5	2	11,1	-	-	-	-	-	

In the fourth group of children with enamel VLCR established the predominance of low and very low MPS respectively 50.0% and 37.5%. Satisfactory MPS 12.5% of cases. High and very high MPS completely absent.

Thus the analysis of the data indicates a violation of mineralizing function of oral fluid in children of primary school age, expressed decrease mineralizing potential of saliva at the LCR and VLCR tooth enamel.

It revealed a direct correlation relationship between the studied parameters of CR tooth enamel and the IPU. Since the first lower productivity promotes the deterioration of the second and they are interdependent.

Studying of mineralizing potential of oral fluid in primary school children also has substantial diagnostic value for identifying the development opportunities of cariogenic situation in the oral cavity in primary school children during the period of the dentition.

The oral liquid is one of informative biological fluids in the human body. It plays a significant role in the regulation of homeostasis of the oral cavity. During the study, various parameters of the oral liquid can be used as a marker of a number of diseases of the oral cavity.

Therefore, the diagnostic value of MPS oral liquid children is unquestionable. In accordance with the received data it is advisable to carry out a test control mineralizing potential of mixed saliva to predict possible development of cariogenic situation that contributes to the early diagnosis of the establishment of increased cariogenic situation and timely appointment of prophylactics.

Conclusion. It was determined the four degree of resistance to tooth decay HCR, NCR, LCR VLCR. The changes of the biophysical properties of mixed saliva: decrease of pH, buffer capacity and rate of saliva secretion in the LCR and VLCR tooth enamel in children which is a forecast of possible development of an active flow of caries during the eruption of permanent teeth in children and appropriateness of the destination as the exo and endogenous caries prevention immediately after the eruption.

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