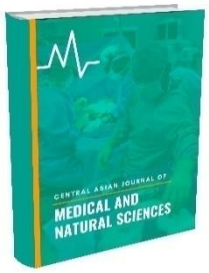
CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES



Volume: 04 Issue: 05 | Sep-Oct 2023 ISSN: 2660-4159

http://cajmns.centralasianstudies.org

Diagnosis of the Risk of Caries in Children of Prechool Age Using Express Methods

1. **Rikhsieva Dilorom Furqat qizi**
2. **Abdullayev Jaxongir Ravshanovich**

Received 2nd Aug 2023,
Accepted 19th Sep 2023,
Online 28th Oct 2023

[1,2] Tashkent state dental institute, Tashkent, Uzbekistan

Abstract: The modern concept of minimally invasive intervention in dentistry is based on assessing the risk of disease development, predicting its course and outcome, controlling risk factors, and early diagnosis. This approach allows for the most effective preservation of dental health in the population. The application of predictive methods and risk assessment for tooth decay at communal, group, and individual levels forms the basis for planning the prevention and treatment of this condition.

Key words: caries, prediction, diagnosis, Streptococcus mutans.

Relevance:

The infectious theory of caries development is widely recognized, with streptococci and lactobacilli playing a crucial role in its progression. The primary causes of destructive processes in tooth structure are the cariogenic microflora of dental plaque, underdeveloped tooth structure (congenital and acquired), impaired enamel mineralization, and inadequate oral hygiene [1]. Saliva, with its qualitative parameters, also plays a significant role in the pathogenesis of caries. The complexity of saliva's physiological role and its susceptibility to external and internal factors make it a subject of interest for research [2]. Studying integral indicators of oral fluid helps in understanding the mechanisms of enamel remineralization and the development of carious processes, and it may also have potential applications in predicting dental pathology.

Currently, express methods are used for studying the microbial composition of the oral cavity and integral indicators of saliva, which are relatively simple and convenient, especially for children in dental clinics[3]. One such method is the "GC Saliva-Check mutans." The key advantages of this diagnostic system include reliability, patient-friendliness, identification of specific local risk factors, and the ability to be conducted in a dental office without the involvement of other specialists or lengthy laboratory investigations.

In combination, these methods help assess the oral cavity's homeostasis and predict the development of carious processes in children. In a clinical setting, this allows for individualized preventive measures and significantly improves their effectiveness. Predicting the risk of caries development in a child holds significant potential for its prevention and treatment, including the organization of dynamic observation[4].

High prevalence and intensity of dental caries, along with regional variations in primary prevention methods, remain a significant issue in modern dentistry [5]. The prevalence of caries in deciduous teeth in 3-year-old children varies from 15% to 75% with an average intensity of 3.6. For 6-year-old children with deciduous teeth, the prevalence can go up to 78% with an intensity of 4.89, while for permanent teeth, it's around 35% with an intensity of 0.40 [6]. Enhancing comprehensive caries prevention for children can significantly improve their dental health status and prevent functional disorders of the stomatognathic system.

Adequate individualized prevention is based on determining the risk of caries. The risk level can be assessed through two methods:

1. Evaluating the presence and intensity of pathogenic (plaque, sugar consumption) and protective (e.g., fluoride prophylaxis) factors.
2. Assessing the results of the action of these factors.

A microbiological parameter involves assessing the presence of Streptococcus mutans and Lactobacillus in saliva, which are recognized as crucial microorganisms for caries development. The colonization of saliva by microorganisms positively correlates with the bacterial count in dental plaque [7]. The balance between the autochthonous transitory flora on the tooth surface (supragingival plaque) and the obligate flora leads to enamel demineralization, with an increase in the number of microorganisms such as S. mutans and Lactobacillus, associated with a decrease in pH (down to 5.0-4.5). The majority of oral cavity microorganisms are localized in dental plaque, with 70% of the volume of dental plaque consisting of microbes. Measuring the level of microorganisms in saliva can be useful for determining caries risk in patients and for monitoring preventive measures.

Caries can be seen as an infectious disease. Parents can transmit Str. mutans to their children, and early infection of Str. mutans in children can lead to early and multiple carious lesions in primary teeth. These teeth can serve as a source of infection for permanent teeth, maintaining carious infection until the full development of adult teeth. Identifying high or low bacterial titers in children can be used to control their diet, oral hygiene, and other preventive procedures. Thus, better caries prediction is possible.

Three main approaches to caries prevention have been identified based on the multifactorial nature of caries:

1. Increasing tooth resistance (using fluoride applications).
2. Reducing carbohydrates in the diet, as bacteria, primarily Streptococci, synthesize extracellular polysaccharides more rapidly when provided with sucrose as a substrate. Sucrose is considered the most cariogenic of all sugars [8].
3. Reducing or inhibiting microbial activity (chemical substances, e.g., chlorhexidine can reduce the number of Streptococci and other microorganisms) [9].

Materials and Methods:

We conducted a study involving 20 children aged 3 to 6 years. The average caries intensity in the examined group was 3.5 (dmft index). Since the patients had primary dentition, the oral hygiene level was assessed using the Fedorova-Volodkina index. The research was carried out in the morning after breakfast and in the evening before dinner.

We determined the presence of Streptococcus mutans in saliva using the SALIVA-CHECK MUTANS kit. At high concentrations of Streptococcus mutans in saliva, the bacteria react with colloidal gold particles labeled with S. mutans monoclonal antibodies present in the testing device. Specifically,

colloidal gold particles settle on the surface of Streptococcus mutans. The resulting bacteria then react with other S. mutans antibodies, leading to the appearance of a red line in the test window. Colloidal gold-labeled S. mutans monoclonal antibodies that do not react with Streptococcus mutans react with immunoglobulin in the Control C window, forming a control red line. The patients were given chewing wax and asked to chew for one minute to stimulate saliva secretion. Afterward, a saliva sample was collected in a container, and the volume of the obtained sample had to reach line A. The collected saliva was then mixed with reagents.

The SALIVA-CHECK MUTANS test kit includes the following reagents:

- Reagent #1: NaOH solution.
- Reagent #2: Organic acid solution.

Initially, one drop of reagent #1 was added to the saliva sample. The container was sealed with fingers, and the mixture was stirred for 10 seconds. Then, four drops of reagent #2 were added and mixed for several seconds. The color of our saliva sample changed to light green (indicating a shift from alkaline to neutral pH). After adding the sample to the Control (C) window of the testing device, a broad red line appeared, indicating the start of the test. The result was assessed 15 minutes later.

The test result was considered positive if a thin red line appeared in the Test (T) window, indicating a high concentration of Streptococcus mutans (>5x10^5 colony-forming units/ml of saliva), signifying a high risk of future carious lesions for the patient. If a red line did not appear after 15 minutes, it indicated a low concentration of Streptococcus mutans in saliva, and therefore, a low risk of carious lesions at that time.

Results and Discussion:

The data from our research are presented in the table.

Table 1. Distribution of Caries Risk by Time of Day

Time of Day	Caries Risk	Number of Participants	Fedorova-Volodkina Index
Morning	High (>5x10^5 CFU/ml)	5	2,3
	Low (<5x10^5 CFU/ml)	15	1,8
Evening	High (>5x10^5 CFU/ml)	12	3,1
	Low (<5x10^5 CFU/ml)	8	2,0

Our research showed that the concentration of Streptococcus mutans is low in the morning. For most children, this can be attributed to a satisfactory and good level of oral hygiene in the morning hours. In the morning, with an average Fedorova-Volodkina index of 2.3, a high level of Streptococcus mutans in saliva (>5x10^5 CFU/ml) was detected in 5 individuals, representing 0.25%. A low level of Streptococcus mutans in saliva (<5x10^5 CFU/ml), with an average Fedorova-Volodkina index of 1.8, was found in 15 individuals, accounting for 75% of the participants. In the evening, a high level of Streptococcus mutans in saliva (>5x10^5 CFU/ml), with an average Fedorova-Volodkina index of 3.1, was identified in 12 individuals, representing 60%. A low level of Streptococcus mutans in saliva (<5x10^5 CFU/ml), with an average Fedorova-Volodkina index of 2.0, was observed in 8 individuals, accounting for 40%. According to the survey, children do not brush their teeth or perform any oral hygiene measures after lunch, which results in decreased hygiene levels and an increased concentration of Streptococcus mutans in saliva (Table 1).

Conclusions: After undergoing caries risk assessment, children will have a better understanding of how they can reduce the likelihood of developing new carious lesions through proper oral hygiene practices, either independently or with the help of their parents. The main positive features of the

diagnostic system used include reliability, patient-friendliness, identification of specific local risk factors, and the ability to be conducted at a dental appointment without the involvement of other specialists or lengthy laboratory research.

References:

1. Nikolaevna - Associate Professor, Ph.D., Assistant of the Department of Pediatric Dentistry, 89103468830
2. Blinkbom, A.S. Joint epidemiological survey on dental health of 12-year-old school children in Dublin and Glasgow. A.S. Blinkbom // Community Dent. Oral Epidemiol. - 1992 - Vol. 20 - No. 3 - pp. 307-308.
3. Bian, Z. Caries experience and oral health behavior in Chinese children with cleft lip and/or palate. Z. Bian, M. Du, R. Bedi // Pediatr. Dent. - 2001 - Vol. 23 - No. 5 - pp. 431-434.
4. Bratthall, D. Dental caries: Intervened. Interrupted. Interpreted. Concluding remarks and cartography. D. Bratthall // Eur. J. Oral Sci. - 1996 - Vol. 104 - No. 4 - pp. 486-491.
5. Kuzmina, E.M. Dental Disease Prevention. A textbook. - Polimediapress, 2001 - p. 216.
6. Suntsov, V.G., Leontyev, V.K., Distel, V.A., Wagner, V.D. Dental Prophylaxis in Children. - Moscow: Medkniga; Nizhny Novgorod: Publishing House of NGMA, 2001 - p. 344.
7. Journal "Pediatric Dentistry and Prevention" - 2009 - Vol. 8 - No. 1 (28).
8. Jean-Francois Rule, Stefan Zimmer. Professional Prevention in Dental Practice. - Moscow: MEDpress-inform, 2010 - pp. 90-91.
9. E.A. Skatova, M.K. Makeeva, A.A. Shakaryants. Practical Aspects of Caries Risk Assessment. "DentalU" - 2010 - No. 6 - pp. 24-25.