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THE ROLE OF CARIOGENIC AND PROTECTIVE FACTORS IN THE PREVENTION OF CARIES

Axmedova Malika Qilichovna,
Xafizova Muxarram Nematilloyevna
Irgashev Ibodullo Ergashevich
Asian International University
Bukhara, Uzbekistan
Email: axmedovamalika1982@gmail.com

Abstract: Dental caries is a multifactorial infectious disease that can develop at any age of the patient (at an early age, in adolescence and in adults) throughout life, leading to demineralization of the enamel with the formation of a carious cavity. According to the World Health Organization (WHO), dental caries remains a significant problem in most developed countries of the world, affecting 60 to 90% of schoolchildren and the vast majority of adults.

Keywords: dental caries, microbial biofilm, fluorides, arginine, remineralization, neutralizer.

The main risk factors for the development of caries are: highlight the role of cariogenic microorganisms of the oral cavity (Streptococcus Mutans, Lactobacilli, et all), nutrition with a predominance of easily digestible carbohydrates, changes in the properties and composition of saliva, socio-economic level of the family, dental visits and others. In addition to cariogenic factors, which constantly and continuously affect the hard tissues of the teeth, leading to demineralization of the enamel, there are protective mechanisms (composition and properties of saliva, fluorides) that can shift the balance towards the remineralization process. Thus, the carious process can be stopped and even reversed if the integrity of the hard dental tissues is preserved.

Clinical studies prove that the level of oral hygiene plays a significant role in the development of dental caries. Dental plaque is a complex biofilm that forms over time on the surface of the enamel, especially in areas that are difficult to reach with a toothbrush (contact surfaces of teeth, cervical area), as well as on the mucous membrane of the soft tissues of the oral cavity (dorsum of the tongue, mucous membrane of the cheeks, alveolar processes). It has been proven that up to 1000 species of microorganisms are colonized in the thickness of dental plaque, depending on its maturity and localization

The process of caries development consists of a shift in the balance between cariogenic and protective factors: if cariogenic factors predominate in the oral cavity, then the demineralization process dominates, if protective factors, then

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remineralization starts and the development of caries stops. Alternation of cycles of de- and remineralization can occur for a long time until the “end point” is reached - the formation of a carious cavity. The fact that the development of dental caries is a dynamic process and at the initial stages is reversible is of particular importance in the treatment and prevention of caries, and early diagnosis of lesions allows for timely prevention and treatment of focal demineralization.

The use of modern techniques improves the process of diagnosing caries and makes it possible not only to identify the lesion long before the formation of a cavity, but also to clearly assess the degree of its severity.

Prevention of caries

The fact that dental caries is a dynamic and reversible process is the basis for caries prevention. Fluoride has been used to prevent caries for more than 70 years. Numerous clinical studies have proven that fluorides stabilize demineralization and accelerate the process of remineralization of hard dental tissues. The WHO Expert Committee confirms the importance of regular oral hygiene using fluoride-containing preparations to maintain oral health at the population level. The use of endogenous and exogenous methods for the prevention of dental caries significantly reduces the increase in caries. According to WHO, fluoridation of drinking water reduces the prevalence of dental caries by 15.0%, the use of fluoride-containing toothpastes and mouth rinses reduces the increase in caries by 24-26%. Fluoride ions promote the incorporation and retention of calcium and phosphate ions into the enamel structure, forming a compound called fluorapatite, which is more resistant to acids than tooth enamel. At the same time, there is no reliable evidence that the use of fluoride is harmful to the body.

The recommended concentration of fluoride in drinking water, salt, and toothpastes depends on age, the degree of risk of caries, and the concentration of fluoride in water in a given region, which is important for reducing the likelihood of developing fluorosis.

The most accessible and widespread method of fluoride prophylaxis at the mass level remains regular daily oral hygiene. Despite the fact that the vast majority of toothpastes for adult patients on the market are fluoride-containing, the intensity and prevalence of caries still remains high.

Numerous studies have shown that the incidence of dental caries is correlated with low levels of oral hygiene and poor quality tooth brushing. Taking this fact into account, there is a need to create technologies that can not only influence the processes of de- and remineralization in the hard tissues of teeth, but also suppress the pathogenicity of plaque on the enamel surface.

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