

EPIDEMIOLOGICAL FACTORS INFLUENCING THE PREVALENCE OF ORAL MUCOSAL DISORDERS AND DENTAL CARIES: AN UPDATED LITERATURE REVIEW

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Summary. Oral mucosal disorders and dental caries remain among the most widespread conditions affecting global populations, with their prevalence influenced by a complex interaction of environmental, microbiological, and behavioral factors. Recent epidemiological studies demonstrate a steady increase in both mucosal pathologies and carious lesions across various age groups, especially among children and adolescents. Understanding the early mechanisms of demineralization, alterations in oral microbiota, and host susceptibility is essential for developing targeted preventive strategies. This literature review synthesizes contemporary data on the distribution, clinical features, and risk determinants of oral mucosal disorders, while highlighting their relationship with dental caries progression. Emphasis is placed on modern preventive approaches, including remineralization therapy and microbiome-modulating interventions, which are crucial for improving oral health outcomes.

Keyword. oral mucosal disorders; dental caries; oral microbiome; epidemiology; prevention; remineralization therapy.

ЭПИДЕМИОЛОГИЧЕСКИЕ ФАКТОРЫ, ВЛИЯЮЩИЕ НА РАСПРОСТРАНЁННОСТЬ ЗАБОЛЕВАНИЙ СЛИЗИСТОЙ ОБОЛОЧКИ ПОЛОСТИ РТА И КАРИЕСА: ОБНОВЛЁННЫЙ ОБЗОР ЛИТЕРАТУРЫ

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Аннотация. Заболевания слизистой оболочки полости рта и кариес зубов остаются одними из наиболее распространённых патологий среди населения различных регионов мира, а их распространённость определяется сложным взаимодействием экологических, микробиологических и поведенческих факторов. По данным современных эпидемиологических исследований, наблюдается устойчивый рост частоты как поражений слизистой оболочки, так и кариозных процессов среди различных возрастных групп, особенно у детей и подростков. Понимание ранних механизмов

деминерализации, изменений орального микробиома и индивидуальной восприимчивости организма имеет ключевое значение для разработки целенаправленных профилактических мер. В обзоре обобщены современные сведения о распространённости, клинических проявлениях и факторах риска заболеваний слизистой оболочки полости рта, а также подчеркнута их взаимосвязь с прогрессированием кариеса. Особое внимание уделено современным профилактическим подходам, включая реминерализующую терапию и методы коррекции микробиома, имеющим важное значение для улучшения стоматологического здоровья населения.

Ключевые слова: заболевания слизистой оболочки полости рта; кариес зубов; оральный микробиом; эпидемиология; профилактика; реминерализующая терапия

Oral hygiene is an important factor that affects the development of caries. Thorough and regular brushing of teeth can partially compensate for the effect of other factors (early infection with *Str. mutans* and excessive consumption of easily fermentable carbohydrates) [2].

However, many parents believe that there is no connection between the health of temporary and permanent teeth and therefore do not pay due attention to oral hygiene [15]. It should be borne in mind that young children do not need dental care, this procedure should be performed for them by adults [2]. It is important that parents start brushing their children's teeth in a timely manner. Even before the first teeth appear, mom or dad needs to clean the child's mouth using a napkin moistened with boiled water or a rubber fingertip. About six months, when the first teeth erupt, you need to start using a soft baby brush, which should be changed every 3 months, and a paste with a calcium content. It is necessary to brush your teeth in the morning before Breakfast and in the evening after the last meal [9].

For regions that are endemic in terms of fluoride content in water, you can use fluoride-containing pastes. However, recommendations for the age at which these products can be used and dosage vary from country to country and from organization to organization (for more information, see the sub-Chapter on the role of fluoride compounds). It is important that parents gradually impart knowledge and lay the foundations of hygiene education according to the age of the child to develop habits first, and then in the future to form a persistent skill of brushing teeth [10]. Starting from 2.5-3 years of age, many children begin to brush their teeth themselves, but due to immaturity of motor skills and lack of persistent skill, the child will not be able to fully and correctly conduct oral hygiene on their own.

Parents should be supervised and assisted in brushing their teeth [3].

It should be taken into account that the family lifestyle, hygiene habits and knowledge of dental health of parents are a factor directly related to the possibility of developing caries in their children [12].

To date, experts have proposed a variety of methods, measures and means for the treatment and prevention of dental caries [12, 17]. According to modern research, xylitol has proven itself to be a natural sweetener that does not give in to fermentation, and therefore is not perceived by bacteria. The ability of xylitol to restrain the adhesion of pathogenic microorganisms to the surface of teeth, block the reproduction and formation of acids of pathogenic microorganisms, and reduce the titer of *S. mutans* in saliva and plaque is confirmed by some experimental works [1]. At the same time, the scale of research does not give a reason for the widespread introduction of xylitol [19]. This is contradicted by the results of using xylitol in young children [5, 8]. The authors achieved a reduction in the increase in the intensity of dental caries by 86.7 % [15]. Walsh L. J.'s works are devoted to the effect of ultraviolet rays on biofilms [5].

There are data on the use of triclosan and chlorhexidine-agents aimed at the effect of a bacterial factor, but their use in the practice of a pediatric dentist is difficult [20]. Other authors do not agree with this: when applying 40% chlorhexidine varnish, the caries growth rate was reduced to 38 % [9]. At the same time, a systematic review of the literature showed that the evidence for the caries-preventive effect of chlorhexidine varnish in children was inconclusive [5]. Artyunov et al. it is recommended to use a polymer film "diplen f" for children, containing a complex of sodium fluoride and chlorhexidine. The authors proved the effectiveness of application and caries-static effect by combining "diplen f" with "R. O. C. Sbaby" toothpaste [4]. Studies have shown that the local use of calcium-phosphate-containing products "R. O. C. S. MedicalMinerals" for two years can significantly reduce the growth of dental caries in children [10]. To restore the areas of enamel demineralization and increase its caries resistance, calcium, phosphate, and fluoride preparations contained in a solution of calcium gluconate, remodent, and GCToothMousse are used [13]. The effectiveness of a favorable effect on the hard tissues of the tooth is estimated by reducing the growth of caries by 50-60 % [14]. GCToothMousse is not used in patients with a burdened allergic history [5]. The positive effect of the remineralizing gel "Belagelsa/R", developed by the company "Vlad Miva", is demonstrated by [7].

Quite recently, in order to prevent dental caries in children, probiotics have been introduced, among the positive properties of which are the ability to normalize the microbial landscape due to the production of bacteriocin, adhesion

retarders [5], and according to SookheeS. [4], inhibit the growth of cariesogenic bacteria.

A significant contribution to the inadmissibility of the development of carious disease is played by fluorine ions, which was reflected in the previous studies [12]. The ability to restore fluoride is shown in the foci of destructive enamel, if the content of this trace element in the oral fluid is 0.1 mg/liter. At low values of this trace element in drinking water, the desired concentration can not be achieved. Therefore, endogenous and exogenous prevention of dental caries is particularly relevant in endemic areas [8]. As an external source of fluoride, according to various prevention schemes, pastes [2], rinses, gels, varnishes, foams [16] are offered, including the active use of non-invasive and invasive sealing of fissure [1]. In the literature, various methods of endogenous use of fluoride are proposed by enriching drinking water, salt, milk with it, or by taking sodium fluoride tablets as prescribed by a doctor. The effectiveness of the method is estimated by reducing caries by 50-60 %, but due to the cumulative effect, prolonged use on a regular basis is important [14].

Local use of fluoride-containing products involves the use of toothpastes, fluoride-containing lacquers: Duraphat, Bifluorid 12, FluorProtector, gels: NurpoAPF, Elmex, Silcot-varnish, FluocalGel, Fluor-Dose-varnish, solutions of sodium fluoride for rinsing and applications, enamel-germitizing liquid. The effectiveness of the method is estimated by reducing caries by 30-40 % [14]. The use of 0.2% fluoride in liquid form as an application is considered a common, affordable and proven method for the treatment and prevention of dental caries [7]. The fluoridation method based on fluorinated varnish is widely used [3]. This form is most convenient when working with young children. According to Maslak E. E., as a result of applications using ColgateDuraphat varnish in children under five years of age, after nine months, the foci of demineralization stabilized in 80 % of cases, and the depth of foci of carious lesions significantly decreased by 76 % [6]. However, it is important to personalize the amount of fluoride with a focus on the year of life of the child and the content of this compound in the drinking water of the region, in order to achieve a balance between the risk of fluorosis and caries static effect.

At this time, the use of fluoride-containing pastes in children is regulated by professional communities in different ways. There is no approved basis for dosage, volumes, and age limits, based on which the predicted effect of using pastes with microdoses of fluoride is possible [9]. The U.S. centers for dental disease control and prevention (CDCP) allows children under two years of age to use fluoride-containing toothpaste. A little earlier-from a year and a half, the use of fluoride-

containing paste is allowed by the Australian scientific center for dental health of the population [19]. The European Academy of paediatric dentistry [16], the Scottish Intercollegiate information organization (SIGN), the German dental Organization (DGK), and the American Academy of paediatric dentistry [11] suggest the use of fluoride-containing pastes when children have their first tooth. Experts in the national recommendations of the British paediatric dental community and who consider the use of fluoride-containing drugs to be real and do not set an age limit [20]. In areas with insufficient saturation of fluoride ions in drinking water (less than 0.3 mg/l) [5], according to the requirements of professional dental associations, European and American unions [16], a comprehensive administration of systemic and local fluorides for the prevention of caries in children has been tested. However, the possibilities of using and confirmed data on the usefulness of regenerative therapy for early childhood caries are not sufficiently developed. Taking into account the peculiarities of the initiation, development and course of caries in young children, it is urgent to develop and implement a method based on reducing the formation of plaque, inactivation of pathogenic microbial communities, in the prevention and treatment of dental caries in the most vulnerable population [12]. In New Zealand, the development of a caries prevention Program is based on studying the level of women's hygiene knowledge and teaching them individual oral hygiene [13]. A review of numerous foreign sources showed mandatory training of pediatricians in the main issues of prevention of dental diseases [6].

Thus, the analysis of literature data has shown that dental caries in children is a multi-factor economically and socially significant health problem, which requires a systematic, thorough approach. Assessment of the strength and degree of exposure to risk factors for this disease should be carried out in the conditions of a particular patient, taking into account the stage of development and age - related features of the structure of baby teeth, as well as Exo-and endogenous circumstances.

Some of the risk factors for developing caries of baby teeth are associated with more or less objective circumstances (the state of the environment, the level of General somatic health of the mother, the course of pregnancy and childbirth), so "attempts to influence them by patients" and the dentist are restrictive, only some of their correction is possible. However, a large group is occupied by risk factors that completely depend on the behavior of the child and his parents (the nature of nutrition, oral hygiene, motivation to maintain dental health, etc.) and can be minimized both by the dentist and by self-help measures [17, 22]. The well-known fragmented and antagonistic research on the timing of teething, as well as

the polyethological nature of the impact on the development of aggressive dental diseases, dictates the need to consider regional and ethnic features of the course of caries in young children, taking into account a differentiated approach in order to develop and implement a prevention Program. At the same time, these factors will be the main objects that determine the scope and direction of therapeutic measures.

Thus, the search for new effective therapeutic and preventive measures that increase the resistance of enamel to acids in caries, increase the overall immunity of the body and reduce the risk of developing inflammatory periodontal diseases is currently ongoing [2, 10].

A large number of calcium-containing preparations are offered for the treatment and prevention of dental caries. In our country, a 10% solution of calcium gluconate is widely used for application and electrophoresis, while the incidence of caries is reduced by 19,6-39,4% [8, 16].

For the treatment and prevention of caries, fluoride preparations are also used in various types and modifications, ranging from centralized fluoridation of drinking water, salt, milk to their use in various hygiene products (toothpastes, gels, elixirs, etc.) [4]. Currently, there are only a few reports of alternative effective means of caries prevention [13]. An important part of the treatment of initial caries is strict compliance with the rules of oral care, the purpose of which is to prevent the formation and long-term existence of plaque in the area of demineralization. In addition, it is necessary to convince the patient to monitor the nature of the diet: reduce the use of carbohydrates and exclude them in the intervals between meals [12,11].

Currently, drugs of hemoptysis officinalis that have antimicrobial, analgesic, hemostatic and astringent effects are widely used [1, 4]. Polyphenolic compounds, in particular tannins, among which hydrolyzable tannins predominate, are considered to be the active substances of hemoptysis [12]. Tannin-containing substances are used in medicine, mainly to lubricate the skin with burns, cracks, ulcers. However, almost nothing is known about the inhibitory effect of tannin-containing herbal preparations on plaque microorganisms [6]. Tannins reduce the viability of pathogenic bacteria. Under their action, numerous bacterial flagella shorten and lose their mobility, which significantly complicates the process of attachment of bacteria to epithelial cells [5]. In dental practice, clove buds containing essential oil, tannins, mucus and fats are used. The purulent component (up to 85%) of the essential oil is eugenol, which has a strong antiseptic effect. The composition of hadidentified, acetylamino, a mixture of bicicletasaran, chavicol, methyl salicylate, and Humulin. Clove oil has an anti-inflammatory, wound-healing, analgesic, cauterizing effect [4].

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