

NON-CARIOUS LESIONS OF HARD TISSUES OF DENTAL TISSUES ETIOPATHOGENESIS, TREATMENT AND PREVENTION

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Abstract:An analysis of literature data revealed that disruption of the morphological and chemical structure of tooth enamel and dentin plays a role in the pathogenesis of non-carious lesions of dental hard tissues, leading to a decrease in the resistance of dental hard tissues. Somatic diseases in women during pregnancy, particularly endocrine pathology, as well as environmental, occupational, nutritional, and social factors, also play a significant role in the development of non-carious lesions of dental hard tissues.

Keywords:Non-carious lesions of hard dental tissues, somatic pathology, ecology, professional, nutritional and social factors.

Over the past two decades, fundamental changes have occurred in theoretical and practical dentistry. Dentistry is currently developing within a market economy that dictates not only economic demands but also emphasizes the need for scientific research and theoretical justification for the most effective methods of diagnosis, treatment, and prevention of major dental diseases. The most pressing problem in modern dentistry is non-carious lesions of teeth, developing before and after their eruption. The movement of a tooth toward the alveolar margin, overcoming the barriers of bone tissue and mucous membrane, and its appearance in the oral cavity is considered a difficult process to explain. Therefore, until recently, theories of tooth eruption were known, such as root, alveolar, pulp, and bone remodeling. Some authors believe that the increase in pulp volume occurs due to the differentiation of the mesenchyme and an increase in the volume of the ground substance, resulting in pressure within the tooth germ, which forces it toward the free margin. Bone formation at the base of the tooth germ begins long before the crown of the tooth emerges from the oral mucosa and continues throughout the eruption period. Some authors believe that isolated tooth movement does not exist. Its growth and development are linked to the development of the alveolar bone. Teeth eruption is influenced by the nervous and endocrine systems, metabolism and the condition of the alveolar bone in the embryo, nutritional characteristics, heredity, and geographic conditions. While recognizing the regulatory role of the nervous and endocrine systems in tooth eruption, some experts note that "differentiation of tooth tissue is important, accompanied by an increase in volume and the creation of a certain pressure within the germ. Furthermore, the restructuring of bone tissue in front and behind the germ is of great importance, which determines its movement." Growth and development are closely interrelated processes, characterized by an increase in tissue mass due to an increase in the number and size of cells and their differentiation. The overall control of the growth process is complex and is believed to be subject to three main factors: genetic, endocrine, and trophic.

Other experts believe that environmental and socioeconomic factors influence the growth process, including growth hormones, thyroid hormones, and sex hormones, which are present in the body in strictly defined ratios for each stage of development. Recently, a link has been

observed between endocrine pathology and tooth growth. Growth retardation and delayed tooth eruption have been described after pituitary gland removal, in cerebropituitary dwarfism and hypogonadism, congenital hypothyroidism, and hypothyroidism associated with adiposogenital dystrophy. Furthermore, the main stimulator of cartilage, bone, and dental tissue histogenesis is pituitary somatotrophic hormone, while thyroid hormone controls tissue differentiation. It has been established that the prevalence of non-carious diseases developing after teething in Kazan is 12%. The highest prevalence rates are characteristic of wedge-shaped defects (50%), pathological abrasion (40%), and dental hypersensitivity (36%). In older age groups, these forms of dental pathology occur in one in two people. Scientifically based protocols have been developed for the diagnosis, treatment, and rehabilitation of patients suffering from various forms of non-carious dental lesions.

As studies have shown, the incidence of wedge-shaped defects in hard dental tissues among young people in the Stavropol Territory is 16%. Among students with wedge-shaped dental defects, 76% had a limited form of stages I and II, and 24% had stages III and IV. In 68% of students, wedge-shaped defects were in the acute phase, and in 32% - in the stabilization phase [4]. As for dental erosion, in the 1970s, less than 5 studies were published per year. In the 1980s, the number of such works did not exceed 10, while currently at least 50 studies are conducted per year on this issue. In the UK, children aged 12 years were examined. Almost 5% of the subjects at the beginning of the study and more than 13% after 2 years had deep lesions of enamel or dentin. To monitor dental erosion, the authors recommend identifying such lesions at an early stage and determining their causes. Some authors indicate that erosion of hard dental tissues is associated with acidic demineralization of enamel, that is, erosion is formed due to the consumption of acidic foods (carbonated drinks, fruit juices and other products with a low pH level); as a result of gastrointestinal diseases; eating disorders; occupational hazards and low levels of salivation, low buffering capacity of saliva.

Enamel is a mesoporous substance known to be cell-free and incapable of regeneration when damaged. However, it constantly exchanges mineral ions, which enter from saliva through the pores and are adsorbed on its surface, making remineralizing therapy possible. This mechanism is caused by a localized change in pH on the tooth surface due to the accumulation of plaque containing certain types of acid-forming streptococci (*mutans*, *sanguis*, *mitis*, *salivarius*), which are characterized by anaerobic fermentation, and some lactobacilli. Abroad, a tool for use in general practice has been developed to determine the "basic erosive wear index" (BEWE), allowing for comparison with other, more discriminatory indices. At Htorex, BEWE has served as the foundation for initiating the development of internationally recognized, standardized, and validated indices. According to the developers of this tool, it should provide, on the one hand, clear and defined structures for scientific and clinical use, and on the other hand, be subject to further improvement.

Abroad, a tool for use in general practice has been developed to define a "basic erosive wear assessment" (BEWE), allowing for comparison with other, more discriminatory indicators. At the World Health Organization (WHO), the BEWE served as a foundation for initiating the development of internationally recognized, standardized, and validated indices. The developers of this tool believe it should, on the one hand, provide clear and defined structures for scientific and clinical use, and, on the other, be subject to further improvement. To evaluate the effectiveness of questionnaires as a method for the early detection of dental diseases, the authors

recommend a screening method for specifying the contingent of children who require adequate dental care. Other specialists believe that the low effectiveness of treatment and preventive measures for cervical non-carious lesions of dental hard tissues is due to an underestimation of the medical and biochemical aspects of the problem, as well as a suboptimal selection of restorative materials and methods for their clinical application. In this regard, the authors recommend their own medical-technological algorithm for the diagnosis and treatment of non-carious dental lesions. Enamel loss initially occurs on the palatal surfaces of the maxillary central and lateral incisors; enamel with non-carious lesions appears "glassy." Next, in descending order of severity, the following are affected in the maxilla: the palatal surface of the molars, the palatal surface of the canines, the occlusal surface of the molars, the palatal surface of the premolars, and the occlusal surface of the premolars. The incisal edges of the incisors become thinner, and the chewing surfaces flatten. In severe cases, all occlusal morphology disappears. As can be seen from the cited publications, some authors continue to adhere to the idea that the prevailing force (pressure, tension) influences tooth eruption due to tissue expansion. This idea was proposed in the last century and has been repeatedly published, but has not been confirmed experimentally.

There are three groups of agents that reduce dentin sensitivity: mineral salts, protein precipitation, and agents that act on nerve endings. A direct relationship has been established between the quality of fillings at all observation periods and the level of oral hygiene in non-carious dental lesions, while Black's principles must be followed when preparing cavities. A combined method, laser technology, and the use of professional tools in a dental office have shown good results. Experimental models of wedge-shaped dental defects demonstrated the penetration of hydroxyapatite into hard dental tissues and its interaction with dentin, substantiating the possibility of using fluoride- and hydroxyapatite-containing preparations for the prevention and treatment of this pathology. Enamel around the defect is ground using fine-grained diamond burs with an 80-micron coating (with a red marking stripe). Some authors recommend reducing the enamel etching time to 5 seconds.

An innovative method for defect closure is the use of direct composite onlays manufactured in a factory setting. COMPONEER CLASS V (Coltene/Whaledent, Switzerland or other manufacturing countries): thin composite onlays (0.3-0.5 mm) with a uniform surface and a special positioning guide allow for the closure of defects in the cervical region, including erosive lesions.

Thus, based on an analysis of the literature, it can be concluded that disruption of the morphological and chemical structure of tooth enamel and dentin plays a role in the pathogenesis of non-carious lesions of dental hard tissues, leading to a decrease in the resistance of dental hard tissues. Furthermore, somatic diseases in women during pregnancy, particularly endocrine pathology, as well as environmental, occupational, nutritional, and social factors, play a significant role in the development of non-carious lesions of dental hard tissues.

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