

MODERN APPROACHES TO THE PREVENTION OF DENTAL PATHOLOGY IN EMPLOYEES OF THE CHEMICAL INDUSTRY

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Abstract. The article presents a review of the scientific literature containing data on the peculiarities of the influence of various production factors on the state of hard tissues of the teeth and oral mucosa in persons directly in contact with these factors. The pathogenesis in the development of caries and non-carious lesions, inflammatory periodontal diseases and diseases of the oral mucosa is described. The manifestations of these diseases are most often due to a pronounced sensitization of the body to harmful production factors, in the oral cavity there is a pronounced change in local immunity, homeostasis with the manifestation of dysbiosis, as a result of which the features of their clinical manifestations change.

Key words: harmful production factors, caries, periodontium, mucous membrane

Within this framework, ensuring the sanitary and hygienic well-being of the working population occupies a central position, as occupational health directly influences both individual quality of life and overall socio-economic development. Numerous studies have demonstrated that prolonged exposure to unfavorable production factors of biological, chemical, and physical origin leads to functional disturbances in various systems of the human body, including metabolic, immune, and adaptive mechanisms [6].

Among the wide spectrum of human pathologies, dental diseases occupy a particularly significant place due to their high prevalence, chronic course, and tendency to progress under the influence of external factors. The distribution and severity of dental morbidity are influenced by a range of determinants, including environmental conditions, lifestyle, occupational hazards, and individual susceptibility, which have been extensively discussed by researchers worldwide [4,10]. However, despite the growing body of scientific data, there is still no unified consensus regarding the extent and mechanisms of the influence of occupationally harmful factors on the development and progression of dental diseases [1,5].

In recent years, this uncertainty has stimulated active and targeted research into the dental status of workers employed in hazardous and potentially hazardous industries, particularly those associated with the release of toxic substances into the environment [3,4,6]. The organization of rational and accessible dental care for employees exposed to occupational risks, along with the timely detection, prevention,

and treatment of oral diseases, is currently regarded as a task of considerable medical and social importance. Effective dental care not only reduces morbidity but also contributes to maintaining work capacity and productivity among industrial workers [3,10].

The problem of the adverse impact of specific industrial sectors on the oral cavity remains highly relevant. A strong association has been established between the high prevalence of non-carious dental lesions and diseases of the oral mucosa and employment in industries such as oil and gas extraction, metallurgy, chemical manufacturing, as well as baking and confectionery production [11]. Dental health plays a crucial role in preserving the functional capacity of a significant segment of the nation's workforce, particularly industrial employees, as numerous studies convincingly demonstrate the close relationship between the condition of the dentoalveolar system and the overall health status of the organism.

It has been reliably shown that industrial workers are exposed to a high risk of developing occupational diseases, largely due to the penetration of various chemical elements and compounds into the body through the oral cavity [15]. This category of workers is characterized by a consistently high prevalence of dental caries and inflammatory periodontal diseases, which are often marked by a more severe and recurrent clinical course [3].

Chemical agents present in the industrial air environment have been detected in oral fluid, the hard tissues of the teeth, dental plaque and calculus, as well as in biopsy samples of oral tissues [12]. These substances contribute to the aggravation of dental caries by disrupting mineral metabolism, particularly through the substitution of calcium ions in hydroxyapatite crystals. In addition, they promote chronic inflammatory processes in periodontal tissues and impair the structural integrity of the oral mucosal epithelium, thereby reducing local resistance and facilitating the progression of pathological changes [5].

Working conditions at industrial enterprises are often accompanied by factors harmful to human health, which are called "production (professional) hazards". Long-term influence of these factors can lead to pathological changes in the oral mucosa, periodontal diseases, hard dental tissues, and contributes to the development of chronic oral diseases [1, 4, 5, 15, 18, 28]. Scientific studies show that the prevalence of major dental diseases among the working-age population reaches 95-100% and has a steady downward trend.

A modern dentist must know the causes of these disorders in order to properly and successfully carry out treatment, as well as to carry out preventive work among the population.

The analysis of the literature available to us determines the goal of studying the relationship between the development of various dental diseases in persons directly in

contact with harmful factors of industrial production.

The unfavorable factors of the industrial environment mainly differ in intensity depending on the ecological situation and professional activity in a particular region, the technical perfection of production.

A number of researchers note a high level of prevalence of dental diseases among workers in the chemical industry. It was revealed that chemicals have a harmful effect on the hard tissues of the teeth, periodontal tissues, and the composition of the oral fluid [11, 34]. A correlation has been established between the concentration of hydrogen sulfide and the prevalence of oral diseases, the amount of harmful emissions into the atmosphere and periodontal disease [27, 32]. Under the influence of vapors of inorganic acids and their derivatives, teeth decalcify with the appearance of acid necrosis of the upper and lower frontal teeth [33].

In a number of scientific papers, the problems of the significant influence of the conditions for the production of synthetic detergents (SMC) on the tissues of the tooth, periodontium and oral mucosa were considered and studied [13, 33].

The leading harmful factors of the working environment and the labor process for workers, the main professions of the petrochemical industry are: the severity and intensity of labor, vibration, noise, unfavorable microclimate (vapors of acetic and terephthalic acids). These factors significantly affect the pH, the buffering capacity of saliva of workers, the macro- and microscopic composition of hard tissues of teeth, the resistance of enamel to adverse factors and contribute to the occurrence of cracks, necrosis of tooth enamel, keratoses of the mucous membrane [14, 21, 22, 23].

According to the materials of observations, foreign scientists came to the conclusion that under the influence of sulfuric and hydrochloric acids, roughness and abrasion of the surfaces of the front teeth and enamel erosion occur [30].

It has been established that chemicals polluting the air of the copper powder shop disrupt the structure and chemical composition of the mineral base of the tooth, contributing to the development of demineralization of hard tissues, and also lead to the development of leukoplakia, cheilitis, papillomatosis, oncopathology [8, 29].

In experimental works, morphological changes in the structure of the dentin of teeth under conditions of high lead content are presented. Chronic exposure to lead contributes to demineralization with foci of destruction in all areas of the dentin, the development of diseases of the oral mucosa, and increases the prevalence of periodontal diseases (gingivitis and periodontitis) [16, 31].

It is important to take into account that the teeth of the workers of such main production units of the industrial group as the ammonium nitrate shop, the nitric acid shop and the methanol shop are most affected by carious disease [7].

In glass production, the development of keratoses and hyperkeratoses on the mucous membrane of the oral cavity and lips is facilitated by prolonged exposure to

high temperatures; air polluted with harmful chemicals also has a toxic and irritating effect on the oral mucosa [9].

Erosion and pathological abrasion of enamel caused by the presence of hydrochloric, sulfuric, and hydrocyanic acids were noted among workers in chemical industries [17, 36].

An increase in the total number of bacteria with a predominance of gram-negative bacteria was determined in the study of physical, biochemical and bacterioscopic parameters in the oral cavity in workers at ethanol production enterprises [26].

The research results confirm the role of industrial aerosols in the occurrence of dental diseases in production workers in contact with such carcinogens as benz (a) pyrene, inorganic arsenic compounds, lead, cadmium, crystalline silicon dioxide, and in workers exposed to resistant to aerosols of mineral oils, soot, formaldehyde and exhaust gases of diesel engines [12].

A number of authors indicate that harmful factors (gasoline, sulfur dioxide, carbon monoxide, etc.) in the production of rubber products cause violations in workers of local immunity of the oral cavity and a number of biochemical indicators of mixed saliva, affecting the prevalence of major dental diseases. diseases [10].

A high prevalence of diseases of the hard tissues of the teeth and periodontium has been established in all examined persons who are in contact with cadmium and its compounds in the metallurgical production [24].

Bulyakov R.T., Chemikosova T.S. (2015) note that the leading harmful factors at fiberglass production enterprises are fiberglass dust and products for its manufacture, which affect the incidence of dentoalveolar system [6].

In the works of some researchers, it was noted that the increase in dental morbidity among workers in the production of non-ferrous metals is directly dependent on the severity of adverse factors [2].

In their studies, foreign authors present the results of the analysis of data on the significant impact on the occurrence of diseases of hard tissues of teeth and periodontal tissues of an unfavorable microclimate and physical factors: an excessive level of acoustic and electromagnetic vibrations, thermal and ionizing radiation [37, 38].

The main hazardous production factors in the development of dental diseases among workers in industrial enterprises are ionizing radiation and a chemical factor [18].

In bakery industries, it has been established that dental caries can be caused by sugar dust in the air [20].

The results of the study of the dental status of vibration production workers showed that in patients suffering from vibration disease, the main place in the pathogenesis of periodontitis belongs to neurovascular dystrophy of periodontal tissues [3].

A number of authors point to the dependence of the process of dental morbidity on various psychosocial factors. The effect of stress on the incidence of periodontitis in industrial workers has been shown [21].

Occupational stress can be caused by the physical intensity of work. It has been shown that the most significant factors for the examined persons are fear, nervousness or stress at work and problems with the economic support of the family, as well as interpersonal relationships in the family [19].

Thus, the literature available to us highlights the modern view of the complex impact of harmful production factors that determine the high prevalence of dental diseases among workers in industrial enterprises. The analysis carried out shows that the incidence rates of teeth and periodontal disease are related to the nature of the work performed.

At the same time, it should be noted that the studies we analyzed did not reveal the results of studying risk factors in modern industries. Located in special economic zones, residents of which, as a rule, must comply with the safety requirements of the personnel working area. Also, scientific works do not take into account new requirements in the prevention of occupational diseases.

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