

**STRUCTURAL AND FUNCTIONAL CHARACTERISTICS OF ORGANS AND TISSUES
OF THE ORAL CAVITY IN WORKERS OF INDUSTRIAL ENTERPRISES OF THE
REPUBLIC OF UZBEKISTAN.**

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ABSTRACT

Relevance. The demand for scientific substantiation of the structural and functional state of the tissues and organs of the oral cavity of workers of some industrial enterprises has been determined by analyzing the results of research work, to establish the regularities, direct harmful effects.

Purpose and objectives: The aim of the study was to justify the structural and functional changes of the organs and tissues of the oral cavity under the influence of factors that arise in the workplaces of some industrial enterprises in Uzbekistan.

Materials and methods. The total number of examined persons was 1600, including 1450 workers (main group M/G) of the three studied industrial enterprises: Fergana Oil Refinery Plant (FORP - M/G-1) - 420; Almalyk Mining and Metallurgical Combine (AMMC - M/G-2) - 425, and Navoi Chemical Plant (NCP - M/G-3) - 605 workers, as well as 150 persons in the control group (C/G) who applied to a dentist at the clinic of TSDI. Working conditions and general health of industrial workers were studied according to the data of the sanitary medical part and laboratories of the plants; a general dental examination was carried out, and the condition of the oral cavity (OC) was assessed; pain, discriminatory, and taste sensitivity of the tongue and oral mucosa (OM), functional mobility of taste reception of the tongue, resistance and microhardness (MH) of tooth enamel and dentin, condition of periodontal tissues, hygienic condition of the OC and pH of mixed saliva were studied, and finally, the obtained data were processed by statistical methods.

Results. It has been determined that the levels and proportion of major dental diseases among workers in the studied industries remain sufficiently high compared to the control group; violations of the basic structural and functional state of the organs and tissues of the oral cavity have been established, with the frequency of pathologies and structural-functional changes directly dependent on the length of work associated with the industries; based on the obtained results, it has also been confirmed that a number of physicochemical factors negatively affect the organism, to varying degrees, which is reflected in the structural-functional tissues.

Conclusion. Thus, it is justified that physicochemical and technological factors arising in the workplaces of various industries directly or indirectly but negatively affect the human body; they form or accelerate such pathological processes as a decrease in the excitability threshold of teeth, peri-tooth tissues, and the oral mucosa, disruption of pain, taste, and discriminatory sensitivity of the oral mucosa, as well as deterioration in the microhardness of hard tooth tissues, and others.

Keywords: dentistry, oral cavity pathology, harmful factors, functional examination, professional pathology, working conditions, hygienic factors.

Relevance. It is known that there are two main views on the influence of toxic substances at low concentrations on the functional state of the body; when a chemical factor of low intensity acts on the

body, compensatory reactions create a state of nonspecific increased resistance; if the exposure to the poison continues for a long period, the compensatory capabilities of the body may be exhausted, and then the state of nonspecific increased resistance will be replaced by a weakening of the organism. Other authors believe that any reaction of the body to the action of a chemical substance cannot be indifferent to it. It is also known that when a chemical factor of low intensity acts on the body, compensatory reactions create a state of nonspecific increased resistance, or any reaction of the body to the action of a chemical substance cannot be indifferent to it. The protective function of the organs and tissues of the oral cavity is formed as a reaction aimed at maintaining the normal functioning of the respiratory and digestive systems. At the same time, it retains its significance for other systems, as changes occurring in the organs and tissues of the oral cavity may become a source of pathological impulses, leading to the development of various disorders of the body as a whole. In addition, the problem of the occurrence of dental diseases among workers of industrial enterprises has not been fully studied - the morphofunctional structures and changes of the organs and tissues of the oral cavity under the influence of various factors, which are sources of the technological process of industrial production, are not fully justified.

Objective and tasks: The aim of the study was to justify the structural and functional changes of the organs and tissues of the oral cavity under the influence of factors that arise in the workplaces of some industrial enterprises in Uzbekistan.

Materials and methods of the study. In the first stage of the work, in a retrospective plan, based on the data from the Fergana, Tashkent, and Navoi regional Centers for Sanitary and Epidemiological Surveillance, we compiled a sanitary description of the territories and obtained and analyzed the data of the sanitary epidemiological service for the period from 2022 to 2024 on the state of medical and sanitary (MSCH) services for workers at the studied enterprises and the work of factory laboratories for monitoring working conditions and information on the health of workers of the Fergana Oil Refinery Plant (FORP - M/G-1), Almalyk Mining and Metallurgical Combine (AMMC - M/G-2), and Navoi Chemical Plant (NCP - M/G-3).

The second stage involved prospective studies, with a total of 1600 subjects, including 1450 workers from 3 M/G of the studied enterprises; M/G-1 - 420; M/G-2 - 425, and M/G-3 - 605 workers, and 150 individuals not associated with such industries - the control group (C/G) seeking dental care at local dental clinics. Of the total number of subjects, men constituted 67.7% and women - 35.3%; the most numerous age group was those aged 30 and above - 72.2%; the most numerous in terms of experience were workers with 1 to 10 years of experience - 66%; the smallest were those with 16 years and above - 7.7% (Table 1).

Table №1.

Distribution of the examined individuals by age and gender.

№	Age and work experience	Number of examined individuals		Males		Females	
		Total individuals	T %	Total individuals	T %	Total individuals	T %
Total	Total	1600	100	1052	65,7	548	35,3
	O/H	1450	90,6	980	67,6	470	32,4
	K/G	150	9,4	72	48,0	78	52,0
	20-24 years	165	10,3	125	11,9	40	7,3

Age group	25-29 years	280	17,5	175	16,6	105	19,2
	30-34 years	375	22,3	202	19,2	173	31,5
	35-44 years	400	25,0	200	19,0	200	36,5
	45 years and above	380	23,75	350	33,3	30	5,5
Work experience (1450 individuals)	1-5 years	425	29,3	270	27,5	155	32,9
	6-10 years	528	36,4	365	37,2	163	34,7
	11-15 years	385	26,5	250	25,5	135	28,7
	16 years and above	112	7,7	95	9,7	17	3,6

Dental examinations of M/G workers were conducted with the participation of employees of the MSCH enterprises, with standardized forms filled out according to a unified methodological principle. Attention was paid to subjective sensations in the oral cavity during history-taking; dental complaints were clarified during interviews, periodontal tissues, oral mucosa (OM), and lips were examined, noting the presence of fillings, dental prosthetics, and their condition. Tooth sensitivity (TS) (S.A. Gafforova, M.V. Bekmetova et al., 2002); pain and discriminatory sensitivity (PS and DS) of the OM (M.V. Sisneva, B.A. Khvatova (1974)); taste perception threshold and functional mobility of taste reception of the tongue (TPTFMT) ((M.V. Bekmetova (1983), N.S. Zaiko (1958)); resistance of tooth enamel to caries (V.R. Okushko, L.I. Kosareva (1983)), microhardness (MH) of tooth enamel and dentin (S.M. Remizova (1965)); the condition of periodontal tissues ((Shiller-Pisarev tests, periodontopapillary-alveolar (PPA)) and the hygienic condition of the oral cavity (OC) (L.V. Fedorova (1982)); resistance of periodontal tissue capillaries (Kulazhenko (1960)), pH of mixed saliva; determination of the microelement composition of teeth, saliva, blood, and hair collected from workers of the studied enterprises using neutron activation methods [4]; biochemical composition of saliva was studied. The obtained materials were processed using the parametric t-Student criterion with the Excel MS Office 2017 software.

Results and Discussion. It is known that during oil processing, harmful substances such as phenol, ammonia, sulfur dioxide, nitrogen oxides, toluene, acetone, hydrogen sulfide, carbon monoxide, various hydrocarbons, and others are formed and released into the air of the workplace, which are harmful to the human body. Analysis of the obtained results from the documents of the sanitary and hygienic laboratory of production (norms for maximum permissible concentrations - MPC approved by the Ministry of Health of Uzbekistan were used); in M/G-1, average air indicators of the workplaces were noted: hydrogen sulfide - 10.0 mg/m³ (MPC = 0.008); benzene - 5.0 mg/m³ (MPC = 0.1); toluene - 65.0 mg/m³ (MPC = 0.8); gasoline - 105.0 mg/m³ (MPC = 1.5); phenol - 0.3 mg/m³ (MPC = 0.003); hydrocarbons - (total) - 358.0 (MPC - 0) and others: at the workplaces of M/G-2, also found, in the air of different points of workplaces and workshops, mainly sulfuric acid, furfuryl alcohol, hydrogen sulfide, benzene, phenol, and formaldehyde were detected, which belong to harmful substances of hazard class 2, as well as, stone and metal dust, sulfuric and acetic acids, methanol, tetrahydrofuran, formaldehyde, the content of which in some samples exceeds their MPC: at workplaces and certain points of production in M/G-3, where more than ten types of chemical fertilizers, synthetic detergents and cleaning agents are produced, NO₂, NO₃, HCN, Ce₂, CH₃OH,

CO, HCN, MA, MEA, CH₂COOH, acetone, ammonia were found, with the concentration of ammonia and CO exceeding the MPC by 1.5-2.0 times, CH₃OH by 1.2-1.6 times; NO₂, NH₃, CO - in some samples exceeded the MPC by 1.2-1.3 times, the presence of which can have an adverse effect on the health of the factory workers.

Analysis of the dynamics of the incidence rates of temporary disability (TD) among workers in 2022 and 2023 showed that in M/G-1, respiratory diseases (RD) were at the top (correspondingly - 25.8%; -29.8%), followed by digestive system diseases (DSD) (correspondingly - 12.5%; -14.3%), and musculoskeletal system diseases (MSD) (correspondingly - 9.8%; -9.6%); in M/G-2, RD (correspondingly - 29.3%; -32.9%) were in the first place, followed by DSD (correspondingly - 9.8%; -9.6%), and MSD (correspondingly - 11.2%; -7.6%). Furthermore, in M/G-1 and M/G-3, kidney and urinary tract diseases were observed, while allergic pathologies were observed in M/G-2.

Our research results on the dental status of workers revealed that among the M/G workers, the prevalence rates of dental caries were very high, reaching 92.8% at FORP, 89.9% at AMMC, and 88.6% at NCP; similar indicators were obtained when studying the intensity of dental caries lesions (caries, fillings, extractions - CFE) - 11.8; -10.2; -10.4 respectively. When considering the prevalence rates of caries depending on the length of employment and age, it was found that both among M/G workers and in the control group (C/G), these indicators increased in direct proportion - the longer the employment and the older the age, the higher the indicators. The highest caries prevalence rates in all M/Gs were found among workers with 11-15 years of employment, with the highest rates observed in workers at FORP (99.81±0.44%). A decrease in caries prevalence rates was observed among workers with 16 years of employment and more, especially pronounced among workers at AMMC (1.4 times). The levels of CFE indicators were generally higher among female workers in all plants compared to male workers: at FORP - 41.8%; -36.2%; at AMMC - 39.8%, -34.6%; at NCP - 39.2 - 35.2% respectively. In M/Gs, the caries increase indicators were highest in the age group of 25-29 years (1.5; 1.4; and 1.1), as well as in workers with 10-15 years of employment (1.4; 1.3; 1.3 respectively).

It was found that the frequency of tooth damage by chemical necrosis (CN) among M/G workers was 15.23% at FORP, 17.64% at AMMC, and 22.64% at NCP; in the C/G - 7.69%. The frequency of tooth damage by CN among M/G workers increased with age and length of employment, except for M/G-2 workers, and the exception was the group of workers with 16 years of employment and more. It was also characteristic that with age and an increase in length of employment, an inversely proportional relationship was observed - a decrease in the frequency of localized form and an increase in the frequency of generalized form. CN of teeth occurred with approximately the same frequency in both genders, and it was less observed in molar teeth but always accompanied by necrosis of frontal teeth. In M/G-3 workers, the frequency of tooth CN varied - from 10.9% to 31.1%, after 34 years of age, the frequency of CN decreased; this trend was noted for AMMC workers (from 12.5 to -21.8% respectively) and FORP workers (from 8.3 to -21.0% respectively). With age and length of employment, the frequency of CN usually increased, however, in the age group of 45 years and older, a decrease in its frequency was observed.

Pathological tooth wear (PTW) among examined workers was detected in M/G-1 - 13.7%; M/G-2 - 15.8%, and M/G-3 - 25.8%. Also noted is an interesting pattern with 16 years or more of tenure and in the age group of 20-24 years - in 100% of cases; in terms of gender, it was found that in M/G-3, the pathology was more common in men than in women (66.1% and 33.9% respectively). According

to the frequency of mechanical injuries to the hard tissues of the teeth (MIHTT), it was detected in M/G-3 (24.8%), M/G-2 (16.2%); M/G-1 (14.8%), and in the C/G - 8%. There were no significant differences between M/Gs by gender, and it was also found that among many young subjects (aged 20 to 30), the frequency of MIHTT was 1.5-3 times lower than among those aged 35 and older.

The frequency of dental calculus and deposits (DC and DD) among M/G workers is quite high; M/G - 13.3%; M/G-2 - 23.3%, and M/G-3 - 18.8%, while among examined C/G workers - 12.6%; typical features include - DC and DD were mainly found in the area of lower frontal and upper lateral teeth, and in M/G workers, they were also localized in the area of lower frontal teeth. Moreover, in terms of size, DC and DD in M/G workers were more massive, of different consistencies, and difficult to remove, and after removal, workers complained of tooth hypersensitivity.

The results indicated a fairly high frequency of periodontal tissue diseases (PTD); - M/G-70.0%; M/G-2 - 75.1%; M/G-3 - 79.0%, while among C/G individuals - 54%: among them, gingivitis was detected on average in M/G-1 - 17.8%; M/G-2 - 15.5%, and M/G - 21.5%, and among all M/G workers, a high frequency was noted in the group with 10 years of employment and more, and among workers aged 20-34 years. Gingivitis was characterized by swollen and edematous gums, which became spongy, easily detached from the teeth. Also, pronounced atrophic processes of the periodontal tissues were observed - pale gums, quite firmly attached to the teeth, but not to the tooth necks, but to their roots. The tooth necks were exposed, mainly on the buccal and lingual sides.

When studying the frequency of oral mucosa and soft palate diseases (OMSD), it was found in M/G-1 - 37.8%, in M/G-2 - 31.2%, in M/G-3 - 46.9%, and in C/G - 18% (table No. 5). At the same time, in M/G-1 workers aged 20-24 years, 45.8%, aged 25-29 years - 39.1%, and aged 45 and older - 44.7% were affected; M/G-2 - 20-24 years - 41.7%; also, among all M/G workers, a certain regularity was noted - the longer the employment, the more oral mucosa and soft palate lesions. In C/G as well, at the age of 20-24 (20%) and the age of 25-29 (30%), cases of OMSD were noted. Among M/G-3 workers, these pathologies were more often identified in the age groups of 35-44 years (56.8%) and 45 and older (54.3%). Also noteworthy is that the most frequent oral mucosa lesions were characterized by leukoplakia; - in M/G-1 - 17.4%; - M/G-2 - 14.6%; - M/G-3 - 19.3%, while in C/G - 6.7%. An interesting finding is the study of OMSD depending on gender, that is, in our research, the incidence of oral mucosa lesions was more common in women than in men. Also, the analysis of morbidity depending on age showed that OMSD affects older individuals more, although they also occur in young age.

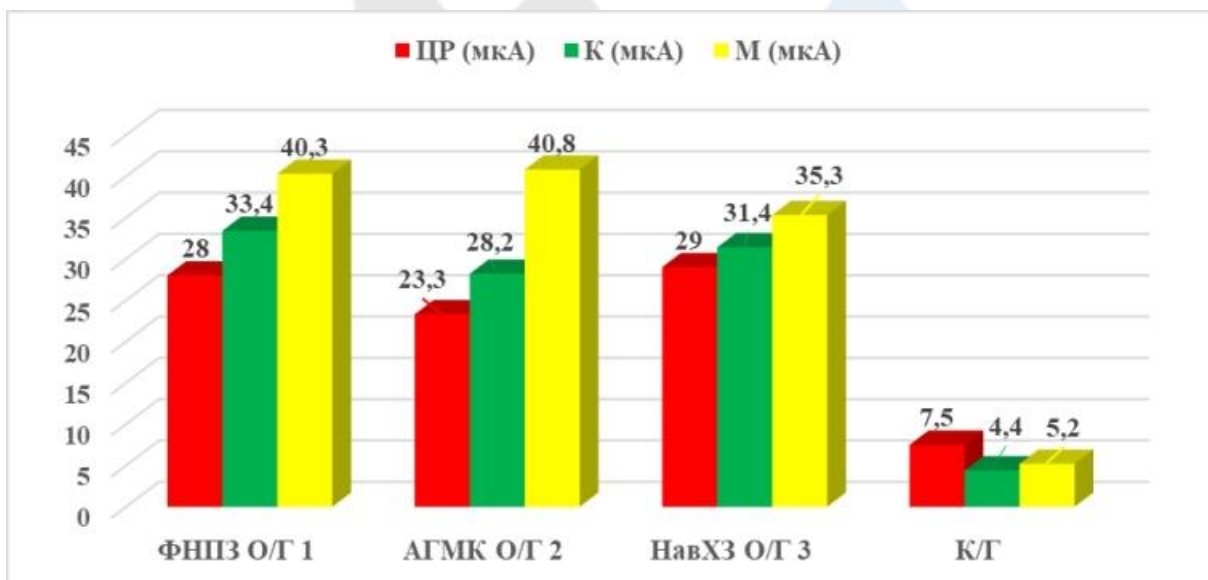
Among all the surveyed plants, workers predominated who needed prosthetic treatment, among M/G-1 - 59.5%; M/G-2 - 59.05%; M/G-3 - 56.2%, among surveyed C/G individuals - 7.35%, as well as with the presence of dental prostheses - 8.8%; -9.41%; -10.1%; -42.3% respectively; the proportion of workers who did not need prosthetic treatment ranged from 7.62 to 24.9%; and in C/G - 58.8%; workers with occlusal anomalies - from 35.5% to 38.3%. In the obtained data, there was no single regularity or correlation between the indicators of workers who did not need prosthetic treatment, those with dental prostheses, the need for dental prostheses, and occlusal anomalies.

The results of the study on the state of the sensitivity of the nerve receptor apparatus (SINRA) of the oral mucosa and soft palate region (OMSPR) in 120 examined individuals (30 from each group) revealed (fig. No. 1) a more pronounced SINRA on the vestibular surface (VS) of the alveolar process compared to its oral part ($P < 0.001$). In the OMSPR, M/G workers in the 4th tooth had a tendency for the pain threshold to increase compared to the palatal surface of the 2nd and 6th teeth ($P > 0.5$ -

$P < 0.05$). The pain threshold in the 2nd tooth of the palatal side in M/G was lower compared to the VS of the OMSPR ($P < 0.05$), and the difference in indicators between the 2nd, 4th, and 6th teeth was insignificant ($P > 0.05$). When determining the threshold of discomfort (TD) in C/G individuals, it was found that compared to the buccal mucosa, the most sensitive zone is the VS of the gums ($P < 0.001$). In M/G workers, a statistically significant ($P < 0.01$) decrease in TD was noted in all investigated areas (fig. 7.1.2). A comparison of the indicators of sensitivity of the tongue dorsum and gum OMSPR did not reveal a significant difference ($P > 0.05$), however, a significant difference was noted between the indicators of gum OMSPR and cheek ($P < 0.01$). The research results confirmed a decrease in the pain threshold and discomfort threshold in M/G workers.

Figure №1. Tooth excitability in surveyed individuals.

Additionally, to study taste sensitivity (TasteS) of the tongue, research was conducted on 75 individuals (20 workers from each M/G and 15 individuals from C/G). The results revealed that complaints about disturbances in taste sensations were reported by approximately 45 individuals: Among M/G workers, various TasteS disorders of the tongue were noted for all types of solutions used.



The increase in taste sensation threshold was most pronounced for sour - 31.2% and bitter - 25%, while the decrease was most pronounced for sweet - 53.1% and salty - 59.4%: in M/G workers - 45.2%; - 34.7%; 41.2%, and 39.2% respectively; in M/G-3 - 22.8%; - 28.9%; - 66.8%, and - 62.5% respectively. Additionally, when determining the threshold for sweet and salty, deviations were predominantly observed towards sour and sour-bitter taste in M/G-1 - 42.8%; - 34.6%; M/G-2 - 33.4%; - 33.2%; M/G-3 - 55%; - 44.8% cases respectively. When determining the threshold for sour and bitter, deviations were noted in the form of sour-bitter sensation in M/G-1 - 22.4%; - 31.1%; M/G-2 - 43.6%; - 48.2%; M/G-3 - 35%; - 24.8% cases respectively. The data obtained indicate a decrease in taste sensation for sour and bitter among M/G workers and a significant difference from C/G.

The study of microhardness (MH) of tooth enamel (55 molar teeth; 20 teeth from M/G-1, 20 teeth from M/G-2, 15 teeth from M/G-3) extracted due to severe periodontitis, with grade IV mobility, and 10 teeth from C/G individuals, revealed that enamel of the superficial layer possessed the highest hardness, significantly higher than in other layers ($P < 0.001$). The MH in the enamel thickness was

significantly higher than in the dentino-enamel junction ($P < 0.001$) but lower than on its surface. In the teeth of M/G workers, MH of enamel was significantly increased in all studied layers compared to C/G ($P < 0.01$). Additionally, in the dentin of M/G workers, an increase in MH compared to C/G ($P < 0.01$) and a decrease compared to M/G-2 individuals ($P < 0.001$) were observed; in the dentin thickness, central part, and tooth cavity, there was a tendency for increased MH compared to C/G ($P > 0.05$); the results of the study show that in M/G-2 workers, there is an increase in MH in enamel and dentin, while in M/G-1 and 3 workers, there is a sharp decrease in MH of all investigated areas on the enamel surface and in its thickness.

When studying the results of the acid resistance test (ART) in M/G workers, it was found that the intensity of enamel etching ranged from 10 to 100% on the blue color scale. Depending on the intensity of staining, we conditionally distinguished 4 levels of tooth resistance to caries (table №2): level 1 from 10 to 30%, level 2 - 30-40%, level 3 - 40-50%, level 4 - above 50%.

Table №2.

Changes in the functional indicators of the oral cavity observed.

Examined Groups	TER Test	Enamel Resistance Level	DMFT (in scores)	Focal Demineralization of Enamel	pH of Mixed Saliva
FORP (W/G-1)	55,1+1,5 ^x	4 ^x	4,9+0,05 ^x	36,8+1,9 ^x	5,2+0,01 ^x
AMMC (W/G-2)	34,5+1,2 ^x	2 ^x	3,2+0,06 ^x	28,3+1,9 ^x	6,1+0,01 ^x
NCP (W/G-3)	52,9+0,9 ^x	4 ^x	4,9+0,05 ^x	33,4+ 2,2 ^x	5,4+0,01 ^x
Control	22,4+1,3	1	1,4+0,03	6,3+1,0	6,8+0,02

Among the surveyed M/G-1 workers, 23.2% were noted to have level 1 tooth resistance to caries, 21.8% had level 2, and many workers (55%) had level 3-4 enamel resistance. In M/G-2, the figures were 33.2%, 32.3%, and 34.5%, respectively, while in M/G-3 they were 21.2%, 27.7%, and 52.9%. In C/G, the corresponding percentages were 44.2%, 32.8%, and 22.4%. The results of the mixed saliva pH study in M/G workers indicate a shift towards acidity in M/G 1, 2, and 3, while in C/G individuals, the pH of mixed saliva was 6.8. In our opinion, the pH value of saliva changes because of exposure to acidic gases, vapors, micro-dust, and substances such as furfural, furan, tetrahydrofuran, tetrahydrofurfuryl alcohol, furfuryl alcohol, ethanol, xylitol, lacquers, nitrogen, copolymers, phenol-formaldehyde resins, catalysts, yeast feed, acetone, sulfuric acid aerosol, hydrocarbons, acetone, which have an acidic reaction. The microelement composition of enamel, dentin, cementum, hair, blood, and saliva was studied using the neutron activation method; 20 teeth and 12 hair, blood, and saliva samples were collected from M/G workers, while literary data [3] were used for control. According to the results (table №8), silver (Ag) was absent in the enamel of M/G-1 workers, while in M/G-2 and -3 workers, its content $-1.45+0.02$; $-1.88+0.22^*$ was closer to the norm. Conversely, in dentin, Ag content was not noted in M/G-2 and -3 workers, while in M/G-1 workers, it was 3-4 times higher than the norm. In tooth cementum, Ag content significantly differed, ranging from 2 to several hundred times higher than the comparison group's indicators.

Analyzing the results of the studies, it can be concluded that under the influence of occupational hazards in the workshops of the mentioned productions M/G, there occur disruptions in the function of the taste analyzer, a shift in the pH of mixed saliva towards acidity, deterioration of GI, PI, and

RMA in PR, a decrease in microhardness and resistance degree of tooth enamel, as well as negative clinical conditions of OM and periodontal tissues. Moreover, with an increase in workers' professional experience, these disturbances worsen and are accompanied by deviations in the macro and microelement composition of tissues from the norm.

Conclusions. The main unfavorable factor of the production environment in the M/G-1 and M/G-3 enterprises is phenol, formaldehyde, furfural, benzene, hydrogen sulfide, and sodium hypochlorite; in M/G-2, it is sulfuric acid, benzene, stone and metal dust, acetic acid, tetrahydrofuran exceeding MPC, which negatively affect the health of workers, including the PR organs.

In the main workshops and workplaces of the studied productions (FORP, AMMC, and NCP), the air in the working area is polluted with a complex of harmful chemical substances, including mixtures of substances of hazard classes 1 and 2; pollution levels and the proportion of air samples exceeding MPC depend on the nature of the production, the technology used, and the presence and effectiveness of existing sanitary-technical devices. At the same time, the levels and proportion of major dental diseases among workers in the studied productions remain relatively high, with a tendency towards a decrease in morbidity rates in recent years; respiratory diseases have the highest proportion; the frequency of diseases of other classes is determined by the nature and levels of air pollution in the working area in the main workshops, the reduction of which remains the main task of the administration and health authorities.

The levels and proportion of major dental diseases among workers in the studied productions remain relatively high: on average, the prevalence of caries is 90.43%; caries increment - 0.89; chemical necrosis of teeth - 18.43%; pathological tooth abrasion - 33.2%; mechanical enamel damage - 19.9%; tooth and dental arch deformities and defects - 18.5%; periodontal tissue disease - 74.7%; OM diseases - 38.7%; need for prosthetics - 58.4%, and pathology and anomalies of dental arches and joints - 36.6%, compared to the examined individuals in the control group, all types of dental pathologies are determined to be 1.5-5.5 times more.

The functional indicators and nonspecific reactivity of PR tissues in workers are disturbed, with a decrease in the excitability threshold of teeth and peri-tooth tissues (by 4-6 times), as well as the threshold of BCH, VCH, and DCH (by 25-59.4%), changes in the microhardness of tooth enamel and dentin, which are most noticeable in the superficial layer (by 13%), and then spread deeper into the teeth (by 11.8% in enamel thickness, by 1.2% in dentin-enamel junction). Thus, the data obtained from the study of electrometry indicators of tooth hard tissues, TER test, KPU, GI, PI, RMA, tooth enamel microhardness, and pH of mixed saliva in PR workers from the studied productions convincingly demonstrate the need for in-depth scientific research to determine the etiological factors of pathological processes in PR organs and tissues. This is necessary for improving the quality of dental services and expanding the methodology of specialized medical dental care for this category of workers.

The spectrum of trace elements detectable in the hard tissues of the teeth of workers from the studied productions, using the neutron activation method, differs both qualitatively and quantitatively, which is associated with the influence of various production environments and depends on their length of service. Additionally, the enzyme spectrum of saliva in workers is altered towards increased alkaline phosphatase (AP) activity and decreased acid phosphatase (ACP) activity, which is attributed to the impact of harmful production factors on the phosphate, carbonate, and protein buffer systems, leading to disruption of saliva homeostasis.

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