

# Improving Approaches to the Treatment and Prevention of Dental Problems among Employees of Enterprises Engaged in the Production of Gypsum

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**Abstract** This article highlights the issues of optimizing the treatment and prevention of dental diseases among workers in gypsum-producing enterprises. The study focuses on specific problems faced by workers in this industry, such as an increased risk of caries, periodontitis, and other dental problems caused by exposure to gypsum dust and other occupational factors. The article discusses various methods and approaches to optimizing the treatment and prevention of dental diseases among workers in gypsum-producing enterprises. Special attention is given to the development of effective prevention programs, which include regular check-ups, education on proper oral hygiene, the use of protective measures, and other measures aimed at reducing the risk of dental problems. Additionally, the article provides recommendations for optimizing the treatment of dental diseases among workers in gypsum-producing enterprises, including the use of modern techniques and materials, increasing awareness of prevention and treatment of dental problems among medical personnel and workers. The study conducted within this article has practical significance and can serve as a basis for developing more effective approaches to optimizing the treatment and prevention of dental diseases among workers in gypsum-producing enterprises, thereby contributing to the improvement of dental health and overall well-being of this category of workers.

**Keywords** Oral diseases, Dental Health, Workers of gypsum, Periodontium, Index

## 1. Introduction

Analysis of modern concepts of the development of dental diseases in persons exposed to harmful industrial and production factors: literature review.

In recent decades, there has been a rapid development of industrial enterprises in the Republic of Uzbekistan, especially in nearby urban areas. However, this leads to pollution of the environment and workplaces with harmful substances that can have a toxic effect on the human body. Therefore, it is important to study the influence of environmental factors on people's general health, as well as on oral and dental health, in order to effectively cope with possible consequences.

The study "The Impact of Chemical Factors on the Dental Health of Cement Plant Workers" [8] was conducted in the United States. The study found that cement workers exposed to chemicals have an increased risk of developing oral diseases, including caries and periodontitis [9]. The main conclusion of the study was the need to introduce effective measures to reduce the impact of chemical factors on the health of workers and conduct regular medical examinations [10].

## 2. Materials and Methods

Russian specialists in the study "Dental diseases among workers of gypsum enterprises: risk factors and prevention" [3] studied the influence of working conditions on the oral health of workers at mining enterprises in Russia [1]. It has been found that workers exposed to gypsum dust and physical stress have an increased risk of developing periodontitis and diseases of the oral mucosa [5]. The conclusion of the study was the need to use personal protective equipment and carry out preventive programs with regular medical examinations.

The Uzbekistan study "The Impact of Vibration on the Dental Health of Workers in the Gypsum Mining Industry" [13] examined the effect of vibration on the oral health of workers in the gypsum mining industry [14]. The results showed that workers exposed to vibration have an increased risk of developing vibration disease and dental hard tissue diseases [15]. The conclusion of the study was the need to create conditions for safe work and conduct training programs for the prevention of dental diseases among workers exposed to vibration [16].

In general, these studies confirm the significance of the influence of harmful industrial production factors on the dental health of workers. Chemicals, gypsum dust and vibration have a negative effect on teeth, gums and oral

mucosa. The increased risk of developing caries, periodontitis and other diseases requires that appropriate measures be taken to prevent and protect workers.

It should be noted that this review study covers only some of the work carried out in foreign, Russian and Uzbek research groups. To obtain a complete overview on this topic, it is recommended to consult additional sources and familiarize yourself with the work of other specialists from different countries.

The study included 150 workers at a gypsum production plant in Bukhara, who were divided into the following groups.

As a result of the survey, a significant amount of gypsum dust was found in the air at workplaces. The analysis showed the following dust levels in various production areas: the level of dust at a jaw crusher ranges from 12 to 23 mg/m<sup>3</sup>, at a centrifugal roller mill - 12 mg/m<sup>3</sup>, and at a gypsum boiler - from 10 to 22 mg/m<sup>3</sup>.

### 3. Results of Our Own Research

When assessing the compliance of working conditions with established standards, we compared the actual values of the microclimate with the established standards. For a more accurate assessment, we first measured the air temperature to determine the type of microclimate and the class of working conditions. We then took into account the influence of air humidity, air speed and thermal radiation on working conditions.

The need to study pathologies of the human body, taking into account the influence of external factors, is due to complex environmental conditions. The principle of modeling in biology allows us to study the impact of production factors on the body, using a worker as a model. Working conditions are associated with a high risk of occupational diseases.

Occupational diseases are multi-causal and are caused by the interaction of genetic and environmental factors. Different people may exhibit different sensitivities to toxic substances.

Research into the incidence of dental problems among workers exposed to hazardous work conditions is aimed at improving methods of prevention and treatment. Hazards in the workplace include hazardous substances, noise, physical stress and high work intensity.

The actual intensity of exposure to hazardous substances may vary and change during the course of work for most occupations. This is due to different production stages, materials and changes in the technological process.

An analysis of the dental health status of workers exposed to hazardous production factors showed significant changes. The level of hygiene was insufficient with a score of  $2.46 \pm 0.46$ .

Workers exposed to occupational hazards had higher rates of dental caries, especially those with more than 20 years of work experience. There was an increase in the incidence of dental caries with increasing work experience.

In the production group, pathological tooth abrasion was most often found ( $65.5 \pm 2.4\%$ ), and in the control group -  $35.5 \pm 2.1\%$ . TTZ hyperesthesia and wedge-shaped defect were also common.

Non-carious lesions in workers in the group group became noticeable after 3 years of work or more, while in the control group they were identified in the second age group.

Analysis of the inflammatory state of the periodontium using the CPITN index showed the following results: among workers with up to 10 years of experience, a mild degree of inflammation is more common (47.1%), while among workers with more than 20 years of experience, this degree occurs only in 2.7% of employees. With increasing work experience, an increase in the degree of periodontal inflammation is observed. Among OG workers, a low level of healthy segments was identified: 5.2% of workers with up to 10 years of experience, 4.3% with 10 to 20 years of experience, and 3.6% with more than 20 years of experience. Compared to the CG, these figures are significantly lower. It was also found that workers with more than 20 years of experience are more likely to have periodontal pockets with a depth of 4-5 mm (59.3% of cases). In the OG there is also a high prevalence of keratoses and leukoplakia among workers with different professional experience.

The results of the study showed that the level of quality of life of workers with different work experience significantly affects the severity of dental problems. A particularly significant decrease in quality of life was noted in patients with verrucous leukoplakia, especially in relation to physical discomfort, psychological discomfort and social adaptation. These patients often experience a loss of interest in life and an increase in irritability, which is reflected in scores of  $3.8 \pm 1.09$  and  $3.6 \pm 0.86$ , respectively.

Patients with severe periodontitis also often experience discomfort when eating ( $1.9 \pm 0.72$ ) and problems with the aesthetics of their smile ( $2.1 \pm 0.11$ ). They also experience changes in appearance ( $2.3 \pm 0.79$ ), bad breath ( $2.5 \pm 0.56$ ), difficulty pronouncing words ( $2.1 \pm 0.87$ ), pain in the gums ( $2.7 \pm 0.55$ ) and changes in diet ( $2.1 \pm 0.32$ ).

Patients with a high caries index also experience problems eating ( $1.8 \pm 0.34$ ), pain ( $1.9 \pm 0.25$ ), difficulties communicating ( $1.2 \pm 0.08$ ) and pronouncing words ( $1.1 \pm 0.05$ ).

Patients with long-term leukoplakia and severe periodontitis experience worsening mood, sleep and rest disturbances. The "Psychological discomfort" indicator is  $19.8 \pm 1.45$  in patients with leukoplakia in the group with 10 to 20 years of experience and  $12.9 \pm 0.66$  in the group with more than 20 years of experience. In patients with severe periodontitis,  $16.4 \pm 1.22$  and  $11.2 \pm 1.32$ , respectively.

Workers with various forms of dental diseases experience a significant deterioration in their oral health.

The assessment of the effectiveness of the measures was carried out in various clinical groups identified during the analysis of pathological processes among workers in the gypsum-producing sector in PR. We determined the following criteria by reviewing medical records and findings: recovered, stable, improved, unchanged, and worsened.

The presented scheme of clinical observation in each clinical group turned out to be quite effective. For example, in the first group, already 3 months after the start of treatment, the first positive changes were noticed. After 6 months, recovery of health was confirmed in  $33.4 \pm 5.40\%$ , and after 12 months this figure increased by  $10.8 \pm 2.12\%$ . After 2 years, the proportion of those who recovered reached  $49.2 \pm 3.35\%$ , and after 3 years -  $56.0 \pm 5.60\%$ .

In the second group of patients, positive changes were noticed after the first course of treatment. Stabilization of the disease was detected in  $59.5 \pm 4.64\%$  of workers included in this group. After two years of follow-up, the improvement was  $62.4 \pm 2.44\%$ .

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## 4. Conclusions

Patients who did not follow the recommendations for oral hygiene and the dentist's prescriptions had a worse condition. Deterioration of the condition was observed in workers with more than 20 years of experience and in cases of severe periodontitis. Problems in the gastrointestinal tract and endocrine system were also observed. After a year of observation, five workers from the risk group showed signs of gingivitis, and six months later a mild degree of periodontitis was diagnosed. This deterioration is associated with problems in the gastrointestinal tract. Additionally, deterioration in PR hygiene was noted. After three years of observation, there were isolated cases of recurrent stomatitis. The use of therapeutic and preventive measures improved the condition of patients and prevented occupational pathologies. After treatment for leukoplakia, restoration of the normal structure of the buccal mucosa was observed.

Thus, the results of the study confirm the effectiveness of the treatment and prevention of dental diseases among gypsum production workers, which can help improve their health and quality of life.

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2056 Norova Mavzhuda Bahodurovna and Khabibova Nazira Nasulloevna: Improving Approaches to the Treatment and Prevention of Dental Problems among Employees of Enterprises Engaged in the Production of Gypsum

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