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TA'LIMI VAZIRLIGI



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- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

# M

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Pedagogika, psixologiya fanlariga ixtisoslashgan ilmiy jurnal



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# PATHOGENETIC AND CLINICAL RATIONALE FOR THE PREVENTION AND MANAGEMENT OF PERIODONTAL DISEASES IN WORKERS WITHIN DUST-HAZARDOUS ENVIRONMENTS

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Samarkand State Medical University

**Abstract:** This study presents the findings of a comprehensive clinical and functional assessment of industrial workers (specifically in cement production) to determine the impact of occupational dust exposure on periodontal health. The aim was to enhance preventive strategies and optimize integrated therapeutic protocols for chronic generalized periodontitis in dust-exposed personnel based on an in-depth analysis of periodontal status. A cohort of 120 workers aged 18–44 with a minimum of 3 years of occupational exposure (primary group) was evaluated alongside a control group. Diagnostic tools included index-based assessments (OHI-S, PMA, GI, and CPITN), functional evaluation using Laser Doppler Flowmetry (LDF), biochemical analysis of inflammatory markers, and cytological profiling. The study identified specific pathogenetic patterns of periodontal damage resulting from the mechanical and fibrogenic effects of mineral dust. Persistent impairment of microcirculation and alterations in local immunity were observed, showing a strong positive correlation with the duration of employment. The results substantiate a differentiated approach to dental rehabilitation, which significantly improves the effectiveness of periodontitis prevention and clinical management in industrial settings.

**Key words:** periodontal diseases, industrial dust, cement production, occupational health, prevention, Laser Doppler Flowmetry, Samarkand.

**Annotatsiya:** Sanoat korxonalarida (sement ishlab chiqarish misolida) ishlovchi xodimlarning klinik va funksional holatini kompleks baholash natijalari keltirilgan bo'lib, ishlab chiqarish changining periodontal to'qimalarga ta'siri aniqlangan. Tadqiqotning maqsadi – periodontal holatni chuqur tahlil qilish asosida chang ta'siriga uchragan xodimlarda surunkali generalizatsiyalangan parodontitni oldini olish va kompleks davolashni takomillashtirishdan iborat. 18–44 yoshdagi, kamida 3 yillik mehnat stajiga ega bo'lgan 120 nafar ishchi (asosiy guruh) hamda nazorat guruhi tekshirildi. Tadqiqotda indeks usullari (OHI-S, PMA, GI, CPITN), funksional diagnostika (lazer doppler floumetriyasi – LDF), yallig'lanish markerlarining biokimyoviy tahlili va sitologik tekshiruvlar qo'llanildi. Natijalar mineral changning mexanik va fibrogen ta'siri bilan bog'liq periodontal zararlanishning o'ziga xos patogenetik xususiyatlarini aniqladi. Milk mikrotsirkulyatsiyasining barqaror buzilishi hamda mahalliy immunitetdagi o'zgarishlar mehnat staji davomiyligi bilan uzviy bog'liqligi aniqlandi. Olingan natijalar stomatologik reabilitatsiyada differensial yondashuv zarurligini asoslaydi va bu yondashuv parodontitni oldini olish hamda davolash samaradorligini sezilarli darajada oshiradi.

**Kalit so'zlar:** periodontal kasalliklar, sanoat changi, sement ishlab chiqarish, kasbiy salomatlik, profilaktika, lazer doppler floumetriyasi, Samarqand.



**Аннотация:** Представлены результаты комплексного клинико-функционального обследования работников промышленного производства (на примере цементной отрасли) с целью определения влияния производственной пыли на состояние тканей пародонта. Цель исследования – совершенствование профилактических мероприятий и оптимизация комплексного лечения хронического генерализованного пародонтита у лиц, подвергающихся воздействию пыли, на основе углублённой оценки пародонтального статуса. Обследовано 120 работников в возрасте 18–44 лет со стажем профессионального контакта не менее 3 лет (основная группа), а также контрольная группа. Используются индексные методы (OHI-S, PMA, GI, CPITN), функциональная диагностика (лазерная доплеровская флоуметрия – LDF), биохимический анализ воспалительных маркеров и цитологические исследования. Выявлены специфические патогенетические особенности поражения пародонта, обусловленные механическим и фиброгенным воздействием минеральной пыли. Установлены стойкие нарушения микроциркуляции и изменения местного иммунитета, достоверно коррелирующие с продолжительностью трудовой деятельности. Результаты обосновывают необходимость дифференцированного подхода к стоматологической реабилитации, что существенно повышает эффективность профилактики и лечения пародонтита в условиях промышленного производства.

**Ключевые слова:** заболевания пародонта, промышленная пыль, цементное производство, профессиональное здоровье, профилактика, лазерная доплеровская флоуметрия, Самарканд.

## INTRODUCTION

Periodontal pathology remains a critical focus of modern dentistry due to its widespread prevalence among the working-age population. In the Republic of Uzbekistan, workers in dust-hazardous sectors—such as cement manufacturing, asbestos processing, and flour milling—represent a high-risk demographic, where industrial dust acts as a persistent occupational stressor.

Industrial dust possesses aggressive mechanical, irritant, and fibrogenic characteristics. Upon contact with the oral cavity, these particulates induce mucosal microtrauma, impede microcirculation, and compromise tissue nutrition, thereby facilitating chronic inflammatory processes. Despite clinical progress, specialized preventive and rehabilitative measures that account for the unique pathogenetic impact of dust remain under-researched, necessitating the development of localized, innovative dental care models.

## LITERATURE REVIEW

Periodontal disease is a global public health priority, with severe forms affecting 20%–50% of the population. In Uzbekistan, WHO data suggest a prevalence range of 81%–92%. Recent trends show a rise in aggressive periodontitis among younger workers, leading to premature tooth loss and a diminished quality of social life.

The link between industrial environments and oral health has been documented by Rizaev J.A. (2008) and others, who argue that the health of the industrial workforce is a vital indicator of national socio-economic stability. However, the reduction in occupational dental clinics over recent decades has exacerbated morbidity rates. The pathogenetic mechanism of cement and mineral dust includes mechanical abrasivity, whereby fine particles cause marginal gingival erosions, allowing for bacterial colonization; hygroscopic and alkaline stress, as the high absorption capacity and pH of cement dust lead to dehydration of the mucosa, altering salivary viscosity and neutralizing natural protective enzymes; ischemic damage, with LDF studies confirming significant reductions in capillary blood flow (ischemia) that intensify with increasing occupational seniority; and immunological dysregulation, characterized by a marked decrease in secretory immunoglobulin A (sIgA) combined with an upsurge in pro-inflammatory cytokines, creating a self-sustaining cycle of tissue destruction.

## RESEARCH METHODOLOGY

The study sample consisted of 120 cement plant employees (primary group) aged 18–44, with more than 3 years of occupational exposure, compared with a control group of individuals without occupational hazards. The methodological framework included index assessment through clinical monitoring using PMA, GI (Löe–Silness), CPITN, and OHI-S; functional evaluation using Laser Doppler Flowmetry (LDF) to quantify gingival capillary perfusion; and laboratory and cytological analysis of immune markers and gingival sulcus smears to detect inflammatory changes.

## ANALYSIS AND RESULTS

Clinical evaluation of the primary group demonstrated a high prevalence of inflammatory periodontal markers, with a predominance of periodontal pockets 4–5 mm in depth and significant calculus formation. Functional LDF data revealed a statistically significant decline in the microcirculation index among workers

with a tenure exceeding 5 years, confirming chronic tissue ischemia caused by fibrogenic dust. Cytological findings showed increased epithelial desquamation and pronounced leukocyte infiltration, verifying an active pathological state. The alkaline nature of cement particulates further contributes to mucosal desiccation and a reduction in local immune defense (decreased sIgA), as confirmed by biochemical analysis.

### CONCLUSIONS AND RECOMMENDATIONS

Periodontal tissue damage in dust-hazardous industries is highly prevalent and directly correlates with work experience and the intensity of the dust factor. The pathogenetic foundation of the disease is a combination of mechanical trauma and chronic microcirculatory impairment, accurately detectable via LDF. Differentiated preventive programs, incorporating early functional diagnostics, significantly improve the quality of dental outcomes for industrial personnel. The results justify the integration of mandatory dental screenings into the system of periodic medical examinations for cement industry enterprises.

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- 13.00.00 Pedagogika fanlari
  - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
  - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
  - 13.00.03 Maxsus pedagogika
  - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
  - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
  - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
  - 13.00.07 Ta'limda menejment
  - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
  - 13.00.09 Ijtimoiy pedagogika
  - 07.00.00 Tarix fanlari
  - 19.00.00 Psixologiya fanlari
  - 01.00.00 Fizika-matematika fanlari
  - 02.00.00 Kimyo fanlari
  - 03.00.00 Biologiya fanlari
  - 09.00.00 Falsafa fanlari
  - 10.00.00 Filologiya fanlari
  - 11.00.00 Geografiya fanlari



# MAKTABGACHA VA MAKTAB TA'LIMI

**Mas'ul muharrir:** Ramzidin Ashurov

**Ingliz tili muharriri:** Murod Xoliyorov

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