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Paradont Diseases in Employees of The Textile Industry, As Well As Morphological Changes in Teeth

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ABSTRACT

It is well-known in the manufacturing industry, particularly across all branches of the textile industry, that various organic and inorganic dye solutions are utilized in painting and finishing workshops. These chemical dyes and solutions act as factors that trigger autoallergenic reactions by denaturing proteins on the mucous membranes of the skin and respiratory tract. According to several authors, the composition of dyes used in dyeing and finishing workshops at textile enterprises predominantly consists of organic compounds. Inspections have revealed that the paint-finishing workshops of textile combines contribute significantly to air pollution, primarily through aerosols of paint particles.

Chemical dyes contain approximately 70 types of the 107 elements listed in the Mendeleev table of chemical elements. These elements are further classified into organic and inorganic compounds. The use of these compounds, in turn, leads to the release of various substances into the environment.

A periodontium is the collective term for the complex of tissues surrounding and supporting a tooth. In periodontal diseases, it is recommended to consider these tissues as a single complex, assessing whether the damage affects one tissue, multiple tissues, or all at once. While evaluating periodontal conditions, we employed methods such as PMA (papillary-marginal-alveolar) and PI (Periodontal Index).

Keywords: *industrial enterprises, chemical elements, periodontal diseases, enterprise employees, periodontal indicators.*

1. INTRODUCTION

Currently, in many developed countries, including our country, dental diseases have covered almost the entire population. In the provision of quality dental care to the population, a large mass is assigned to the dental polyclinic. The main task of the dental hospital is to prevent dental diseases in time, to treat patients with diseases of the maxillofacial area. Dental care is a common type of special medical care provided to the population. The prevalence rate, classification of periodontal diseases

in the special literature, according to scientifically based evidence, is 80%–90% of people between the ages of 10 and 20 who have gingivitis. And after the age of 20 (60–70%), it is noted that there is periodontitis, after the age of 40 – periodontosis and other diseases [2, 9, 11]. Periodontal diseases, specifically periodontitis, are particularly common in gastrointestinal disorders, while other internal organ and system disorders also have a higher incidence of periodontal disease (up to 100%) compared to healthy people. Hence, periodontal diseases are the second most common among dental diseases, after caries [3, 7]. The question of dividing periodontal diseases into certain classifications has always been an urgent problem. As a result of this, a large number of classifications have been proposed [4, 6].In many workers working in the textile industry, non-caries of dental hard tissue depend on the 1st working life and 2nd age groups of injuries. It is known from the literature that non-caries have a number of types of injuries—tartar, with an increase in the duration of work, the number of periodontal diseases also increases [1, 5]. In contrast, periodontal diseases develop to dystrophic inflammation and exacerbation to periodontopathy.

2. PURPOSE OF THE RESEARCH

The purpose of our study is to study paradont diseases in textile industry workers as well as morphological changes in teeth.

3. MATERIALS AND METHODS

To achieve the goal, we selected 375 employees of the textile combine who reside in Yangiyul District of Tashkent region and are based within the territory of Yangiyul District. Of these, 306 (81.6%) are male employees and 69 (18.4%) are female employees. Among the selected staff, 118 (31.47%) were healthy, while 257 (68.53%) were working staff with periodontal disease. We divided these working employees into two groups: the first group consists of healthy staff, forming the control group, and the second group comprises working staff with periodontal diseases. We further studied 275 working staff with periodontal disease by dividing them into three additional subgroups. The minimum age of the selected employees is 21 years, while the maximum age is 52 years or older.

First of all, when studying various changes in the oral cavity among employees, we paid special attention to periodontal levels, particularly in relation to the work processes in which they are actively involved. These include sections that come into contact with chemical dyes, such as the dyeing section, laboratory section, drying section, finished fabric section, and fabric coloring section. Additionally, there are departments like accounting and personnel, where employees who do not come into contact with chemical dyes are active. To determine the diagnosis of periodontal diseases, it is essential to understand the stages of their development. This also requires considering staff complaints, conducting oral examinations, and employing special diagnostic methods. We studied PMA (papillary-marginal-alveolar) and PI (Periodontal Index) indicators in the selected employees, along with morphological changes in their teeth. In our research, we utilized clinical, general morphological, and statistical methods.

4. RESULTS

In dentistry today, there are numerous methods to assess oral hygiene and the periodontal index. However, it is particularly important in the short term to evaluate the degree of periodontal disease and its stage among enterprise employees using ready-made laboratory preparations. For this purpose, we employed the PMA (papillary-marginal-alveolar) and PI (Periodontal Index) methods.

In our study, we utilized the PMA (papillary-marginal-alveolar) method, which is designed to identify periodontal diseases. This method is based on the assessment of gum inflammation (gingivitis), considered an initial sign of periodontal disease. To determine the inflamed condition of the gums, we used the Schiller-Pisarev method (involving iodine crystals, potassium iodide salt, and distilled water). The results of the PMA are expressed as a percentage, with standard indicators established (Table 1).

Table 1

PMA indicators (%)	**Inflammation of the gums in periodontitis degrees**
< 30%	Mild inflammation
31-60%	Moderate inflammation
61% <	Severe inflammation

In this case, we calculated the results that passed the PMA in each employee of the enterprise using the formula below.

PMA indicator= Σ points * 100% / 3 * number of teeth

According to our calculations, the following average values were obtained in the employees of the enterprise.

The PMA method was not considered indicative of periodontal disease among employees in the control group, as their reported rates were below 30%. In the main group, however, periodontal rankings were determined based on the resulting results.

We divided the selected employees, first of all, into groups according to seniority: employees of the textile enterprise with 4-year, 7-year, and 9-year seniority. We then studied the morphological structure of their teeth.

We examined the morphological features of the teeth in both the control group and the main group of employees working at the textile enterprise. We also continued to monitor employees diagnosed with periodontitis. We recruited employees who applied to the New District Medical Association and the New District Dental Polyclinic for histological examination of tooth tremors. These were analyzed using the hematoxylin-eosin and Van-Gieson methods. When studying the teeth of employees in the control group—who do not interact with chemical dyes (i.e., those in the personnel department, accounting department, and guard department)—with 4 years of seniority, the following findings were observed: The enamel is anatomically located on the crown part of the tooth. Within it, we can observe enamel prisms formed from an extremely thin fibrillary network. Each prism, in turn, consists of 5–6 edge structures. Additionally, the enamel surface is covered with a Nasmyth membrane. Dentin appears to have formed from dentin ducts, covering the bulk of the tooth. The dentin canaliculi, on the other hand, are lined, with odontoblasts present. Collagen fibrils are also visible. In the teeth of employees in the control group with 7 years of work experience, the following was noted: Odontoblasts are pear-shaped, forming polyhedral shapes with basophilic cytoplasm. The cell nucleus is located in the basal membrane. Odontoblast cells extend from the apical part of the cell and branch into the dentin tubule. When examining the teeth of employees in the control group with 9 years of work experience—who also do not interact with chemical dyes—the following was observed: In the cementum, collagen fibers and cementocytes are embedded within non-cellular substances. It was also noted that Sharpey's fibers were enlarged, with their tips adjacent to the radial fibers of the dentin. Complete vascular bleeding was observed in the tooth pulp, along with erythrostasis, diapedesis hemorrhages, and hemodynamic disturbances appearing as swollen perivascular spaces.

The following observations were made when studying the teeth of employees in the main group—who interact with chemical dyes, specifically in the paintwork department and fabric coloring department. For employees with 4 years of work experience who are in contact with chemical dyes, the following was observed: Almost no changes occurred in the organic basis of the tooth enamel. The thin filamentous networks remained unchanged. Organic lattice prisms, embedded within mineral salts in the interior and intermediate parts, were also visible. The prisms were preserved at the dentin-enamel junction, oriented perpendicular to the dentin, and exhibited a spiral orientation in the middle of the enamel. It was noted that the enamel retained Schreger's lines, which cross radially, as well as Retzius lines, which pass through the longitudinal cross-section of the tooth. The percentage content of dentin, in both inorganic and organic matter, remained unchanged. Collagen, the primary component of organic matter, also showed minimal alteration. The ratio of calcium phosphate and magnesium phosphate salts, which constitute the inorganic substance, was maintained.

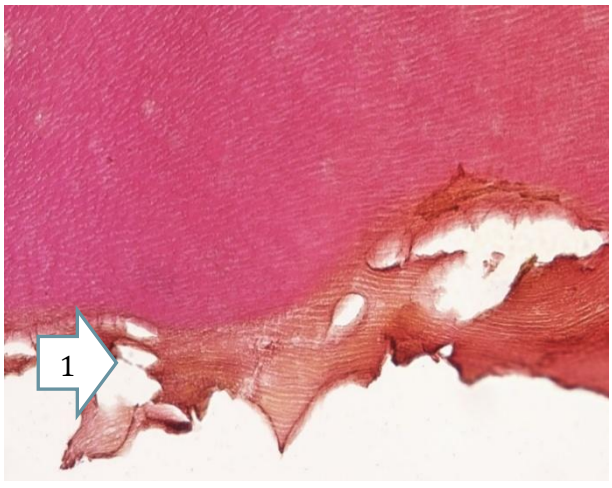

Fig.1. Histological appearance of the tooth of an employee in the main group with a 7-year internship. 1-the appearance of dilated dentin ducts. Van-Gison staining. 10x10

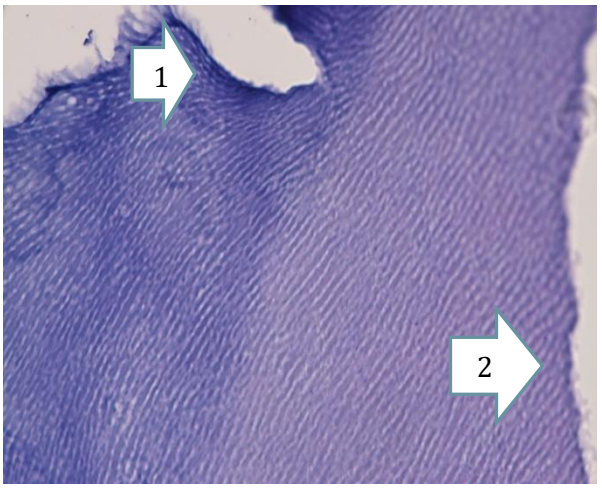

Fig.2. Histological appearance of the employee's tooth in the main group with a 7-year internship. 1-expanded foci in dental cement and small portions of initial cementolysis. 2-the appearance of transverse lines on the Dentin floor. Hematoxylin-eosin staining. 10x10

When the teeth of employees in contact with chemical dyes, with 7 years of work experience, were studied, the following observations were noted: The integrity of the enamel cuticle remained intact (Figure 1). The dentin tubules were flat, and their lumens were not enlarged. In the cementum, it was observed that collagen fibers and cementocytes were precisely situated between non-cellular substances (Figure 2). Odontoblasts were also observed to remain free of pathological changes. Additionally, Sharpey's fibers were preserved without pathological changes, and their tips were found to be adjacent to the radial fibers of the dentin.

The following observations were made when the morphological features of the teeth of employees in contact with chemical dyes, with 9 years of work experience, were studied: Numerous vacuoles were identified in the cytoplasm of odontoblasts. An increase in the number of odontoblasts exhibiting signs of hydropic dystrophy was noted. In some areas, swollen fluid had accumulated beneath the odontoblast layer. Radially oriented Korff fibers, as well as tangentially oriented Ebner fibers in the dentin adjacent to the enamel and cementum in the outer zone, were observed to be free of pathological changes (Figure 3). Additionally, the closing zone in the dentin was distinguishable. The dentin layer was also found to have transverse lines in combination with the fibers. Expanded lacunae and small fragments of primary cementolysis were observed in the dental cementum (Figure 4).

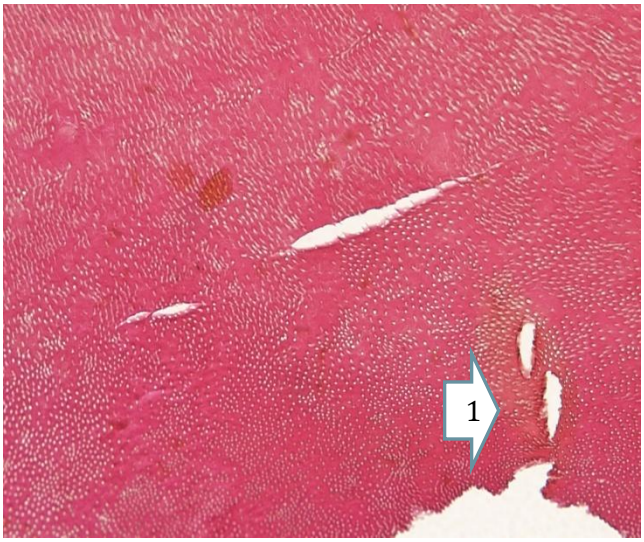

Fig.3. Histological appearance of the tooth of an employee in the main group with a 9-year internship. 1-dentin ducts view of expansion Van-Gison staining. 10x10

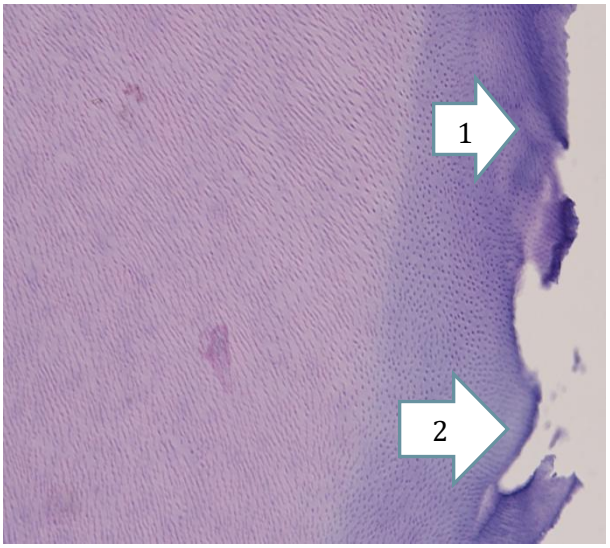

Fig.4. Histological appearance of the employee's tooth in the main group with a 9-year internship. Dentin channels (1) and Sharpey appearance of fibers (2). Hematoxylin-eosin staining. 10x10

At the same time, it has been established that the timely detection and treatment of periodontal disease in employees of textile enterprises is a critical condition for preventing the development of defects in the oral system in the future.

5. DISCUSSION

After analyzing the above processes, we concluded that the basis of morphofunctional changes in teeth in periodontal diseases is an increase in inflammatory processes. Similarly, collagen fibers are not elastic, but in periodontal diseases, they exhibit a slightly wavy orientation, which suggests that their bundles can stretch when subjected to tension [8,10]. The fiber bundles penetrate the cement at one end and the alveolar process bones at the other, with Sharpey's fibers observed in their terminal parts within these tissues. These changes in the fibers indicate a continuously increasing occurrence of inflammatory processes in the gums. Alongside this, it leads to morphological disorders in the teeth.

6. CONCLUSION

In the employees of the textile enterprise, periodontal conditions were evaluated using the PMA and PI methods. The following results were obtained from subjective examinations: tooth fissure formation was 16.2% in the control group and 36.11% in the main group; tooth decay was 39.15% in the control group and 51.6% in the main group; tooth sensitivity (assuming "tooth acuity" refers to sensitivity) was 69.1% in the control group and 76.19% in the main group; tooth decay (noted repetition in the original, possibly intended as another indicator) was 12.25% in the control group and 29.2% in the main group; tooth discoloration was 14.72% in the control group and 25.4% in the main group. Overall, 41.6% of cases were recorded.

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