ПАТОГЕНЕТИЧЕСКИЕ АСПЕКТЫ ЗАБОЛЕВАНИЙ ТВЕРДЫХ ТКАНЕЙ ЗУБОВ У БОЛЬНЫХ С НАРУШЕНИЕМ ФУНКЦИИ ЩИТОВИДНОЙ ЖЕЛЕЗЫ

THE FOLLOWING STUDY WILL EXAMINE THE PATHOGENETIC ASPECTS OF DENTAL HARD TISSUE DISEASES IN PATIENTS WITH THYROID DYSFUNCTION

Жумаев Аслиддин, Н.Б.Исламова.
Самаркандский государственный медицинский университет, Самарканд, Узбекистан
Jumayev A., N.B.Islamov[2].
Samarkand State Medical University, Samarkand, Uzbekistan

Резюме

Цель. На основании клинико-лабораторных данных оценить структурные изменения пораженных кариесом эмали и дентина и повысить эффективность лечения хронического генерализованного пародонтита у больных с диффузным (эндемическим) зобом легкой и средней степени тяжести.

Материалы и методы. Для выполнения поставленных цели и задач исследования в период с 2020 по 2024 годы в Самаркандской областной стоматологической поликлинике и Самаркандском областном эндокринологическом диспансере было проведено клинико-инструментальное исследование состояния пародонтальных тканей 75 пациентов с кариесом и хроническим генерализованным пародонтитом на фоне диффузного эндемического зоба I, II степени в возрасте 25-45 лет. Контрольную группу составили 40 пациентов с кариесом и воспалительными заболеваниями пародонта, не имеющих патологию щитовидной железы. На втором этапе для оценки эффективности предложенных нами лечебно-профилактических мероприятий пациенты с диффузным эндемическим зобом были подразделены на 2 группы: группа сравнения – 30 больных, получивших стандартное традиционное лечение, и основная группа – 45 больных, наряду со стандартным лечением получали предложенное нами комплексное лечение.

Результаты.

В ходе исследования в ротовой жидкости у наблюдаемых групп были обнаружены нижеследующие изменения в результате предложенных методов лечения (табл.5). Достоверное повышение уровня IL-1PA в ротовой жидкости было выявлено лишь у больных основной группы на 75,4% (3872±329,3) через 1 месяц и на 53,5% (3393±179,7) через 6 месяцев от показателя до лечения

(2043±108,2), что имеет огромное значение для подавления иммунного воспаления. В результате анализа концентрации IL-8 в ротовой жидкости в наблюдаемых группах выявлено достоверное понижение его уровня у больных основной группы через 6 месяцев после лечения на 45,8% (148,6±17,11) от значения до лечения (282,5±14,3).

Заключение.

Цитологическая картина при пародонтите у пациентов с диффузным эндемическим зобом характеризуется умеренной лейкоцитарной инфильтрацией, отсутствием иммунокомпетентных клеток. Показатели ВДИ при пародонтите у пациентов с гипотиреозом в 1,4 раза (27,5%) выше, показатели ИД в 1,3 раза (33,3%) выше соответствующих показателей у пациентов с хроническим генерализованным пародонтитом без патологии щитовидной железы ($p<0,05$). В группах пациентов с эндемическим зобом средней и тяжелой степени в смешанной слюне выявлено снижение содержания кальция (0,26 ммоль/л), повышение магния (3,4ммоль/л) на фоне незначительных изменений уровня фосфора (0,4ммоль/л). Снижение концентрации кальция несомненно отражается на минерализующей способности слюны, что на фоне повышения ее кислотности будет неблагоприятно сказываться на состоянии твердых тканей зуба. Хронический пародонтит на фоне первичного гипотиреоза характеризуется нарушениями в иммунном гомеостазе: выраженным угнетением факторов защиты фагоцитарного звена иммунной системы в виде достоверного снижения показателей АФ, НСТ-теста и ФИ; недостаточностью клеточного звена иммунитета, выраженного снижением уровня СР4-лимфоцитов и иммунорегуляторного индекса; недостаточностью гуморального звена в виде уменьшения концентрации IgM и IgA в сыворотке крови, снижения концентрации IgM, повышения IgA и IgG в ротовой жидкости. Цитокиновый статус характеризуется увеличением в ротовой жидкости концентрации ИЛ-1РА, в сыворотке крови повышением концентрации ИЛ-8 и снижением уровня ИЛ-4.

Ключевые слова. полости рта, заболеваний твердых тканей зубов, гигиеническое состояние полости рта.

Abstract

Objective. This research aims to evaluate the structural modifications to the enamel and dentin that are influenced by caries. In addition, the investigation aims to enhance the efficacy of treatment for chronic generalised periodontitis in patients with mild to moderate diffuse (endemic) goitre. Clinical and laboratory data serve as the foundation of the investigation.

Materials and Methods. A clinical and instrumental study of the condition of periodontal tissues was conducted in 75 patients aged 25-45 years with caries and chronic generalised periodontitis against the background of diffuse endemic goitre of

I, II degree at the Samarkand Regional Stomatology Polyclinic and the Samarkand Regional Endocrinology Dispensary between 2020 and 2024 in order to address the study's objectives. Forty patients without thyroid disorders who had periodontal caries and inflammatory illnesses made up the control group. Evaluation of the efficacy of the proposed treatment and preventive measures was conducted in the subsequent phase. A comparison group of 30 patients with diffuse endemic goitre received normal traditional treatment, whereas the main group of 45 patients received the complex treatment that was suggested in addition to standard treatment. Outcomes.

The proposed treatment procedures (5-table) resulted in the following changes in the oral fluid of the study groups. Only patients in the main group had a significant increase in IL-1RA levels in their oral fluid that was 75.4% (3872 ± 329.3) after one month and 53.5% (3393 ± 1797) after six months from the indication prior to treatment (2043 ± 108.0). When it comes to reducing immunological inflammation, this discovery is crucial. Additionally, following therapy, patients in the main group showed a significant drop in the concentration of IL-8 in their oral fluid, which decreased by 45.8% (148.6±17.11) from the starting value (282.5±14.3) after six months.

Conclusions. Diffuse immunoglobulin-related zone (DIRZ) individuals have a moderate lymphocytic infiltration and no immunocompetent cells in their cytological profile. Compared to patients with chronic generalised parotidectomy without pathologic jaw tumours ($p < 0.05$), the indicators of CDI in hypopituitarism were 1.4 times higher (27.5%), and the indicators of IDI were 1.3 times higher (33.3%). On the basis of insignificant changes in the level of phosphorus (0.4 μmol/L), an increase in the level of calcium (0.26 μmol/L) and an increase in magnesium (3.4 μmol/L) was observed in the groups of patients with an endocrine zone of medium and high intensity in a combined salivary sample. The saliva's mineralising capacity is irreversibly affected by the decrease in calcium concentration, which is detrimental to the teeth's hardness. However, the following immune manifestations are indicative of chronic parotid inflammation: This is characterised by a significant reduction in factors that safeguard the immune system, as evidenced by diminished levels of soluble factors, including soluble interleukin (IL)-2, soluble interleukin-6 (sIL-6), soluble vascular endothelial growth factor (sVEGF), and soluble programmed cell death protein 1 (sPD-1); The immune system's B-cell count is declining, while soluble receptors (sR4-lymphocytes) and immune regulatory factors (IRF) are rising in tandem. A decrease in IgM and IgA concentrations in the blood and an increase in IgM, IgA, and IgG concentrations in the fluid of the immune system, which signifies the insufficient presence of the humoral immune system. Increases in the concentrations of Ig-1R in synovial fluid, Ig-8 in blood, and Ig-4 in blood are indicative of the cytochemical state.

Keywords: oral cavity illnesses, dental hard tissue, oral hygiene condition.

The significance of the subject matter. The prevalence of thyroid disorders has been noted to be rising globally. Diabetes mellitus is the most prevalent endocrine disease, with thyroid pathology being the second most prevalent. There are several reasons for this increase, such as environmental iodine deficit, the influence of different stromogenic factors, the decline in the ecological situation, and improved thyroid nodule diagnostics [1].

Inflammatory diseases of the periodontium are apparent to be more prevalent in hypothyroidism. It is noteworthy that research on the impact of thyroid pathology on the state of periodontal tissues is also crucial because endemic goitre, one of its diseases, is highly prevalent, particularly in areas where there is a lack of several natural focal factors, including fluorine and iodine [2].

A increasing body of evidence indicates a correlation between several internal organ diseases and generalised inflammatory lesions of the periodontium. Their research indicates a possible effect of iodine shortage on periodontal tissues[3,4].

Ongoing research in our country is investigating the potential correlation between hypothyroidism and dental hard tissue lesions and periodontitis. The efficacy of its prevention and treatment in these patients, however, has yet to be completely elucidated[5,6].

It has been proposed that thyroid dysfunction may contribute to the development and progression of caries, alterations in the mineralisation of hard tissues, and periodontal pathology. It has been noted that in women aged 18-50 years, a rise in the diameter of enamel prisms in hypothyroidism is seen in the enamel of undamaged teeth, as well as thickening, loosening, disruption of enamel prism shape, and dentin deformation with destruction of tubules in caries foci. Nevertheless, it is still unclear exactly what morphological alterations occur in diffuse endemic goitre. It is crucial to take into account the value of early diagnosis of the pathological state of the hard tissues of the teeth and periodontium in patients with thyroid dysfunction, as well as the expeditious implementation of therapeutic and preventive measures, in light of these observations[8,9].

Objective. In this study, the structural alterations caused by caries in the enamel and dentin are evaluated. The study also aims to improve the efficacy of treating mild to moderate diffuse (endemic) goitre in patients with chronic generalised periodontitis. The research relies on clinical and laboratory data.

Objectives of the research:

This study aims to further our comprehension of the status of the hard tissues of the teeth and periodontium in individuals with mild to moderate diffuse endemic goitre. This study is expected to significantly contribute to the field by assessing morphostructural alterations in the microelement composition of individuals with mild

to moderate diffuse endemic goitre by scanning microscopy. Additionally, we are dedicated to assessing the biochemical markers of bone metabolism in oral fluid by measuring the levels of alkaline phosphatase, phosphorus, and total calcium in oral fluid from patients with mild to moderately severe diffuse endemic goitre. The study's objective is to evaluate the immune status of patients with generalised periodontitis and enamel and dentin demineralisation, including the presence of diffuse endemic goitre of mild to moderate severity. In the context of diffuse endemic goitre of mild to moderate severity, the study aims to enhance comprehension of the interplay between these conditions and the potential for interventions to address both caries prevention and the treatment of generalised periodontitis.

The research materials and methodologies.

Between 2020 and 2024, 75 patients with caries and chronic generalised periodontitis aged 25 to 45 years were the subjects of a clinical and instrumental study of the state of their periodontal tissues at the Samarkand Regional Stomatology Polyclinic and the Samarkand Regional Endocrinology Dispensary. The study was carried out against the backdrop of diffuse endemic goitre of I and II degree. The control group was composed of 40 patients who had caries and inflammatory diseases of the periodontium but did not have thyroid pathology. In the second phase, we aimed to evaluate the efficacy of the treatment and preventive strategies we recommended. To do so, patients with diffuse endemic goiter were divided into two groups: a comparison group of 30 patients who received standard traditional treatment, and a main group of 45 patients who, in addition to standard treatment, received the complex treatment we proposed.

Clinical, immunological, radiological, laboratory, and statistical research approaches were used on all patients during the evaluation.

The diagnosis of caries was conducted in accordance with the International Classification of Diseases ICD-10, while periodontal tissue diseases were classified in accordance with the classification that was adopted at the XVI Plenum of the Board of Dentists of the Ministry of Health.

The hygienic index (HI) (Green, Vermillion), the gingival bleeding index (GBI) (Muhlemann, Cowell), and the RMA index (in the Rarma modification) were used to evaluate the hygienic state of periodontal tissues during the examination. A periodontal calibrated probe was employed to measure the depth of periodontal pockets on all four surfaces of the teeth. Son, N. P. Muhleman, identified gingival bleeding. The periodontal PI (Russel) index was utilised to thoroughly evaluate the status of periodontal tissues.

When conducting the examination, the subsequent radiological investigations were implemented: the presence or absence of changes in the tissues of the periodontium, periodontal cleft, alveolar, and periapical bone tissues was determined

by targeted images. These images were employed to elucidate the condition of the periapical tissues in a specific group of teeth. The electrolyte values were precisely measured by employing an AVL ion-selective electrode (ISE) electrolyte analyser to determine the concentration of sodium, potassium, and calcium ions in oral fluid. Grigoryan A.S. et al. devised the cell morphometry method, which was implemented in the investigation to determine the cytokine levels and the indicators of phagocytic, cellular, and humoral immunity. Venipuncture of the ulnar vein was performed on an empty stomach in the morning to obtain blood. Unstimulated oral fluid was collected into sterile dry test containers for 3-5 minutes after a preliminary rinsing of the mouth with water.

Using the A.A. Demin method, the total oxidation-reduction activity of neutrophils was assessed in the nitro-blue tetrazolium reduction test (NST-test). By employing the Berman-Slavskaya method, which was modified by E.A. Oleynikova, the phagocytic activity of neutrophils was assessed through the absorption of latex microparticles. The phagocytic index was ascertained by the average number of latex microparticles that a single neutrophil had absorbed. The ELISA method was employed to determine the levels of lactoferrin and immunoglobulins (classes A, G, and M) in blood serum and oral fluid using a Multiscan EX tablet photometer. Reagents were implemented in accordance with the methodologies proposed in the investigation. The cytokine concentration was assessed using the solid-state ELISA technique using dual antibodies.

The results of the clinical observations and the analysis of the initial research were carried out.

There was an examination of the simplified oral hygiene index, also known as the OHI-S. In comparison to the control group, patients with endemic goitre exhibited an overall increase in this indicator (Table 1). The control group of 25–35 years old had a low hygiene index of 1.2 ± 0.15, which is indicative of good oral hygiene. In comparison to the control group, the 35-45 age group exhibited a comparable trend, with a higher sanitation index of 1.8±0.20.

Table 1

Outcomes of the Green-Vermilion oral hygiene index for the examined groups

Таблица 1

Результаты гигиенического индекса ротовой полости по Грин-Вермильону исследуемых групп

Age	Control group	Main group
25-35	1,2±0,15	1,9±0,13*
35-45	1,8±0,20	2,6±0,31*
Average parameter	1,5±0,17	2,25±0,22*

Note: * - differences are statistically significant when compared to the control group; $p<0.05$

As evidenced by the Loe and Silness index (Table 2), the 25-35 age group demonstrated indicators of inflammatory phenomena, including gingivitis. Severe gingivitis was prevalent in the 35-45 age demographic. Compared to patients in the main group, the control group's reported index was 0.40 lower, at 2.22 ± 0.11. When comparing the two groups, it was shown that the gingivitis severity ranged from moderate to severe. According to a comparison analysis, the main group's gingival index was higher than the control group's.

Table.2

Gingival GI (Loe, Silness)

Таблица .2

Десневой индекс GI (Loe, Silness)

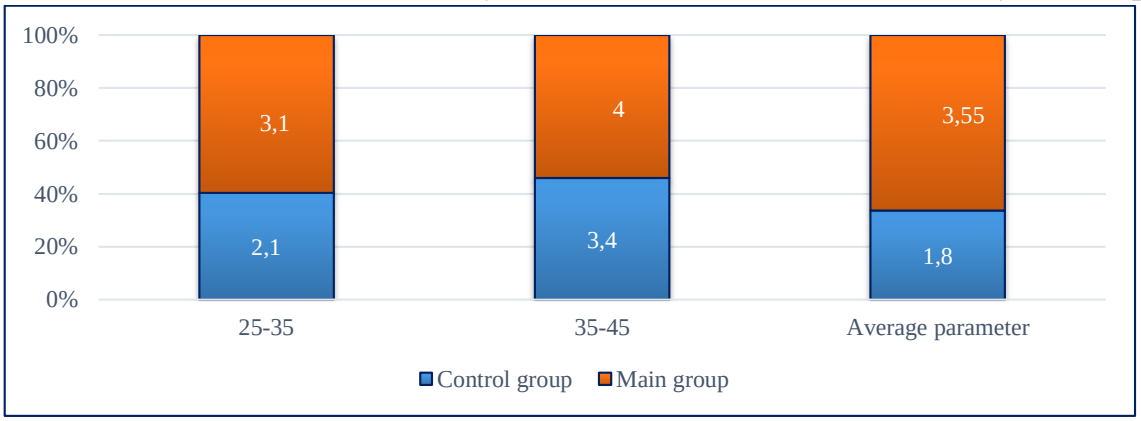
Age	Control group	Main group
25-35	1,23±0,06	1,52±0,10*
35-45	2,22± 0,11	2,62±0,14*
Average parameter	1,73±0,06	2,07±0,11*

Note: * - differences are statistically significant in comparison to the control group; $p<0.05$

Within the primary group that was affected by diffuse endemic goitre, the Russell index was found to be 3.1±0.40, which is two times greater than the index found in the control group.

Figure 1. PI indicators of the studied groups

Рисунок 1. Показатели ПИ исследуемых групп



After conducting a comprehensive examination of the data received from the encuesta, it was discovered that the presence of carious lesions was found in the hard tissues of the teeth in each and every one of the instances that were detected in both groups (see Table 3).

Table 3

Results of dental caries severity KPU

Таблица 3

Результаты интенсивности кариеса зубов КПУ

Age	Control group	Main group
25-35	9,4±1,7	16,3±0,7*
35-45	15,6±2,2	22,7±1,5*
Average	12,5±1,9	19,5±1,1*

Note: * - differences are statistically significant relative to the control group; $p<0.05$

As compared to the group that was affected by thyroid illnesses, the CPI index in the control group, which consisted of individuals aged 25 to 35, was 9.4±1.7, which is a significantly lower value. Within the age range of 35 to 45 years old, the KPU index values were higher than the index values of patients aged 25 to 35 years old. It was observed that the index value in the main group was 19.5±1.1 times higher than the index value in the control group.

The localisation of carious cavities in the cervical area happened in 33 percent of instances in all of the individuals who were checked for diffuse endemic goitre. According to Black, the remaining 67 percent of carious lesions were found in the first four classes.

Both the kind and the frequency of particular problems that patients had were investigated. Patients with diffuse endemic goitre reported experiencing tooth root displacement three times more frequently than patients in the control group (87% and 27%), as well as the prevalence of tooth loss in the front teeth - 88%, which is 6.3 times more frequently than patients in the control group (13%). The main group reported experiencing complaints about tooth sensitivity 2.3 times more frequently than the control group, which had a frequency of 69% and 31% respectively.

A comprehensive cytological analysis of patient samples revealed that the majority of the samples displayed moderate cellularity in their cytograms, along with a preponderance of damaged tissue structures inside the periodontium. This was discovered as a result of the examination having been carried out. Even though there was a backdrop of considerable leukocyte infiltration, it was noted that there were no immunocompetent cells present. This is an important finding. Additionally, the existence of fungal mycelial threads was found, which indicates that there is a decrease in the defensive mechanisms that are present inside the periodontium as the chronic inflammation progresses. Patients in the control group, on the other hand, showed signs of immunocompetent cells in moderate numbers across all preparations, and there was

evidence of fungal mycelia in isolated cases (see Figure 1 for more information).

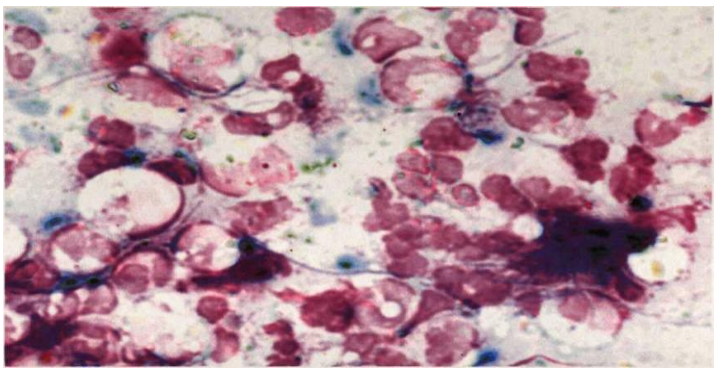


Figure 1. A sitogram of the primary cohort of individuals who have been diagnosed with mild periodontitis is depicted in the picture. There are a significant number of nuclear elements in total that are present. It was determined that the samples were stained with the Romanovsky-Giemsa method. The size of the increase is 200, which indicates that it is meaningful.

Рисунок 1. Цитограмма основной группы пациентов с пародонтита средней степенью. Значительное количество суммарных ядерных элементов. Окраска по Романовскому-Гимзе. Увелич. х 200.

A calculation of the inflammatory response was done as part of a cell-based investigation that was carried out. The study was designed to evaluate the efficacy of the differential (DIF) and cell-by-cell (CBC) indices in predicting the outcomes of cancer patients. Utilising morphometric imaging of the patients' cells, the investigation was conducted. Pretreatment examinations were conducted on the primary and secondary groups to ascertain the number of cells present in their tissue. A determination of the prognostic value of the following indicators in the study group was the purpose of the current investigation (see Figure 1 for more information). The numbers 2 and 3). A significant difference was observed in the inflammatory and destructive indicators among the patient groups with varying degrees of disability ($p < 0.05$).

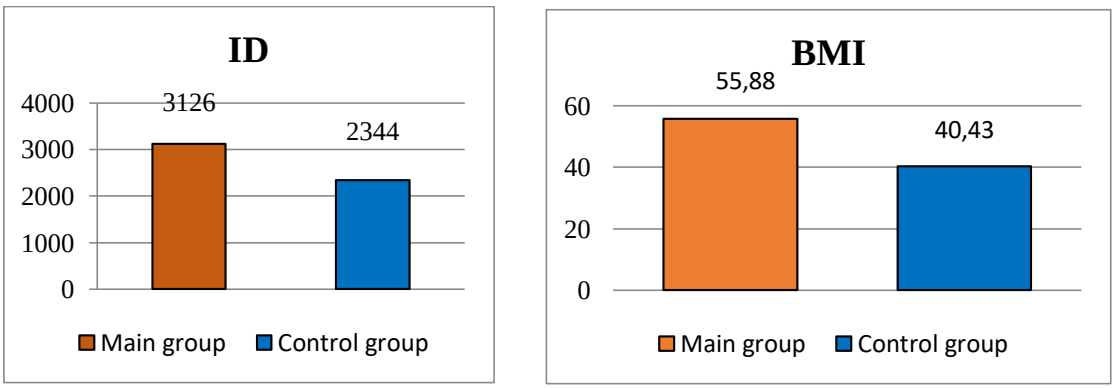


Figure 2, 3. Identification and Body Mass Index parameters of the examined cohorts

Рисунок 2, 3. Параметры ИД и ВДИ исследуемых групп

It was determined, after conducting an in-depth analysis of the data that was obtained, that the decrease in thyroid function has an effect on the cytokine profile. This was demonstrated by a significant increase in the levels of IL-1RA and IL-8 that were found in the blood serum of patients who were suffering from periodontitis and had diffuse goitre (refer to Table 4). In patients who were part of the primary group, the biological impact of endemic goitre and periodontitis was characterised by an elevation in IL-1RA concentrations. This occurred simultaneously. A correlation with inflammatory-destructive events in the periodontal tissues was suggested by the fact that the concentration of IL-8 demonstrated a considerable rise in patients with periodontitis and goitre in comparison to the participants in the control group.

Table 4.

Cytokine levels in the blood serum of patients among the examined groups

Таблица 4.

Концентрация цитокинов в сыворотке крови пациентов исследуемых групп

Indicators, µg/ml	Main group	Control group
IL-1RA	1743±162,1*	836,1±24,3*
IL-4	0,005±0,002*	2,52±0,4*
IL-8	78,5±3,3*	13,14± 1,02*
TNFα	2,53±0,07	3,26±0,02
INFγ	21,13±1,75	19,82±4,3

NOTE. * - The differences are statistically significant when compared to the control group; $p<0.05$

IThe spontaneous synthesis of IL-4 during the chronic inflammatory process was seen to be blocked, as evidenced by a significant decrease in the concentration of this interleukin in the blood serum of patients in the main group compared to the control group. This was observed to be the case.

"Results of complex treatment of chronic generalised periodontitis in patients with diffuse endemic goitre," according to the data that was presented before. An evaluation of the impact of the complex of improved treatment of generalised periodontitis on the parameters of dental status, nonspecific, cellular, and humoral links of immunity, cytokine status, and features of the cytomorphometric picture was carried out specifically for the purpose of enhancing the efficacy of periodontal diseases in patients who were diagnosed with diffuse endemic goitre. This was done in order to improve the effectiveness of the treatment of periodontal diseases.

Patients suffering from chronic generalised periodontitis under the influence of endemic goitre were randomly assigned to one of two groups in order to evaluate the

efficacy of the suggested treatment complex. The patients were separated into two groups. A multifaceted treatment regimen for periodontitis was pursued by the primary group, which consisted of 45 individuals. This regimen entailed the administration of an immunomodulator, echinacea juice (2.5 millilitres, twice daily for three weeks for mild periodontitis, twice daily for one month for moderate periodontitis, and thrice daily for one and a half months for severe periodontitis), in conjunction with ultrasonic phorbol ester oil application (15 minutes daily for moderate and severe periodontitis, and once every two days for mild periodontitis). It is recommended that patients apply Recaldent gel to the afflicted tooth surfaces twice daily in order to prevent the development of dental caries. This is meant to prevent the development of dental caries. Traditional treatment methods were implemented in accordance with the established methodologies in the control group, which consisted of 30 individuals diagnosed with diffuse endemic goitre and CGP. A combination of dental treatment and hormone replacement therapy was administered to individuals who were diagnosed with diffuse endemic goitre. This was done in accordance with the recommendations of an endocrinologist. This study focused on hygiene and periodontal index indicators as the primary areas of investigation for determining the effectiveness of treatment for patients who were diagnosed with diffuse endemic goitre. These results were reviewed at one month, six months, and one year after the treatment was completed. It was noted during the cytological examination that the multilayered squamous epithelium of the gums in the cytograms of patients in the primary group following treatment was characterised by a predominance of undamaged cells. The nucleus of the cell became clearly defined, the cell membrane was retained, and cells that were polluted by microbial flora were either not detected or isolated (Figure 4).

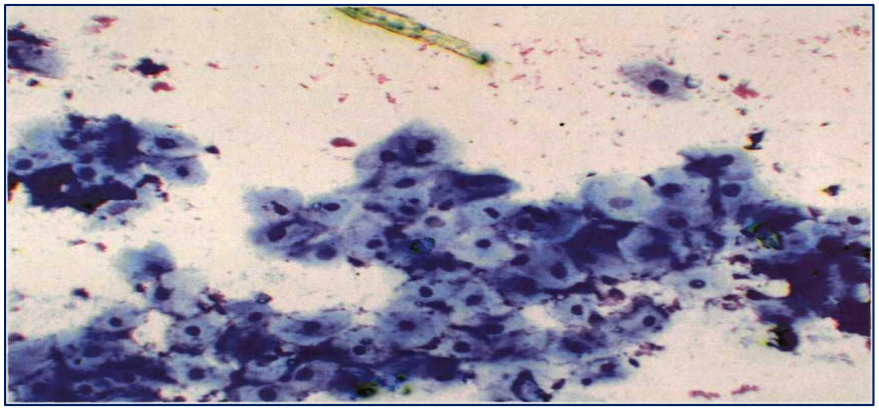


Figure 4. Post-treatment sitogram of the primary patient (principal group). squamous epithelium cells of the gums, which are multilayered, do not exhibit any symptoms of cytopathology. Colouring by Romanovsky-Giemsa. highest multiplied by 200

Рисунок 4. Цитограмма пациента основной группы после лечения. Клетки многослойного плоского эпителия десны без признаков

цитопатологии. Окраска по Романовскому-Гимзе. Ув. х 200

Upon completion of the treatment, it was discovered that the body mass index (BMI) of the primary cohort was 88.4% (6.43 ± 1.3), but the BMI of the control group was 55.8% (24.8 ± 2.3).

In the main group, a subsequent analysis of the dynamics of lactoferrin levels in oral fluid (2738 ± 289.2 before treatment) revealed a significant increase in the concentration of lactoferrin (LF) in patients after treatment. This increase resulted in a 56.8% increase (4297 ± 195.4) after one month, and a 42.3% increase (3895 ± 102.7) after three months. A decrease in the quantity of lactoferrin in the oral fluid was seen after six months in this group. This was in conjunction with the indicators obtained in the same group after one month of therapy, which suggested that the inflammatory process in the periodontium had been reduced. A tendency was observed in the control group where the level of lactoferrin in the oral fluid demonstrated a propensity to increase by 9.3% (2992 ± 212.2) after one month of therapy and then decrease by 11.5% (2438 ± 104.4) after six months of treatment at the same time. In the primary group, the dynamics of blood serum lactoferrin concentration were observed, and a substantial decrease in lactoferrin concentration was found (pretreatment: 1891 ± 348.3; after 1 month of treatment: 855.9 ± 96.6; after 6 months of treatment: 712.5 ± 84.4). A decrease in lactoferrin concentration was seen in the control group, with the concentration reaching 30.2% (1317 ± 109.3) and 31.8% (1287 ± 112.3) after a period of six months. 14 Despite this, these alterations did not reach the level of statistical significance ($p > 0.05$). This phenomenon is conceivable as a result of a decrease in the number of microorganisms in the buccal cavity, a hypothesis that has been supported by molecular genetic research methodologies. In the primary cohort of patients, the investigation found that there was a reduction in the amount of lactoferrin that was consumed and accumulated in the oral fluid. Echinacea juice has been demonstrated to have an immunomodulatory impact, which means that it can regulate the formation of natural killer (NK) cells and enhance the accumulation of lactoferrin-producing cells within the oral cavity. This phenomena may be linked to the immunomodulatory action of echinacea juice.

These modifications were detected in the oral fluid of the study groups subsequent to the implementation of the proposed treatment procedures (5-table). Only patients in the primary group exhibited a substantial increase in the level of IL-1RA in their oral fluid. The increase was 75.4% (3872 ± 329.3) after one month and 53.5% (3393 ± 179.7) after six months, as compared to the indicator before treatment (2043 ± 108.2). This discovery is of utmost significance for the reduction of immune system inflammation. Furthermore, it was revealed that the concentration of IL-8 in oral fluid had a significant decrease among patients in the main group following therapy. This decrease was 45.8% (148.6±17.11) from the starting value (282.5±14.3) achieved after

a period of six months.

Table 5

The dynamics of cytokine levels in the oral blood of the groups under investigation

Таблица 5

Динамика уровня цитокинов в ротовой жидкости крови у исследуемых групп

Oral fluid parameters, pg/ml	Until treatment	After treatment			
		Main group		Control group	
		In 1 month	After 6 months	In 1 month	Через 6месяцев
IL-1RA	2208±109,2	3872±329,3*	3393±179,7*	2319±202,3	2524±174,2
IL-4	0,04±0,02	0,081±0,15	1,02±0,09	0,05±0,02	0,04±0,01
IL-8	282,5±14,3	225,6±19,53	148,6±17,11*	229,2± 14,94	201,8±15,24
TNFα	2,78±0,07	2,82±0,09	2,24±0,12	2,79±0,11	2,71±0,07
INFγ	18,74±3,09	24,83±2,31	20,94±2,44	19,05±1,98	17,86±2,15

Observation: * - The differences are statistically significant when compared to the control group; $p<0.05$

CONCLUSION

The clinical manifestations of chronic generalised periodontitis in patients with diffuse endemic goitre are a combination of generalised gingival recession, a pronounced loss of clinical attachment, and a potentially long-term course. This condition is characterised by a prolonged latent course. In the presence of endemic goitre, the frequency of dental lesions experiences a substantial increase. Carious lesions of the hard tissues of the teeth were found in each and every one of the patients that were included in the main group, according to the findings of an analysis of dental CPI indicators. Compared to the group with diffuse endemic goitre, the CPI index in the control group was 9.4±1.7, which was significantly lower. When it comes to patients who have diffuse endemic goitre, the cytological picture of periodontitis is characterised by modest leukocyte infiltration and the absence of immunocompetent cells. Patients with hypothyroidism showed BMI indicators for periodontitis that were 1.4 times (27.5%) higher than those with chronic generalised periodontitis without thyroid pathology ($p < 0.05$). In a similar vein, it was discovered that the number of BMI indicators in the former group was 1.3 times (33.3%) higher than in the later group.

When compared to the background of small changes in phosphorus levels (0.4

mmol/L), mixed saliva samples from patients with moderate and severe endemic goitre showed a decrease in calcium content (0.26 mmol/L) and an increase in magnesium (3.4 mmol/L). This was observed during the course of the study. A decrease in calcium concentration is recognised to have a negative impact on the mineralising capacity of saliva. This, in conjunction with an increase in its acidity, has the potential to have a negative impact on the state of the hard tissues that are situated within the teeth. There is a large suppression of components that are essential for the phagocytic link of the immune system, as indicated by a substantial decrease in the markers of AP, NST-test, and FI. Chronic periodontitis is characterised by immune homeostasis problems, as evidenced by a significant suppression of these factors. The immunoregulatory index and the level of CR4-lymphocytes are down, indicating that the cellular link of immunity is insufficient. The humoral link exhibits insufficiency, which is manifested as a decrease in the concentration of IgM and IgA in blood serum, a decrease in the concentration of IgM, and an increase in the concentration of IgA and IgG in oral fluid. A drop in IL-4, an increase in IL-8 in blood serum, and an increase in IL-1PA in oral fluid are the three cytokine profiles that are characteristic of the cytokine profile. It has been demonstrated that it is possible to achieve long-term remission of the disease by implementing a therapy complex for periodontitis in patients who have diffuse endemic goitre. This combination has been shown to result in the normalisation of immunological abnormalities at both the local and systemic levels.

REFERENCES

1. Al Shamrany M. Oral health-related quality of life: a broader perspective. *East Mediterr Health J*. 2006;12(6):894-901.
2. Coco BJ, Bagg J, Cross LJ, Jose A, Cross J, Ramage G. Mixed Candida albicans and Candida glabrata populations associated with the pathogenesis of denture stomatitis. *Oral Microbiol Immunol*. 2008;23(5):377-383. doi:10.1111/j.1399-302X.2008.00439.x
3. Cross LJ, Williams DW, Sweeney CP, Jackson MS, Lewis MA, Bagg J. Evaluation of the recurrence of denture stomatitis and Candida colonization in a small group of patients who received itraconazole. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2004;97(3):351-358. doi:10.1016/j.tripleo.2003.10.006
4. Dikbas I, Koksal T, Calikkocaoglu S. Investigation of the cleanliness of dentures in a university hospital. *Int J Prosthodont*. 2006;19(3):294-298.
5. Emami E, de Grandmont P, Rompré PH, Barbeau J, Pan S, Feine JS. Favoring trauma as an etiological factor in denture stomatitis. *J Dent Res*. 2008;87(5):440-444. doi:10.1177/154405910808700505

6. Espinoza I, Rojas R, Aranda W, Gamonal J. Prevalence of oral mucosal lesions in elderly people in Santiago, Chile. *J Oral Pathol Med*. 2003;32(10):571-575. doi:10.1034/j.1600-0714.2003.00031.x
7. Frenkel H, Harvey I, Newcombe RG. Oral health care among nursing home residents in Avon. *Gerodontology*. 2000;17(1):33-38. doi:10.1111/j.1741-2358.2000.00033.x
8. Hsu, C. Y., Pallathadka, H., Jasim, S. A., Rizaev, J., Olegovich Bokov, D., Hjazi, A., Mahajan, S., Mustafa, Y. F., Husseen, B., & Jawad, M. A. (2025). Innovations in cancer immunotherapy: A comprehensive overview of recent breakthroughs and future directions. Critical reviews in oncology/hematology, 206, 104588. https://doi.org/10.1016/j.critrevonc.2024.104588
9. Hsu, Chou-Yi & Jasim, Saade & Rodrigues, Paul & Rizaev, Jasur & Hanumanthayya, Malathi & Ashraf, Ayash & Thakur, Rishabh & Arya, Renu & Jawad, Mohammed & Gabble, Baneen. (2024). Recent progress on phage display-based biosensing systems for detection of pathogenic bacteria in food and water. Microchemical Journal. 208. 112356. 10.1016/j.microc.2024.112356.
10. Saadh, M. J., Jasim, N. Y., Ahmed, M. H., Ballal, S., Kumar, A., Atteri, S., Vashishth, R., Rizaev, J., Alhili, A., Jawad, M. J., Yazdi, F., Salajegheh, A., & Akhavan-Sigari, R. (2025). Critical roles of miR-21 in promotions angiogenesis: friend or foe?. Clinical and experimental medicine, 25(1), 66. https://doi.org/10.1007/s10238-025-01600-7
11. Saadh, M. J., Khidr, W. A., Alfarttoosi, K. H., Bishoyi, A. K., Ganesan, S., Shankhyan, A., Gayathri, S., Rizaev, J., Taher, W. M., Alwan, M., Jawad, M. J., & Al-Nuaimi, A. M. A. (2025). Metal nanoparticles as a promising therapeutic approach for prostate cancer diagnosis and therapy: a comprehensive review. Medical oncology (Northwood, London, England), 42(4), 83. https://doi.org/10.1007/s12032-025-02633-4
12. Saadh, M. J., Muhammad, F. A., Albadr, R. J., Bishoyi, A. K., Ballal, S., Bareja, L., Naidu, K. S., Rizaev, J., Taher, W. M., Alwan, M., Jawad, M. J., & Ali Al-Nuaimi, A. M. (2025). Nanoparticle biosensors for cardiovascular disease detection. Clinica chimica acta; international journal of clinical chemistry, 567, 120094. https://doi.org/10.1016/j.cca.2024.120094