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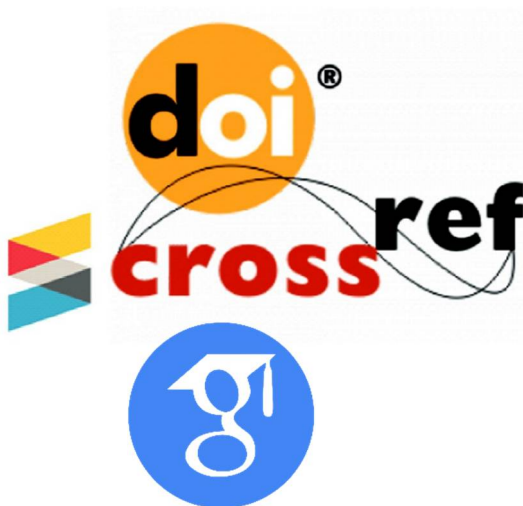
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STUDYING PARODONTAL TISSUE REMODELING MARKERS AND DEVELOPING DIRECTIONS FOR THEIR CORRECTION IN CHRONIC GENERALIZED PARODONTITIS

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<http://dx.doi.org/10.5281/zenodo.18077301>**ANNOTATION**

Inflammatory diseases of the periodontium (IPD) represent a serious socially significant problem affecting all age groups. According to the WHO, they are among the most common dental pathologies alongside caries. The highest incidence is observed among adolescents (55-89%) and adults aged 35-44 (65-98%). In Uzbekistan, the prevalence of CKD among children reaches 53.2%, among adolescents 69-80%, and among adults 92.8%. It is well known that untimely diagnosis and treatment of AMD are fraught with progressive periodontal tissue destruction and bone tissue resorption, leading to secondary adentia. This contributes to a decrease in the height of the alveolar process, leading to a change in the shape of the gums and exposure of the roots of the teeth, deformation of the dental rows, and impaired occlusion. Cosmetic defect triggers social problems - difficulties in speech and social communication, psychological state and self-confidence, limits the possibility

Keywords: oral cavity, remodeling markers, chronic generalized parodontitis, oral hygiene condition.

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SURUNKALI TARQALGAN PARODONTITDA PARODONT TO‘QIMALARINI REMODELLASHTIRISH MARKERLARINI O‘RGANISH**ANNOTATSIYA.**

Parodontning yallig‘lanish kasalliklari (PYK) barcha yosh guruhlarini qamrab oluvchi jiddiy ijtimoiy ahamiyatga ega muammo hisoblanadi. JSST ma’lumotlariga ko‘ra, ular kariyes bilan bir qatorda eng keng tarqalgan stomatologik patologiyalardan biridir. Kasallanishning eng yuqori chastotasi o‘smirlar (55-89%) va 35-44 yoshdagi kattalar (65-98%) orasida qayd etilgan.

O'zbekistonda bolalar orasida tarqalishi 53,2%, o'smirlarda 69-80%, kattalarda esa 92,8% ni tashkil etadi. Ma'lumki, kasallikni o'z vaqtida tashxislamalik va davolamaslik parodont to'qimalarining progressiv destruksiyasiga, suyak to'qimasining rezorbsiyasiga olib keladi, bu esa ikkilamchi adentiyaga olib keladi. Bu alveolyar o'siq balandligining pasayishiga olib keladi, milk shaklining o'zgarishiga va tish ildizlarining ochilib qolishiga sababchi bo'ladi, tish qatorlarining deformatsiyasiga va tishlovning buzilishiga olib keladi. Kosmetik nuqson bir qancha muammolarni keltirib chiqaradi - nutq va ijtimoiy muloqotdagi qiyinchiliklar, psixologik holat va o'ziga ishonchni cheklaydi.

Kalit so'zlar: og'iz bo'shlig'i, remodellashtirish markerlari, surunkali tarqalgan parodontit, og'iz bo'shlig'i gigienasi holati.

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ИЗУЧЕНИЕ МАРКЕРОВ РЕМОДЕЛИРОВАНИЯ ТКАНЕЙ ПАРОДОНТА И РАЗРАБОТКА НАПРАВЛЕНИЙ ИХ КОРРЕКЦИИ ПРИ ХРОНИЧЕСКОМ ГЕНЕРАЛИЗОВАННОМ ПАРОДОНТИТЕ

АННОТАЦИЯ

Воспалительные заболевания пародонта (ВЗП) представляют собой серьезную социально значимую проблему, охватывающую все возрастные группы. По данным ВОЗ, они являются одними из самых распространенных стоматологических патологий наряду с кариесом. Наибольшая частота заболеваемости отмечается среди подростков (55–89 %) и взрослых 35–44 лет (65–98 %). В Узбекистане распространенность ВЗП среди детей достигает 53,2 %, у подростков 69–80 %, а у взрослых 92,8 %. Общеизвестно, что несвоевременная диагностика и лечение ВЗП чревато прогрессирующей деструкцией тканей пародонта, резорбцией костной ткани, что ведет ко вторичной адентии. Это способствует уменьшению высоты альвеолярного отростка ведет к изменению формы десны и оголению корней зубов, деформация зубных рядов и нарушение прикуса. проблемы с дикцией и пережевыванием пищи. Косметический дефект провоцирует социальные проблемы – сложности в речи и социальном общении, психологическом состоянии и уверенности в себе, ограничивает возможности социализации.

Ключевые слова: полость рта, маркеры ремоделирования, хронический генерализованный пародонтит, состояние гигиены полости рта.

The relevance of the topic.

Periodontal tissue diseases occupy one of the leading positions among the dental pathologies occurring in the adult population. The most common form is chronic generalized periodontitis, characterized by slow but progressive destruction of the supporting structures of the tooth. This disease leads not only to functional disorders of the dentoalveolar system but also negatively affects the overall condition of the body.

Modern studies show that connective and bone tissue remodeling processes, regulated by various biochemical markers, play an important role in the development of chronic periodontitis. Studying these markers allows for a deeper understanding of the disease's pathogenesis and the development of effective methods for early diagnosis and correction [11,12].

It is well known that untimely diagnosis and treatment of AMD are fraught with progressive periodontal tissue destruction and bone tissue resorption, leading to secondary adentia. This contributes to a decrease in the height of the alveolar process, leading to a change in the shape of the gums and exposure of the roots of the teeth, deformation of the dental rows, and impaired occlusion. A cosmetic defect triggers social problems - difficulties in speech and social communication, psychological state and self-confidence, limits socialization opportunities. CHD is not only a medical but also an important social problem affecting all age groups of the population. Their high prevalence and consequences negatively affect the quality of life, work capacity, and economic costs of society.

Objective of the study: Assessment of the role of periostin and the transforming growth factor of fibroblasts in the diagnosis and treatment of chronic generalized periodontitis.

Research objectives:

Analysis of the dental status of patients with chronic generalized periodontitis of varying severity;

Assessment of the dynamics of periostin and the transforming growth factor of fibroblasts in gingival fluid in patients with periodontitis;

Study of the levels of cytokines (IL-1, 4, 6, 8, 10, 17, 18) and the antimicrobial peptide cathelicidin LL-37 in the gum fluid;

Development of diagnostic biomarkers for the severity of periodontitis and a comprehensive approach to treatment, taking into account the identified disorders.

Materials and methods of research

72 people were examined, of which 58 were patients with varying degrees of periodontal inflammation and 14 clinically healthy volunteer donors. Among the patients with periodontal inflammation, 36 were with mild, 36 with moderate, and 36 with severe CGP. Women constituted 55.6%, men - 44.4%. Two representative groups were formed, whose age-sex distribution was identical among all groups.

Inclusion criteria: patients aged 20-56 with compensated general condition, who have applied to the TCSI for inflammatory diseases of the periodontium, complaints of bleeding gums, or are undergoing maintenance therapy.

Exclusion criteria: pregnant women, nursing mothers, smokers, persons who have been receiving periodontal therapy for the last 6 months or medications for the last 3 months, patients with acute systemic diseases (diabetes mellitus, cancer, diseases of the gastrointestinal tract, cardiovascular system, thyroid gland), alcoholics, teeth with above-grade mobility, endoparodontal lesions, or unsanitary oral cavity.

The indicators of somatic pathology, complaints, bad habits, and gum fluid were similar in the examined groups. At the same time, diseases were distributed as follows: gastrointestinal tract - 39%, cardiovascular system - 10.3%, ENT - 14.7%, musculoskeletal system - 5.6%, endocrinology - 19.4% and nervous system - 9.5%.

Comprehensive dental examination included: Research participants underwent a comprehensive examination of the oral cavity condition according to the methodology of V.S. Ivanov (2008). Analysis of patients' complaints showed that they reflected the classical clinical picture of generalized periodontitis depending on the severity. The most frequent complaints were bleeding gums. Pain and discomfort during food intake, itching, cosmetic defect of the gingival margin were noted. The most frequent complaints were bleeding gums. Pain and discomfort during food intake, itching, cosmetic defect of the gingival margin were noted. Hyperesthesia was observed in 66%, pain during hygienic procedures, tooth mobility, and halitosis. General symptoms were expressed in headaches, weakness, sleep disturbance, and decreased appetite in 26% of patients.

During clinical examination, the dental formula, occlusion, condition of hard tissues, frenulum, ligaments, articulation, presence of exudate, changes in gingival color (hyperemia, cyanosis), gingival edge hypertrophy, gingival index (GI, Loe-Silness, 1967) and bleeding index (mSBI, Muhlemann-Son) were recorded. The presence of soft coating and dental deposits (OHI-S, Green & Vermilion, 1960), pathological mobility of the teeth (according to D.A. Entin), the depth of periodontal pockets, the periodontal index (Russel, 1967), and the results of radiological studies (visiography, orthopantomography, CT) were also assessed. Clinically healthy volunteers were examined once, and patients with inflammatory diseases were examined at the first visit, after 10 days of therapy, and 3 months after treatment.

The severity of chronic generalized periodontitis was assessed based on clinical and radiological studies. Biochemical analysis of gingival groove contents: Determination of cytokine levels (IL-1, IL-6, IL-8, IL-10, IL-17, IL-18) and antimicrobial peptide cathelicidin LL-37 in gingival fluid was carried out by solid-phase enzyme-linked immunosorbent assay on a "MINDRAY" automatic analyzer. Measurements were taken within 10-15 minutes after the cessation of the reaction

using "Vector Best" reagents. Studies were conducted before treatment in the comparison group, main and control groups.

In chronic generalized periodontitis, a significant decrease in the level of periostin is observed as the severity of the disease increases. In healthy patients, the indicator is 409.63 pg/μl. In mild cases, the level of periostin decreases to 149.54±12.43 pg/μl, indicating the beginning of tissue destruction. In moderate cases, the indicator further decreases to 82.68 pg/μl, and in severe cases, the level of periostin is only 51.48 pg/μl, which confirms the progression of pathological processes in the periodontal tissues. This dynamic indicates a pronounced decrease in periostin, which may indicate a disruption of regenerative processes and an intensification of destructive changes in periodontal tissues with an increase in the severity of the disease (Figure 1).

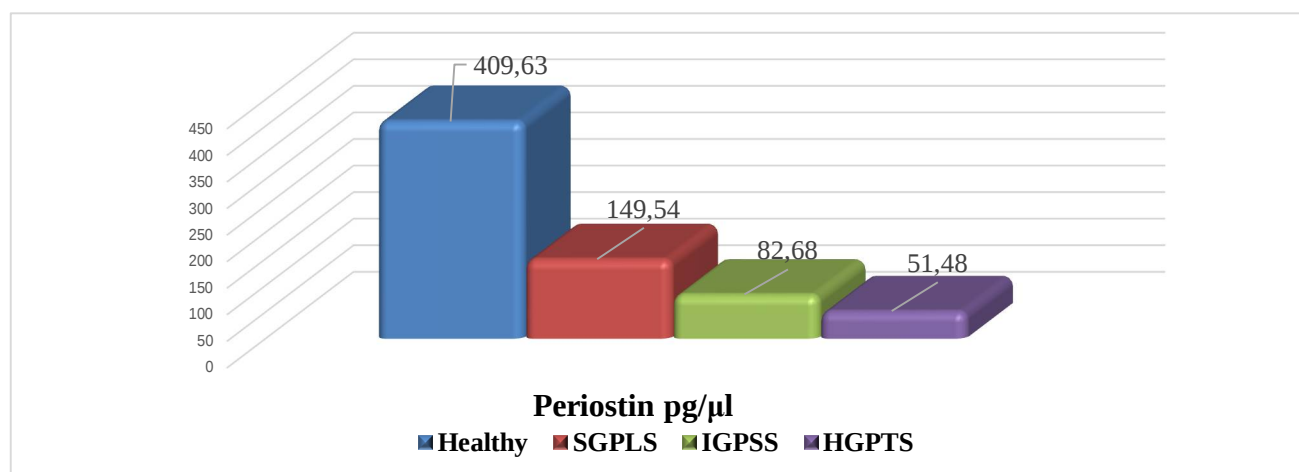


Figure 1. Indicators of periostin and TGF-β levels in normal and CGP of varying severity before treatment

Fibroblast growth factor (TGF-β) data analysis shows: - Normal: 3842.8±346.6 - Mild CGP: 4238.2±348.4 - Moderate CGP: 5219.7 - Severe CGP: 6325.3±472.6 As the severity of the disease increases, an increase in fibroblast growth factor levels is observed. This indicates that with the progression of inflammation, remodeling processes aimed at compensating for damages are activated in the periodontal tissues. However, excessively high values, especially in the severe stage of the disease, can also reflect the intensification of destructive processes in periodontal tissues. Conclusions: The level of fibroblast growth factor can serve as an indicator of tissue remodeling and destruction activity in response to inflammation, increasing as the disease progresses.

Index assessment of periodontal condition in patients with primary groups with CGP of varying severity Table 3

Periodontal status	Patients with CGPLS		Patients with CGPLS		Patients with CGPLS	
	before treatment	after treatment	before treatment	after treatment	before treatment	after treatment
ONI-S	1,45±0,11*	0,15±0,01	2,3±0,14	0,34±0,22	2,90±0,18	0,5±0,04
GI (Loe, Silence)	0,98±0,01	0,10±0,01	1,85±0,12	0,2±0,025	2,93±0,24	0,35±0,02
PI Russel	3,12±0,12	2,71±0,25	4,69±0,24	3,5±0,30	6,71±0,42	4,79±0,5
mSBI gingival bleeding index	0,5±0,04	0,1±0,01	1,75±0,02	0,5±0,06	2,8±0,02	1,0±0,16
PC Depth	3,48 ± 0,25	3,0±0,27	4,80±0,34	3,7±0,40	6,53±0,41	4,3±0,35
Pathological tooth mobility according to D. A. Entin	1,24±0,10	0,9±0,07	2,36±0,18	1,6±0,12	3,0±0,27	2,1±0,25

Note: * - indicators have significant differences compared to the values in the group of practically healthy individuals ($p < 0.05$).

The treatment protocol for patients was the same in the main and control groups, except that in the control group, professional hygiene was performed using a piezo-ultrasound scaler without the use of autoplasmic fibrin membranes (Fig.2). Local treatment included the following measures:

- Rinsing with a 0.05% chlorhexidine solution;
- Use of Parodium gel with vector therapy and introduction of fibrin membranes;
- Selective grinding according to the Jenkinson method;
- If the frontal teeth of the lower jaw are not stable - temporary splinting.

General therapy included:

- Trichopol 500 mg twice a day for 5-7 days;
- ibuprofen 100 mg once a day for 3-5 days;
- Lactofiltrum - one tablet three times a day for 5-7 days;
- Ascorutin - one tablet three times a day for 10 days;
- Novopassitis - one tablet twice a day for 10 days.

At the rehabilitation stage, a diet, strict oral hygiene regimen, a щадящий regime, and dispensary observation were prescribed.

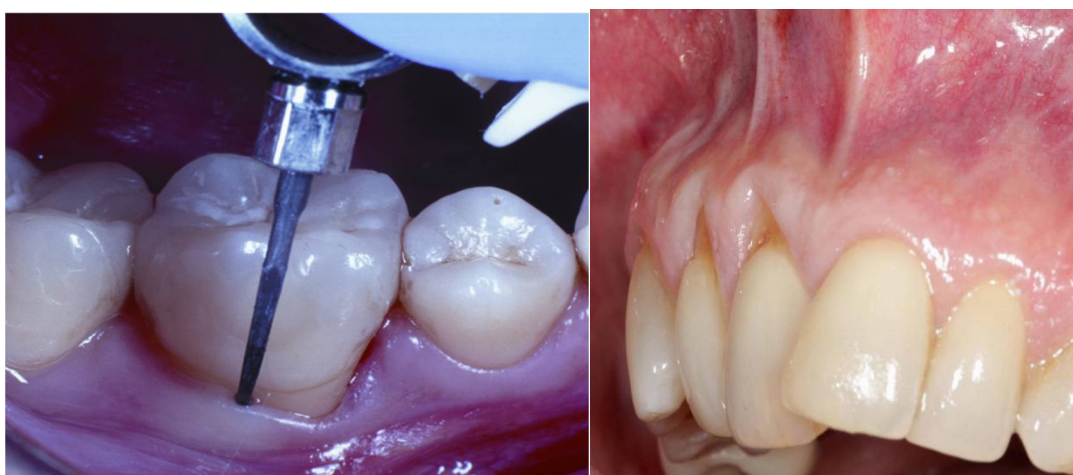


Figure 2. Vector therapy and fibrin membrane production

• After complex therapy, the indicators of the hygiene index and periodontal indices underwent significant changes:

- • OHI-S: Decrease from 1.45 to 0.15 (approximately by 89.66%) indicates significant improvement in oral hygiene.
- • GI (Loe, Silness): A decrease from 0.98 to 0.10 (approximately by 89.8%) indicates a significant decrease in gingival inflammation.
- • PI (Russel): A decrease from 3.12 to 2.71 (approximately 13.14%) indicates a moderate improvement in the periodontal condition.
- • mSBI: Decrease from 0.5 to 0.1 (by 80%) reflects a significant decrease in gingival bleeding.
- Depth of periodontal pockets: Contraction from 3.48 mm to 3.0 mm (approximately by 13.79%) indicates partial restoration of periodontal tissues.
- Pathological mobility of teeth (by Entin): Decrease from 1.24 to 0.9 (approximately by 27.42%) indicates strengthening of teeth in alveolar grooves.

Conclusions: Regenerative therapy led to a significant improvement in oral hygiene, a decrease in inflammation and bleeding of the gums, and a strengthening of the teeth (Table 1).

Complex therapy for mild CGP in the control group also contributed to a significant improvement in most periodontal condition indicators. The most noticeable changes are observed in improving oral hygiene (a decrease in OHI-S by 63.5%) and a decrease in gingival inflammation (a decrease in GI by 67.4%). However, the periodontal status indicators of CGPLS patients in the main group differed significantly from the control group indicators in all parameters (Table 2).

Comparative analysis of the indicators of patients with mild CGP in the observation groups showed that in the main group, there is a more significant improvement in most indicators of the periodontal condition after treatment compared to the control group. Especially noticeable is the difference in the decrease in the gingival bleeding index (GBI) and oral hygiene index (ONI-S), which indicates a more effective reduction in inflammation and improvement in oral hygiene in the main group.

The dental status of patients with CGD of varying severity is characterized by a significant increase in the indicators of all hygiene, periodontal, and CPU indices.

The decrease in periostin levels in CGP at the initial stages of the disease by 2.7 times and its further decrease by 7.9 times in severe CGP indicates an intensification of inflammatory-destructive processes. Low levels of periostin contribute to bone tissue destruction and prevent its restoration. Normalization of periostin levels after treatment indicates the effectiveness of regenerative therapy. Assessment of the dynamics of TGF- β fibroblast growth factor levels indicates its significant increase in the initial stages of inflammation, which can indicate active cell proliferation and possible tissue fibrosis. In the initial stages of inflammation, an increase in the level of TGF- β indicates the activation of compensatory mechanisms in the tissues.

Its further excessive activity can contribute to fibrosis and pathological changes in tissues.

High levels of pro-inflammatory cytokines (IL-1 β , IL-6, IL-8, IL-17, IL-18) in patients with chronic gingivitis (CHD) indicate active inflammatory-destructive processes in the periodontal tissues. A decrease in IL-10 by 2 times compared to the norm demonstrates a weakening of anti-inflammatory control. An increase in IL-37 by 1.6 times in the early stages of the disease may be compensatory, indicating an active immune response, but its decrease by 1.3 and 2 times, respectively, during the progression of CGP, indicates a disruption of protective mechanisms. These indicators can serve as biomarkers for early diagnosis of CGD.

The balance between the levels of periostin and TGF- β can be an important factor in maintaining periodontal health and preventing the progression of inflammation.

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