Volume 4, Issue 1, January 2026 ISSN (E): 2938-3765

THERAPEUTIC STRATEGIES FOR SUBPROSTHETIC MUCOSAL COMPLICATIONS ASSOCIATED WITH REMOVABLE DENTURES

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Abstract
The oral mucosa has a number of properties, making it resistant to various external influences, including physical, thermal and chemical factors. One of the most important properties of the mucosa is its strong regenerative ability. At the same time, despite the protective and biological functions of the oral mucosa, various diseases are widespread, and their treatment is one of the most complex and urgent issues in dentistry. According to WHO, more than 90% of the population over middle age suffer from diseases of the oral mucosa and periodontal tissues.

Keywords: Regeneration, inflammation, COVID-19, complete edentulism.

Introduction

There is a clear connection between pathological processes observed in the oral cavity and changes in the internal organs, metabolic disorders, and immune status. The diversity of dental diseases, their etiology and pathogenesis, the similarity of the clinical manifestations of gastrointestinal disorders and various nosological forms require the development of scientifically based recommendations for prevention and treatment.

The effect of dentures on the oral mucosa has been identified as a major factor in the development of inflammatory processes, especially in elderly patients. It has been shown that impaired proteolytic system activity is a major pathogenetic factor of inflammatory processes in orthopedic patients using removable plate prostheses.

Removable orthopedic structures, even with careful handling, exert a constant mechanical and microbiological effect on the mucosa of the prosthesis, creating a favorable environment for microorganisms. As a result, dysbacteriosis develops in the oral cavity, the protective functions of the normal microflora are disrupted, and the risk of inflammation and other pathological processes increases .

The toxicity of materials used in the manufacture of removable dentures and errors in the polymerization process can cause inflammatory processes in the tissues of the prosthetic socket. Therefore, there is a need to develop biologically safe materials. Also, insufficient preparation for prosthetics does not provide oral hygiene and a suitable environment for the prosthesis, which increases the risk of inflammation, pulpitis and other complications.

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Changes occur in the oral mucosa under the influence of various infections. In particular, during the COVID-19 pandemic, the number of diseases of the oral mucosa has increased significantly. Therefore, the problem of effective diagnosis and rational pharmacotherapy of oral mucosa pathology in clinical practice is urgent.

Materials and methods

The study was conducted in 2024–2025 at the Stomatology Center of the Bukhara State Medical Institute. A total of 149 patients with partial or complete edentulism who needed orthopedic rehabilitation were selected for the study. The patients were aged from 45 to 80 years, and the gender distribution of male and female patients was as follows: (Table 1).

Table 1

Age distribution of patients in the study (%)

Research groups	45-59 years old		60-74 years old	
Women	4 8	32.2 %	3 9	2 6.2%
Men	30	20.1 %	32	2 1.5 %

The main inclusion criteria for patients were the presence of signs of inflammation in the oral mucosa, including hyperemia, edema, erosion, or ulceration . At the same time, during the study, patients did not use other local or systemic anti-inflammatory drugs and their general health was stable.

Figure 1. Appearance of denture stomatitis in complete edentulous upper jaw

However, the long-term interaction of dentures with the oral environment and denture base tissues is still a complex and unresolved issue. Prosthetic materials come into direct contact with denture base tissues and often have a negative impact on the physiological state of the oral cavity. This impact depends on the type of prosthetic material, its structural properties, oral hygiene, and the individual biological characteristics of the patient. In our study, we divided patients with partial and complete edentulous dentures into groups (Table 2 and Figure 2).

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Table 2 **of patients in the study with a diagnosis of unemployment into groups (%)**

Research groups	Partial edentulism		Complete edentulism	
Women	55	36. 9 %	32	21. 5 %
Men	4 7	3 1.5 %	1 5	10.1 %

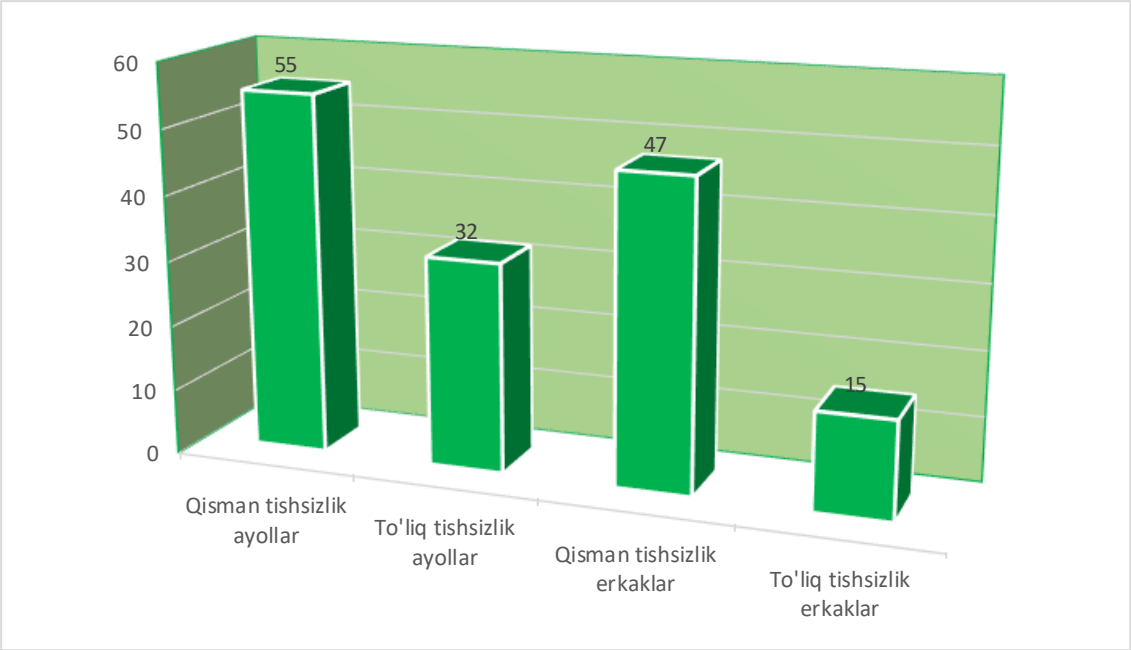

Figure 2. Grouping of patients with partial and complete edentulism

The choice of Calendula officinalis extract as a treatment method is based on its antimicrobial, anti-inflammatory and regenerative properties. Scientific studies show that Licorice extract reduces inflammation of mucous membranes, relieves pain and accelerates regeneration in areas with wounds or erosion. At the same time, the extract has the property of inhibiting pathogenic microflora in the oral cavity, including microorganisms such as Candida spp. and Streptococcus mutans, and has been evaluated as an effective tool in reducing subprosthetic inflammatory processes.

Licorice extract is natural and biologically safe, and does not have a toxic effect on the human body. This allows for its long-term and prophylactic use. Therefore, in the study, Licorice extract was chosen to improve the condition of the mucous membrane of patients, increase prosthetic adaptation, and reduce traumatic effects.

During the treatment, the extract was applied directly to the oral mucosa and the patients were monitored for 3 months. The results of clinical and microbiological observations were used to scientifically evaluate the effectiveness of the extract by analyzing the changes in indicators before and after treatment. Thus, Licorice extract was selected as a safe and effective treatment in dental practice.

During the study, the effectiveness of treatment with Calendula officinalis extract was assessed based on dental and microbiological parameters before treatment, 1 week, 1 month, and 3 months after treatment.

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Research results:

In the pre-treatment period, most patients had oral mucosal obvious signs of inflammation were observed in the oral cavity. Among the subjective complaints, pain, itching and burning took the leading place, their intensity was on average 6.8 ± 1.2 points on the Visual Analogue Scale (VAS). During the clinical examination, diffuse redness, swelling, and in some cases eroded areas were detected on the mucous membrane, and the frequency of inflammatory signs was 100%. According to the results of the study, significant positive changes were observed in the condition of the mucous membrane of patients with partial removable dentures with the use of Calendula officinalis extract. Before treatment, mucosal hyperemia was noted in 100% of patients, swelling in 100%, and erosion or ulceration in 38%. The mean subprosthetic reactivity was 2.8 ±0.4 points, the OHI-S index was 4.5 ±0.6 points, the pain level was 6.7 ±1.1 points on the VAS scale, and the prosthesis adaptation was 0%.

At the end of 1 week of treatment, mucosal hyperemia was reduced by 70%, edema by 65%, and erosion/ulceration by 24%. Prosthesis under reactivity o ' average 2.1 ±0.5 points decreased , OHI - S index 3.1 ±0.5 points improved , pain level and 4.0 ±0.9 points decreased . During the same period, prosthetic adaptation increased by 40%.

At 1 month of treatment, hyperemia decreased by 42%, edema by 40%, and erosion/ulceration by 10%. Subprosthetic reactivity decreased by 1.4 ±0.3 points, OHI-S index by 2.0 ±0.4 points, and pain level by 2.1 ±0.7 points. Prosthetic adaptation reached 70%. At the end of 3 months of treatment, mucosal hyperemia decreased by 16%, edema by 14%, and erosion/ulceration decreased by 4%. Subprosthetic reactivity decreased by 0.6 ±0.2 points, OHI-S index by 1.1 ±0.3 points, and pain level by 0.9 ±0.4 points. Prosthetic adaptation increased by 90%.

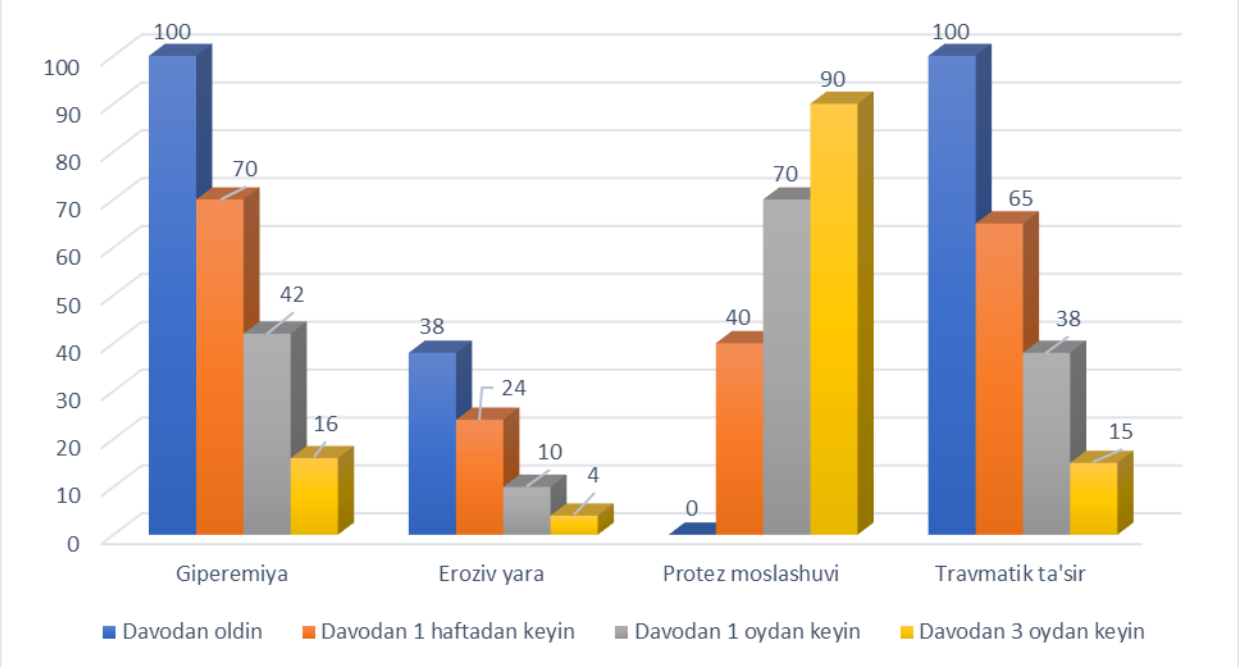

Figure 3. Comparative analysis of treatment results in partial edentulism

Microbiological parameters also showed positive changes, but the main focus of the study was on dental parameters: the concentration of Candida spp. decreased by 14 × 10³ CFU/ml at the end of treatment. These results indicate that the use of licorice extract significantly improved the condition of the mucosa in patients with partial dentures, reduced pain and inflammation, and increased denture fit.

According to the results of the study, the condition of the mucous membrane of patients with prosthetics with completely removable dentures (Table 4)

Table 4 Results of treatment with Calendula officinalis extract with fully removable dentures

Indicator	Before treatment	1 week	1 month	3 months
Hyperemia (%)	100	75	50	20
Swelling (%)	100	70	45	18
Erosion/ulcer (%)	40	28	12	5
Subprosthetic reactivity (0–3)	2.9 ±0.4	2.2 ±0.5	1.5 ±0.3	0.7 ±0.2
OHI-S	4.6 ±0.6	3.2 ±0.5	2.1 ±0.4	1.2 ±0.3
VAS	6.9 ±1.1	4.2 ±0.9	2.3 ±0.7	1.0 ±0.4
Candida spp. (×10³ CFU/ml)	125 ±20	70 ±12	35 ±10	16 ±5
Prosthetic adaptation (%)	0	35	65	85
Traumatic impact (%)	100	68	40	18

Significant improvement was achieved with the use of licorice (Calendula officinalis) extract. Before treatment, all patients (n=131) had mucosal hyperemia and edema, the intensity of hyperemia was 100%, edema was 100%. The presence of erosion or ulceration was in 38%, the average subprosthetic reactivity was 2.8 ± 0.4 points, the OHI-S index was 4.5 ± 0.6 points, and the pain level on the VAS scale was 6.7 ± 1.1 points. During this period, the prosthesis adaptation was 0%, and the level of traumatic impact was 100%. In microbiological parameters, the average concentration of Candida spp. was 120 ± 18 × 10³ CFU/ml.

At the end of the first week of treatment, mucosal hyperemia was reduced by 70%, edema by 65%, and erosion/ulceration by 24%. Subprosthetic reactivity decreased by an average of 2.1 ±0.5 points, OHI-S index improved by 3.1 ±0.5 points, and pain level decreased by 4.0 ±0.9 points. Prosthetic adaptation increased by 40%, traumatic effect decreased by 65%. Candida spp. concentration decreased by 65 ±12 ×10³ CFU/ml .

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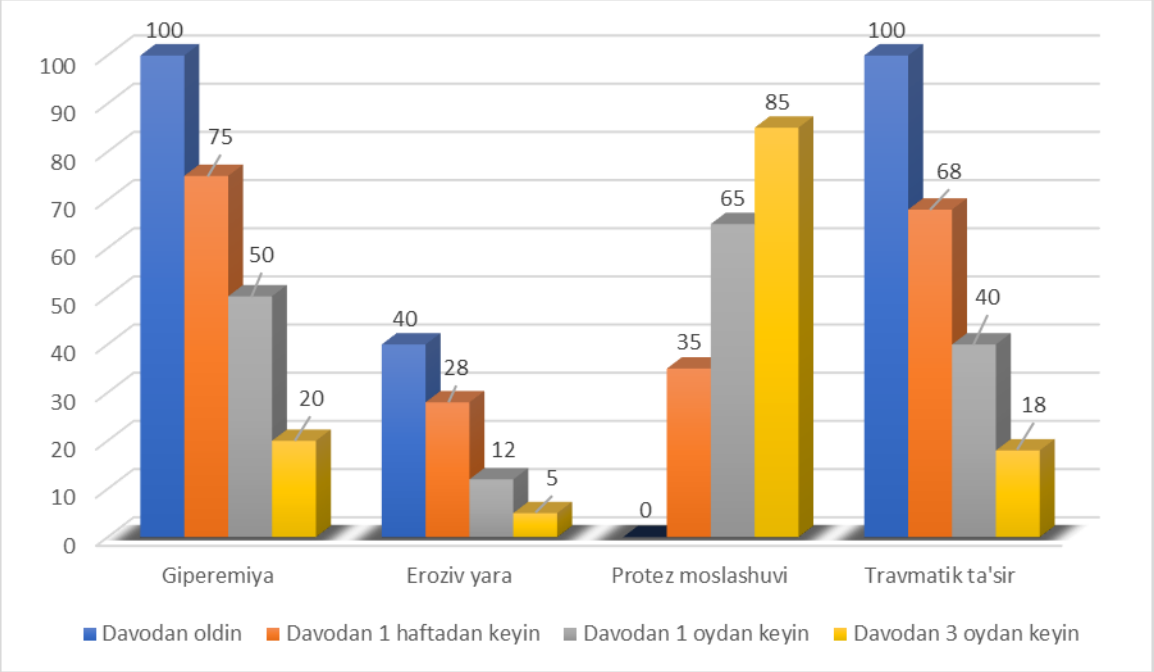

Figure 4. Comparative analysis of treatment results in complete edentulism

After one month of treatment, hyperemia decreased by 42%, edema by 40%, erosion/ulceration by 10%. Subprosthetic reactivity decreased by 1.4 ±0.3 points, OHI-S index by 2.0 ±0.4 points, pain level by 2.1 ±0.7 points. Prosthetic adaptation increased by 70%, traumatic effect decreased by 38%. Candida spp. concentration decreased by 30 ±9 ×10³ CFU/ml.

At the end of 3 months of treatment, mucosal hyperemia decreased by 16%, edema by 14%, and erosion/ulceration by 4%. Subprosthetic reactivity decreased by 0.6 ±0.2 points, OHI-S index by 1.1 ±0.3 points, and pain level by 0.9 ±0.4 points. Prosthetic adaptation increased by 90%, and traumatic impact decreased by 15%. Candida spp. concentration decreased by 14 ±5 ×10³ CFU/ml.

These results show that patients with removable dentures treated with Licorice extract had significantly improved mucosal conditions, reduced pain and inflammation, improved denture fit, and stabilized dental parameters. Microbiological changes were also positive, with a decrease in Candida spp. concentrations, but the main focus of the study was on improving dental parameters.

Conclusion

1. Treatment with licorice extract significantly reduces pain and mucosal inflammation in patients with denture stomatitis . Clinical observations showed that 78% of patients had a reduction in pain to 0–3 points on the VAS scale, confirming the effectiveness of the drug in reducing dental discomfort.
2. In patients treated with licorice extract, mucosal hyperemia and erosive changes were significantly reduced within 14 days. During the study, clinical examinations confirmed complete mucosal regeneration and the absence of signs of inflammation in 85% of patients.
3. Microbiological analyses revealed that licorice extract helped reduce dental pathogenic microflora, with an average 2.5–3-fold decrease in the levels of Streptococcus mutans and Candida albicans. This result demonstrates the antimicrobial efficacy of the extract in the prevention and treatment of denture stomatitis .

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