MODERN CLINICAL INTERVENTIONS FOR ORAL MUCOSAL COMPLICATIONS RESULTING FROM REMOVABLE DENTURES

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Abstract. Removable dentures are a key etiological factor in oral mucosal disorders, particularly prosthetic stomatitis. Mechanical irritation, oral microbiota imbalance, and local immune disruption contribute to inflammation, often presenting with mild or subclinical symptoms that delay diagnosis. Modern therapeutic approaches focus on promoting epithelial repair, stabilizing intraoral pH, reducing hyperemia and discomfort, and improving patient adherence. Clinical evidence suggests that innovative treatment strategies may surpass conventional regimens in efficacy. Additionally, sensitive non-invasive biomarkers can support early detection and better prognostic outcomes in denture-associated mucosal pathology.

Keywords: removable dentures; oral mucosa; prosthetic stomatitis; epithelial repair; hyperemia; pH; innovative therapy; clinical outcomes

Introduction: The oral mucosa exhibits unique structural and functional properties, providing resistance to mechanical, thermal, and chemical influences, alongside a remarkable regenerative capacity (Borodovitsyna S.I., 2019). Despite its protective and biological roles, oral mucosal diseases are widespread, posing complex challenges in modern dentistry. According to the World Health Organization, over 90% of middle-aged and elderly individuals experience disorders of the oral mucosa and periodontal tissues (Arzukanyan A.V., 2021).

Adverse environmental factors, coupled with low therapeutic efficacy, necessitate precise classification of inflammatory oral mucosal diseases, representing a significant

scientific and clinical issue (Zarkumova A.E., 2017). Pathological changes in the oral cavity are often associated with systemic conditions, metabolic disorders, and alterations in immune status. The heterogeneity of dental diseases in terms of etiology and pathogenesis, alongside similar clinical manifestations across nosological forms, emphasizes the need for evidence-based preventive and therapeutic strategies (Robakidze N.S., 2019).

Saliva serves as a practical and reliable diagnostic medium for oral mucosal conditions. Its biologically active components contribute to antibacterial, immunological, and antioxidant defense. Detailed study of salivary biomarkers allows for earlier disease detection and optimization of treatment and patient care strategies (Al Shaar A., Hamadeh O., Ali A., 2024).

Removable dentures significantly affect the oral environment, altering the acid-base balance and mineral composition of saliva. Stamped prosthetic coatings exert minimal impact, and their influence remains limited beyond 12 months post-placement (Sadriyev, 2024). Among elderly patients, dentures are a primary factor in initiating inflammatory processes. In removable plate denture wearers, disruptions in proteolytic system activity are a major pathogenetic mechanism of inflammation (Lavrovskaya O.M., 2019).

Even well-fabricated prostheses apply continuous mechanical and microbiological stress to mucosal tissues, promoting a favorable environment for microbial growth. This can lead to oral dysbiosis, impairing normal microflora defenses and increasing susceptibility to inflammatory and other pathological processes (Rubtsova E.A., 2017). Furthermore, material toxicity and polymerization errors in denture fabrication can trigger localized inflammation, underscoring the need for biologically safe materials. Inadequate prosthetic preparation, poor oral hygiene, and an incompatible oral environment further elevate the risk of inflammation, pulpitis, and associated complications (Shxagapsoeva K.A., 2017).

Modern therapeutic approaches aim to mitigate these challenges through strategies that promote epithelial regeneration, stabilize intraoral pH, reduce hyperemia and discomfort, and enhance patient adherence. Innovative interventions are increasingly

shown to surpass traditional treatments in clinical efficacy and outcomes, while non-invasive biomarkers facilitate early detection and improved prognostic evaluation. Collectively, these strategies contribute to more effective management of oral mucosal disorders associated with removable dentures, emphasizing the integration of preventive, diagnostic, and therapeutic measures in contemporary prosthodontics.

Materials and Methods. The investigation was carried out at the Department of Orthopedic Dentistry and the Stomatology Center of Bukhara State Medical Institute named after Abu Ali ibn Sina. A total of 149 patients (Table 1) indicated for removable denture prosthetic rehabilitation were enrolled during the study period (2024–2025). Based on the clinical condition of the oral mucosa and the prescribed therapeutic regimen, participants were stratified into three cohorts: a control group, a conventional treatment group, and an advanced therapy group.

Comprehensive clinical assessments were conducted prior to prosthetic rehabilitation and subsequently at 1 week, 1 month, and 3 months post-treatment. The evaluation encompassed the quantification of mucosal hyperemia, monitoring of epithelial repair and regeneration, subjective discomfort reporting, and the detection or progression of prosthetic stomatitis and other mucosal pathologies.

Distribution of Patients with Edentulism by Study Groups (%)

Table 1

Study Groups	Partial Edentulism	Complete Edentulism
Women	55 (36.9%)	32 (21.5%)
Men	47 (31.5%)	15 (10.1%)

In addition, the pH levels of mixed saliva were measured to evaluate local biochemical alterations associated with denture wearing. The morphological and functional characteristics of the oral mucosa were assessed using standardized clinical indices and laboratory parameters. Objective examination was supplemented by photographic documentation to monitor the dynamic progression of clinical findings. The inclusion criteria comprised partial or complete edentulism, indication for removable

denture prosthetic rehabilitation, and the absence of acute somatic or infectious disorders. Patients with malignant neoplasms of the oral cavity, severe systemic immunological impairments, or poor adherence to follow-up visits were excluded from the study. All participants provided informed consent prior to enrollment, and the study protocol fully adhered to biomedical ethical regulations.

Prosthetic stomatitis, a prevalent inflammatory condition of the oral mucosa linked to removable dentures, is often exacerbated by mechanical trauma and microbial dysbiosis at the denture-bearing surfaces. In this study, therapy with **Calendula officinalis extract** demonstrated notable clinical and laboratory benefits in patients with prosthetic stomatitis. Comparative evaluation indicated that participants receiving Calendula-based therapy exhibited a significant reduction in mucosal hyperemia and inflammatory manifestations compared to those undergoing conventional treatment.

Epithelial regeneration, assessed via standardized clinical scoring and visual inspection, progressed more rapidly in the Calendula cohort, with most patients achieving near-complete mucosal restoration within one month. Salivary pH analysis further revealed a trend toward normalization, suggesting stabilization of the intraoral microenvironment and partial re-establishment of the acid–base balance disrupted by prolonged denture use.

The bioactive constituents of Calendula officinalis, particularly glycyrrhizin and flavonoids, possess well-characterized anti-inflammatory, antioxidant, and immunomodulatory properties, likely contributing to the observed therapeutic effects. These phytochemicals may promote mucosal repair by enhancing epithelial proliferation, reducing oxidative stress, and modulating local immune responses, thereby restoring oral mucosal homeostasis. In contrast, the conventional therapy group exhibited slower mucosal recovery, with residual hyperemia in some patients. Overall, treatment with Calendula officinalis extract resulted in accelerated epithelial regeneration, decreased discomfort, and improved denture tolerance, highlighting its potential as an effective adjunctive or alternative intervention for managing removable denture-associated stomatitis.

Results: Prior to intervention, most patients exhibited pronounced inflammatory signs of the oral mucosa. Subjective symptoms were primarily pain, pruritus, and burning sensations, with a mean intensity of 6.8 ± 1.2 on the Visual Analog Scale (VAS). Clinical examination revealed diffuse erythema, edema, and, in some cases, localized mucosal erosions, with inflammatory manifestations present in 100% of patients.

After prosthetic rehabilitation with partial removable dentures combined with Calendula officinalis extract therapy, significant improvements in mucosal condition were observed. Initially, mucosal hyperemia and swelling were detected in 100% of patients, while erosion or ulceration was present in 38%. The mean sub-denture reactivity score was 2.8 ± 0.4, the Oral Hygiene Index–Simplified (OHI-S) averaged 4.5 ± 0.6, VAS-measured pain intensity was 6.7 ± 1.1, and denture adaptation was 0%, indicating initial maladjustment prior to treatment.

Following prosthetic rehabilitation with partial removable dentures and treatment using Calendula officinalis extract, patients demonstrated substantial improvements in mucosal health (Table 2). Before therapy, mucosal hyperemia was observed in 100% of patients, swelling in 100%, and erosion or ulceration in 38%. The mean sub-denture reactivity score was 2.8 ± 0.4, the Oral Hygiene Index–Simplified (OHI-S) averaged 4.5 ± 0.6, pain intensity on the VAS was 6.7 ± 1.1, and denture adaptation was 0%, reflecting initial maladjustment prior to therapeutic intervention.

By the end of the first month of treatment, significant improvements in oral mucosal condition were observed. The prevalence of hyperemia decreased to 42%, and edema was reduced to 40%, reflecting progressive resolution of inflammation. Erosions and ulcerative lesions were present in only 10% of patients, indicating substantial healing of previously affected areas. The mean subprosthetic reactivity score declined to 1.4 ± 0.3, demonstrating markedly reduced tissue sensitivity to the denture. Oral hygiene, assessed by the Oral Hygiene Index–Simplified (OHI-S), improved to 2.0 ± 0.4, while pain intensity on the VAS decreased to 2.1 ± 0.7, reflecting minimal discomfort. At this stage, denture adaptation reached 70%, indicating satisfactory functional tolerance of prostheses in most patients.

At the conclusion of the third month, clinical outcomes were further enhanced. Hyperemia was reduced to 16%, and swelling was minimal at 14%, indicating near-complete resolution of inflammatory changes. Erosions and ulcerative lesions were observed in only 4% of patients, reflecting almost full mucosal recovery. Subprosthetic reactivity decreased to 0.6 ± 0.2, suggesting that oral tissues had largely adapted to the dentures without significant inflammatory response. The OHI-S index improved to 1.1 ± 0.3, confirming excellent oral hygiene maintenance, while pain intensity declined to 0.9 ± 0.4, demonstrating negligible discomfort during denture use. Denture adaptation reached 90%, indicating that the majority of patients were fully acclimated and able to function effectively with their prostheses.

Conclusions: The results of this study indicate a consistent trend of progressive improvement in oral mucosal health throughout the course of denture therapy. Reductions in hyperemia, edema, and erosive lesions, along with decreased subprosthetic reactivity and pain scores, underscore the clinical effectiveness of the applied therapeutic protocol. Improved denture adaptation further highlights the importance of optimal prosthetic design combined with patient education in achieving favorable functional and clinical outcomes. These observations emphasize the necessity of continuous monitoring and maintenance of oral hygiene in patients using removable prostheses.

Treatment with Calendula officinalis extract significantly alleviated pain and diminished mucosal inflammation in patients with prosthetic stomatitis. Clinical assessments showed that 78% of patients experienced a reduction in pain intensity to 0–3 points on the Visual Analog Scale (VAS), confirming the extract’s efficacy in relieving discomfort. Within 14 days, patients receiving Calendula-based therapy demonstrated marked reductions in mucosal hyperemia and erosive changes, and follow-up evaluations revealed that 85% achieved complete epithelial regeneration with resolution of inflammatory signs.

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