

PROSTHETIC STOMATITIS ASSOCIATED WITH THE USE OF REMOVABLE AND FIXED PROSTHODONTIC APPLIANCES

Mirkhoshimova Muyassar

Tashkent State Medical University

<https://orcid.org/0009-0008-2633-446X>

e-mail: mirkhoshimovamuyassar93@gmail.com

ABSTRACT

Removable dentures remain one of the most widely used methods of prosthetic rehabilitation in patients with complete and partial edentulism. However, the use of acrylic plate dentures is frequently accompanied by inflammatory and dystrophic changes in the denture-bearing mucosa and by disturbances of local immune protection and oral microbiocenosis. The present article provides a clinical and laboratory substantiation of the use of a newly developed biologically active bioresorbable film containing the immunocorrective agent Imudon. The study design, methods of assessment of local humoral and cellular immunity, microbiological characteristics of the denture-bearing mucosa and functional indices of the masticatory system are described. The results demonstrate that inclusion of the Imudon-containing film in the complex of prosthetic treatment increases the effectiveness of rehabilitation, normalises local defence mechanisms, restores the microbial balance of the oral cavity and shortens the period of adaptation to removable dentures.

Keywords: removable dentures, acrylic base, denture stomatitis, local immunity, Imudon, biologically active film, oral microbiocenosis, prosthetic rehabilitation.

INTRODUCTION

In modern dental practice, removable plate dentures continue to play a key role in the rehabilitation of patients with complete and partial edentulism. Despite the active development of implant-supported prosthetic technologies, economic, medical and anatomical limitations often make conventional removable dentures the only realistic option for many patients. At the same time, clinicians are increasingly confronted with complications associated with the long-term use of acrylic denture bases. These complications include chronic traumatic injuries, denture stomatitis, candidal lesions and combined inflammatory-dystrophic changes of the denture-bearing mucosa. Acrylic denture base resins, while possessing satisfactory mechanical, technological and aesthetic properties, cannot be regarded as fully biologically inert materials. Residual monomer and other components of the polymer matrix may exert toxic and allergenic effects. Moreover, the presence of a rigid plate covering large areas of the mucosa leads to chronic mechanical pressure, thermal insulation, impaired aeration and stagnation of saliva. All of these factors together disturb microcirculation, modify local immune responses and favour colonisation of the denture-bearing tissues by pathogenic and opportunistic microflora. As a result, the oral mucosa becomes more vulnerable to infection and trauma, and the period of adaptation to the prosthesis is often characterised by pronounced discomfort and inflammatory phenomena.

Traditional preventive measures include optimisation of impression techniques and occlusal relationships, improvement of the fit of the denture base, careful finishing and polishing of acrylic surfaces, as well as patient education in oral and denture hygiene. Although these measures are

obligatory and undoubtedly reduce the risk of complications, they are often insufficient to fully compensate for the biological disadvantages inherent to plate dentures.

The present work provides a detailed clinical and laboratory analysis of the effectiveness of a biologically active film containing Imudon, used in combination with removable dentures.

Particular attention is paid to the dynamics of local humoral and cellular immunity, changes in the structure of the oral microflora, the severity of inflammatory lesions of the denture-bearing mucosa and the functional state of the masticatory system.

Aim of the study

The aim of this study was to increase the effectiveness and predictability of prosthetic rehabilitation in patients with complete and partial absence of teeth through the development and comprehensive clinical and laboratory evaluation of a biologically active bioresorbable film containing the immunocorrector Imudon, intended for use in the denture-bearing area during adaptation to removable plate dentures.

Materials and methods

Study design and characteristics of the patients

The clinical study included adult patients aged 51 to 70 years with complete or partial edentulism of one or both jaws who required prosthetic treatment with removable plate dentures. Individuals with severe general somatic pathology in the stage of decompensation, as well as patients with acute inflammatory diseases of the oral mucosa or systemic immunodeficiency, were excluded from the investigation. All participants gave informed consent to take part in the study.

Treatment protocols

Patients of Group 1 (control group) received conventional prosthetic treatment: fabrication and clinical adjustment of removable plate dentures without the use of any medicated films or additional local pharmacotherapy during the adaptation period.

In Group 2, prosthetic treatment followed the same protocol as in the control group; however, during the first days of adaptation a commercially available bioresorbable film Protoplex-M containing Solcoseryl was applied to the internal surface of the denture base. Solcoseryl is known to possess trophic and wound-healing properties and is widely used in dentistry to stimulate tissue repair.

Group 3 received removable plate dentures in combination with a newly developed biologically active film incorporating the immunocorrective drug Imudon. The film was based on a thin biopolymer matrix, which was non-toxic, elastic and capable of gradual dissolution in saliva, thereby ensuring sustained local release of the active substance.

Technique of application of the films

In Groups 2 and 3, before inserting the denture into the mouth, the internal surface of the base was carefully washed and dried. A thin sheet of the corresponding film was then adapted to the entire basal surface so that its borders coincided with the borders of the denture in the vestibular fold and in the palatal or lingual areas. Excess material was trimmed with scissors. After that the denture was positioned in the oral cavity in the usual way and the patient was asked to close the jaws in centric occlusion.

In the case of the Imudon-containing film, the procedure was carried out 2–3 times daily during the first 7–10 days after insertion of the denture. Patients were instructed not to remove the denture for

at least 30–40 minutes after application of the film in order to provide intimate contact between the material and the mucosa, and to minimise eating and drinking during this period.

Methods for evaluation of local immunity

To substantiate the effect of the proposed method on local defence mechanisms, levels of secretory immunoglobulin A (sIgA), IgA and IgG in saliva were determined using radial immunodiffusion. unstimulated mixed saliva was collected in the morning on an empty stomach, centrifuged to remove cellular elements and stored at low temperature until analysis. Lysozyme activity was assessed according to the classical turbidimetric method based on the rate of lysis of a *Micrococcus lysodeikticus* suspension. The functional state of neutrophils was evaluated using a latex particle phagocytosis test with calculation of the phagocytic index (percentage of phagocytosing cells) and the phagocytic number (mean number of latex particles engulfed per phagocyte).

Microbiological examination

Microbiological studies were carried out on smears taken from the mucosa of the denture-bearing area (palate and alveolar ridge for the maxilla, alveolar ridge and retromolar region for the mandible). Sampling was performed prior to prosthetic treatment and subsequently on days 10, 30, 60 and 90 of denture use. Standard methods of cultivation on selective and differential media were applied. The frequency of detection and the colony-forming units of *Escherichia coli*, *Staphylococcus aureus*, *Candida albicans*, *Neisseria*, *Enterococcus faecalis*, *Klebsiella*, β -haemolytic streptococci and other conditionally pathogenic microorganisms were recorded.

Functional evaluation of the masticatory system

The functional state of the masticatory system was examined by means of automated registration of mandibular movements. The duration of the chewing cycle, the number of chewing strokes per minute and the duration of the swallowing period were determined when patients chewed a standard test food. These indices reflect the degree of coordination and efficiency of the masticatory apparatus and are sensitive markers of the patient's adaptation to the prosthesis.

Schedule of examinations and statistical analysis

All types of examination were carried out before denture insertion, on days 3, 7 and 10 after insertion and at 1, 2 and 3 months of follow-up. Statistical processing of the data included calculation of means and standard deviations. Differences between groups at similar time points, as well as intra-group changes in dynamics, were assessed using appropriate parametric and non-parametric tests with the level of significance set at $p < 0.05$.

Results

Dynamics of local humoral and cellular immunity

Before treatment, all patients exhibited decreased levels of sIgA, IgA and IgG in saliva, reduced lysozyme activity and lowered phagocytic index and phagocytic number compared with reference values, which reflected a chronic deficiency of local immune protection in the oral cavity.

In the control group, insertion of removable dentures led to a further decline of these indices during the first 10 days. Only by the second and third months did the values gradually return to the baseline level, which indicated a slow and strained adaptation process. In Group 2, where Protoplen-M was used, a moderate transient improvement of immunological parameters was observed, but by the third month the indices were again close to their initial values.

In contrast, in Group 3 the use of the Imudon-containing film resulted in a significant and persistent increase in levels of sIgA, IgA and IgG already by day 10. Lysozyme activity increased to values

near the upper limit of the physiological range, and both phagocytic index and phagocytic number rose substantially. Although a slight decline was noted at later time points, all indices remained significantly higher than the baseline values throughout the three-month observation period. This confirms the immunocorrective potential of the proposed method.

Changes in oral microbiocenosis

Microbiological analysis demonstrated that in the control group the colonisation of the denture-bearing mucosa by pathogenic and opportunistic microorganisms intensified after denture insertion. The number of colonies of *E. coli*, *Staphylococcus aureus*, *Candida albicans* and other species increased, and this unfavourable pattern persisted for at least one month. In Group 2 a certain decrease in microbial contamination was noted by day 30, but the reduction was modest and unstable.

In Group 3, already by day 10 of treatment with the Imudon-containing film the total number of colonies of pathogenic and opportunistic microflora decreased sharply. By one month, many species were either not detected or were found only in isolated cases. The composition of the microflora approached that typical of a clinically healthy oral cavity in denture wearers, which indicates restoration of microbiocenosis under the conditions of immunocorrective therapy.

Condition of the denture-bearing mucosa

Clinical and macrohistochemical examinations showed that immediately after denture insertion all patients developed inflammatory changes under the base, manifested as areas of hyperaemia and oedema. The total area of inflammatory zones was similar in all groups at the initial stage.

In the control group these changes persisted for a long time: even by the end of the first month extensive areas of inflammation remained, and many patients continued to complain of burning and discomfort. In Group 2 the regression of inflammatory phenomena was faster; however, the area of lesions still exceeded the values recorded in Group 3.

The most favourable dynamics were observed in patients receiving the Imudon-containing film. By the end of the first month the total area of inflammatory zones was several times smaller than at baseline and was significantly lower than in the other groups. Hyperaemia and oedema were mild or absent, and subjective complaints were minimal. This indicates an accelerated and more comfortable adaptation of the mucosa to the prosthesis.

In Group 2 moderate improvement of functional parameters was recorded; nevertheless, they did not reach optimal values. In Group 3, on the contrary, the chewing cycle shortened significantly by day 10 and continued to normalise during the observation period. The number of chewing strokes per minute approached physiological norms, and the swallowing period became shorter and more stable. Patients of this group quickly achieved confident and efficient mastication of solid food with their new dentures.

The combination of immunocorrective action with the properties of a prolonged-release dosage form is of crucial importance. Continuous and controlled release of Imudon at the interface between the denture base and the mucosa ensures a stable therapeutic effect without significant systemic exposure. This approach can be regarded as an example of rational local pharmacotherapy in prosthetic dentistry.

Conclusions

The clinical and laboratory data presented in this article allow the following conclusions to be drawn:

1. Patients treated with removable plate dentures frequently exhibit a decrease in local humoral and cellular immunity, activation of pathogenic and opportunistic microflora and development of inflammatory changes in the denture-bearing mucosa, which complicate and prolong the period of adaptation to the prosthesis.
2. Conventional bioresorbable films with trophic and wound-healing components provide only partial and unstable improvement of clinical and laboratory parameters and do not ensure persistent normalisation of oral microbiocenosis and immune protection.
3. The newly developed biologically active film containing Imudon has a pronounced immunocorrective effect, leading to a significant and sustained increase in levels of sIgA, IgA and IgG in saliva, normalisation of lysozyme activity and enhancement of neutrophil phagocytic function.
4. Application of the Imudon-containing film is accompanied by a marked reduction in colonisation of the denture-bearing mucosa by pathogenic and opportunistic microorganisms and by restoration of a microbiocenosis typical of clinically healthy denture wearers.
5. Against the background of treatment with the biologically active film, the area and severity of inflammatory lesions under the denture base decrease more rapidly, subjective complaints fade earlier and the functional indices of the masticatory system reach more favourable values compared with conventional treatment.
6. Inclusion of the Imudon-containing film in the complex of prosthetic rehabilitation can be recommended as an effective and pathogenetically justified method for improving the results of treatment and the quality of life in patients with complete and partial edentulism using removable plate dentures.

REFERENCES

1. **Малышев М.Е., Иорданишвили А.К., Мушегян П.А., Хабирова Т.Г.** Состояние секреторного иммунитета полости рта у больных с *Candida*-ассоциированным протезным стоматитом // *Медицинская иммунология (Meditsinskaya Immunologiya)*. 2021. Т. 23, № 3. С. 577–584.
2. **Le Bars P., Kouadio A.A., Bandiaky O.N., Le Guéhennec L., de La Cochetière M.** *Host's Immunity and Candida Species Associated with Denture Stomatitis: A Narrative Review // Microorganisms*. 2022;10(7):1437. doi:10.3390/microorganisms10071437. (Обзор врождённого и адаптивного иммунитета при протезном стоматите, роль *Candida* и дисбиоза). **MDPI**
3. Хабилов Н. Л. и др. госпитал ортопедик стоматология кафедраси йил давомида нашр этилган тезислар хисоботи. – Conferences, 2023. 1. Sharipov S. S., Mirxoshimova M. F., Ermatova F. R. "INTEGRATIV STOMATOLOGIK TA'LIM"(IST): MUSTAQIL VA DUAL TA'LIMNI BIRLASHTIRUVCHI YONDASHUV // Конференции. – 2025. – Т. 1. – №. – С. 376-379.
4. Нормуродова, Р. З., Дадабаева, М. У., Мирхошимова, М. Ф., Бабаханов, Р. Г., & Рахманова, М. Д. (2021). Обоснование стоматологического статуса у больных, страдающих сахарным диабетом в условиях стационара. *Современная наука: проблемы, идеи, тенденции.*—2021, 358-366.
5. Xabilov, N. L. "ЧАККА-ПАСТКИ ЖАҒ БЎҒИМИ КАСАЛЛИКЛИГИ БИЛАН ОҒРИГАН БЕМОРЛАРНИ ДАВОЛАШ КЎРСАТГИЧЛАРИ." *Journal of new century innovations* 18.2 (2022): 148-168.

6. Нормуродова, Р. З., Дадабаева, М. У., Мирхошимова, М. Ф., Халиметов, Ж. З., & Толмасов, С. Д. (2021). ЛЕЧЕБНО-ПРОФИЛАКТИЧЕСКИЕ МЕРОПРИЯТИЯ БОЛЬНЫХ ЗАБОЛЕВАНИЯМИ ПАРОДОНТА ПРИ САХАРНОМ ДИАБЕТЕ 2 ТИПА. ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ НАУКИ И ОБРАЗОВАНИЯ В XXI ВЕКЕ, 271-281.
7. Dadabayeva, M. U., Rikhsieva, D. U., Mirkhoshimova, M. F., & Asemova, S. A. (2020). Changes in the oral cavity in patients with chronic kidney disease. *Current approaches and research of the XXI century–2020. Editura “Liceul*, 68-71..
8. Дадабаева, М. У., Зиядуллаева, И. С., Мирхошимова, М. Ф., & Абдуллаев, С. С. (2020). Оралбўйида жойлашган худудлардаги болалар ва катталарнинг стоматологик маданиятини ошириш. *Stomatologiya*, (1), 15-19.
9. Дадабаева, М., Зиядуллаева, Н., Мирхошимова, М., & Абдуллаев, С. (2020). ДЕТИ В ПРИАРАЛЬЕ И ПОВЫШЕНИЕ СТОМАТОЛОГИЧЕСКОЙ КУЛЬТУРЫ ВЗРОСЛЫХ. *Стоматология*, 1(1 (78)), 15-19.
10. Safarov, M. T., Dadabaeva, M. U., Asemova, S. A., Mirhoshimova, M. F., & Rikhsiyeva, D. U. (2020). MODERN ASPECTS OF MATHEMATIC MODELING IN DENTAL IMPLANTATION. In *НАУКА И ОБРАЗОВАНИЕ: ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ* (pp. 354-359).
11. Xabilov, N. L., Xabilov, B. N., Sharipov, S. S., Muxiddinova, F. G., Mirxoshimova, M. F., & Nabiyev, K. A. (2024). STOMATOLOGIYADA O ‘SIMLIKKA ASOSLANGAN KOMPLEKS VOSITALARNI ISHLAB SHIQISH. *Journal of new century innovations*, 66(1), 203-209.
12. Хабилов, Н. Л., Хабилов, Б. Н., Шарипов, С. С., Мирхошимова, М. Ф., & Набиев, К. А. (2024). ХИМИЧЕСКИЕ ОЖОГИ СЛИЗИСТОЙ ОБОЛОЧКИ ПОЛОСТИ РТА. *Journal of new century innovations*, 66(1), 210-216.
13. Хабилов, Н. Л., Хабилов, Б. Н., Шарипов, С. С., Мирхошимова, М. Ф., Набиев, К. А., & Рашидов, Р. А. (2024). БИОПЛЁНКАЛАР ЁРДАМИДА ЯРАЛАРНИНГ ТУЗАЛИШИ. *Journal of new century innovations*, 66(1), 195-202.
14. Xabilov, N. L., Muxitdinova, F. G., Mirxoshimova, M. F., Nabiyev, K. A., Salamova Sh, S., Sharipov, S. S., & Sultanova, N. (2024, November). TO ‘LIQ TISHSIZLIKDA CAD/CAM TECHNOLOGIYALARINING ROLI: ZAMONAVIY YONDASHUVLAR VA IMKONIYATLAR. In *Конференции* (pp. 254-257).