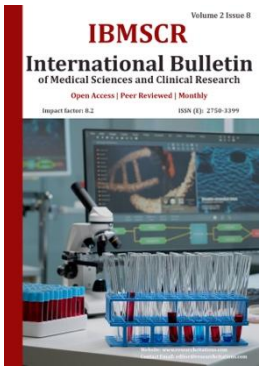

APPLICATION OF PROBIOTIC SOLUTION IN THE TREATMENT OF PURULENT INFLAMMATORY DISEASES OF THE MAXILLOFACIAL REGION

Shomurodov K.E. [1]
Nabiyev R.H. [2]
Musaev Sh.Sh. [3]
[1] DSc, Professor, Head of the Department of Maxillofacial Surgery, Tashkent State Medical University.
https://orcid.org/0000-0002-9834-4965
[2] Assistant in the Department of Maxillofacial Surgery, Tashkent State Medical University. https://orcid.org/0009-0008-6493-6883
[3] PhD, Associate Professor in the Department of Maxillofacial Surgery, Tashkent State Medical University.
https://orcid.org/0000-0002-7411-5850
https://doi.org/10.5281/zenodo.18058633

Abstract. The article presents a comparative clinical study of the effectiveness of local application of the probiotic solution "Probiomix" versus traditional antiseptic therapy in patients with purulent-inflammatory diseases of the maxillofacial region. A total of 44 patients were included in the study: the control group (20 patients treated with chlorophyllipt and hydrogen peroxide) and the main group (24 patients treated with the probiotic solution "Probiomix"). The results showed that the main group demonstrated faster resolution of inflammatory symptoms: cessation of purulent discharge by day 3 (versus day 4 in the control group), formation of granulation tissue by days 3-4 (versus day 6), and onset of epithelialization by day 6 (versus days 7-8). Thus, "Probiomix" promotes faster wound cleansing and healing, reduces the severity of inflammatory reactions, and can be considered a promising method in the complex treatment of purulent-inflammatory diseases of the maxillofacial region.

Keywords: probiotics, Probiomix, maxillofacial surgery, purulent-inflammatory diseases, antiseptic therapy, regeneration.

Introduction. Purulent-inflammatory diseases of the maxillofacial region (MFR) represent a serious medical and social problem due to their high prevalence, tendency for complicated progression, and significant impact on patients' quality of life [1,3,7]. These pathologies are often accompanied by the development of severe infectious processes, requiring a comprehensive approach to therapy and strict adherence to clinical protocols. The traditional method of local treatment remains the use of antiseptic agents (for example, chlorophyllipt and hydrogen peroxide), which reduce microbial contamination and prevent the spread of inflammation. However, accumulated data indicate a number of limitations to this approach, including the development of dysbiotic disorders, slowing of tissue regeneration processes, and the formation of microbial resistance to antimicrobial agents [5,7,9].

In recent years, the use of probiotics in the local treatment of purulent wounds has been considered a promising direction due to their ability to modulate microbiota and stimulate reparative processes [2,6]. However, data on their effectiveness in MFR phlegmons are limited, necessitating additional clinical studies [4,8].

In this regard, the search for alternative or complementary therapeutic strategies aimed not only at suppressing pathogenic microflora but also at restoring normal microbiocenosis is of particular relevance. One of the promising directions is the use of probiotic preparations that

have a modulating effect on the local microbiota, stimulate the body's non-specific resistance, and contribute to regenerative processes in the area of inflammation.

The probiotic solution "Probiomix" is designed for local application and contains a complex of live microorganisms with pronounced antagonistic properties against pathogenic and opportunistic microflora. Its use in dental practice is considered a potentially effective alternative to traditional antiseptics, allowing for a reduction in the frequency of relapses, a decrease in the intensity of inflammatory reactions, and accelerated repair of soft tissues.

A comparative assessment of the clinical effectiveness of the local application of "Probiomix" and standard antiseptic therapy in the treatment of purulent-inflammatory diseases of the maxillofacial area has high practical significance. The results of such research can contribute to the justification of new approaches to therapy and the optimization of modern treatment protocols aimed at improving the effectiveness and safety of medical care.

Aim of this study was to comparatively assess the treatment outcomes of patients with purulent-inflammatory diseases of the maxillofacial region using standard antiseptic therapy (control group) and a combined method using a solution of the probiotic "Probiomiks" (main group). The effectiveness criteria were the dynamics of general and local symptoms, the timing of wound cleansing, and the onset of epithelialization.

Materials and methods. General characteristics of patients in the control group: 20 patients in the control group, after opening the purulent focus and receiving antibiotic therapy, underwent local irrigation of the wound with 1% chlorophyllipt solution and 3% hydrogen peroxide.

General characteristics of patients in group II: Group II included 24 patients with inflammatory diseases of the maxillofacial region and neck. As a local treatment, a solution of the probiotic "Probiomix" corresponding to 10 g/l in physiological saline was used. It is necessary to treat the purulent wound daily until the purulent discharge from the wound stops.

The general condition of the patients upon admission was relatively satisfactory in most cases. All of them complained of general weakness and malaise, elevated body temperature of 37.5˚-39˚C and pain syndrome, impaired chewing, swallowing, and speech functions. Among the local symptoms, moderate or pronounced skin hyperemia and tissue edema were noted. Palpation revealed painful infiltration and fluctuation.

All patients were admitted to us within 3 to 10 days after the onset of the disease. Prior to admission, thermal procedures at home, treatment, or tooth extraction at the polyclinic had been unsuccessful.

Surgical intervention was usually performed on the day patients were admitted to the clinic in an inpatient setting. After preliminary premedication (analgin, diphenhydramine), the purulent focus was necessarily opened, drained, and washed with an antiseptic solution. It should be noted that all patients in the control group were in the first phase of the wound healing process after surgery.

To assess clinical signs in the dynamics of the disease, we used a modified version of the information and diagnostic chart developed by H.K. Dustmukhamedova. The sum of points characterizing the general condition of the body (complaints, pulse, t^0) and local signs of the purulent-inflammatory process were calculated separately. Studies of the dynamics of changes in clinical signs of the disease were conducted upon admission to the clinic and on the 2nd-3rd day, and 6th-7th day of treatment.

In patients with inflammatory diseases of the maxillofacial region, in addition to a general clinical examination (complete blood count, urinalysis, and stool analysis), bacteriological culture of the wound exudate and cytological examination were performed.

In the 1st group, all patients were distributed according to the form of the inflammatory process in the following order: phlegmons - 14 (70%), adenophlegmons - 4 (20%), osteomyelitis - 2 (10%).

The criteria for assessing the dynamics of inflammatory diseases of the maxillofacial region were general and local signs (in points).

As can be seen from the data in Table 1, the general symptoms in patients of the analyzed group were: complaints upon admission to the clinic averaged 7.15±0.11 points, body temperature 4.5±0.14, pulse 3.05±0.17.

Local signs: skin redness (in points) averaged 7.7±0.22, lymph node condition 4.0±0.2, mouth opening 3.67±0.52. Spread to 1-2 topographic-anatomical spaces was 3.0±0.24, to 3-4 topographic-anatomical regions was 6.0±0.22.

Local pain 6.45±0.23, spread of pus to bone tissue 3.0±0.1, pus discharge 3.3±0.3, formation of granulation tissue 1.65±0.15.

By the third day, partial changes in general and local signs were noted: complaints upon admission 6.25±0.09, body temperature 3.4±0.13, pulse 2.05±0.1; local signs: skin redness 5.9±0.44, mouth opening 3.0±0.46, spread to 1-2 and 3-4 anatomical spaces 2.94±0.26 and 5.0±0.1 respectively.

Pain decreased to 5.5±0.21, other criteria remained unchanged.

On the 6th-7th day of treatment, general clinical signs such as complaints, pulse, and body temperature normalized, averaging 4.9±0.07; 1.05±0.07; 1.8±0.09.

Table 1

Dynamics of the clinical course of inflammatory diseases and treatment outcomes of patients in group 1 (control).

No.	Signs		Before treatment	2-3 days	6-7 days
1	General clinical signs	Complaints upon admission	7.15±0.11	6.25±0.09	4.9±0.07
2		Pulse	3.05±0.17	2.05±0.13	1.05±0.07
3		Body temperature	4.5±0.14	3.4±0.13	1.8±0.09
4	Local clinical signs	Skin condition	7.7±0.22	5.9±0.44	2.1±0.19
5		Regional lymph node condition	4.0±0.12	4.0±0.13	0
6		Mouth opening	3.67±0.52	3.0±0.46	2.23±0.16
7		Spread to 1-2 anatomical spaces	3.0±0.24	2.94±0.26	1.72±0.23
8		Spread to 3-4 anatomical spaces	6.0±0.22	5.0±0.21	3.0±0.11
9		Pain	6.45±0.23	5.5±0.21	4.45±0.11
10		Pus spread to bone tissue	3.0±0.12	3.0±0.14	0

11		Purulent discharge from wound	3.3±0.3	3.3±0.3	1.65±0.15
12		Granulation tissue formation	1.65±0.15	1.65±0.15	3.3±0.34
13		Fluctuation of anterior vault	2.67±0.28	1.88±0.13	0
14		Pus discharge from periodontal pocket	4.38±0.40	3.0±0.39	1.33±0.19
15		Pain on percussion	2.87±0.29	1.5±0.13	1.13±0.09

Local clinical signs: skin condition 2.1±0.1, regional lymph nodes normal. Mouth opening 2.23±0.16. Infection spread to 1-2 and 3-4 anatomical spaces, pain subsided to 4.45±0.11, no purulent discharge from the wound, but slight wound exudate present 1.65±0.15, granulation tissue formed 3.3±0.34, pus discharge from periodontal pocket and pain on percussion are 1.33±0.19 and 1.13±0.09 respectively. Epithelialization began on days 7-8.

On the seventh day, general signs normalized, local signs did not significantly improve, purulent discharge from the wound ceased, granulation tissue formed on day 6, and epithelialization began only on days 7-8.

Table 2

Wound cleansing and healing timeline in group 1 patients

Wound process dynamics	**Day**
Infiltrate resorption	4.0±0.5
Pus clearance	3.0±0.5
Granulation appearance	6.0±0.5
Start of epithelialization	7.5±0.5

The inflammatory and inflammatory-regenerative nature of the process was primarily observed to transition to regeneration only by the seventh day.

The application of 3% hydrogen peroxide solution and 1% chlorophyllipt solution as a local treatment for purulent processes leads to complete cleansing of the wound. To assess the course of the purulent-inflammatory process, bacteriological culture of the wound exudate and cytological studies have important diagnostic and prognostic significance. The use of the information-diagnostic method developed by H.K. Dusmukhamedova and modified by us proved to be informative.

Summarizing the treatment results of patients in the control group, it should be acknowledged that, considering today's standards, they leave much to be desired. The wound cleansing from pus occurred somewhat late (on the 4th day after treatment initiation), granulation appeared by the 6th day, and epithelialization began only by the 7-8th day. The average duration of treatment for patients in the control group was 6.78±1.65 days. All this necessitates additional measures aimed at improving treatment methods.

The general condition of patients in the 2nd group at the time of admission was, as in patients in the 1st group, mainly relatively satisfactory, and the complaints and objective data were similar to those in patients in the control group. Upon admission, 24 patients underwent

incision and drainage of the purulent focus under intravenous or local anesthesia. Both patients of the 1st group and patients of the 2nd group were distributed according to the form of the inflammatory process in the following order: phlegmons 16 (67%), adenophlegmons 5 (20%), osteomyelitis 3 (13%).

Data on the study of general and local signs in patients of group II are presented in Table 3.

Table 3

Dynamics of the clinical course of the purulent process and treatment outcomes of patients in group 2

No	Signs		Before treatment	2-3 days	6-7 days
1	General clinical signs	Complaints upon admission	6.8±0.16	4.65±0.11	3.8±0.05
2		Pulse	3.1±0.15	1.35±0.11	1.05±0.03
3		Body temperature	4.3±0.22	1.70±0.10	1.11±0.07
4	Local clinical signs	Skin condition	7.8±0.14	3.10±0.27	2.0±0.1
5		Regional lymph node condition	4.17±0.17	4.00±0.22	0
6		Mouth opening	4.0±0.65	2.50±0.22	2.0±0.1
7		Process spread to 1-2 anatomical areas	2.61±0.28	1.61±0.31	1.31±0.13
8		Process spread to 3-4 anatomical areas	6.0±0.09	3.74x0.40	1.8±0.49
9		Pain	6.35±0.18	4.65±0.11	4.05±0.05
10		Pus spread to bone tissue	3.5±0.5	1.90±0.22	1.35±0.22
11		Purulent discharge from wound	3.7±0.39	1.9±0.25	1.55±0.67
12		Granulation tissue formation	1.55±0.18	3.0±0.2	3.5±0.6
13		Fluctuation of anterior wall	2.36±0.24	0	0
14		Pus discharge from tooth-gingival pocket	4.21±0.33	1.79±0.21	1.38±0.18
15		Pain on percussion	2.81±0.37	4.07±0.07	1.08±0.08

In patients of group II before the 1st day of treatment, the complaints were rated at 6.8±0.16; pulse at 3.1±0.15, body temperature at 4.3±0.22 (up to 38.9˚C). Locally: skin condition was rated at 7.8±0.14; regional lymph node condition at 4.17±0.17; mouth opening up to 1.0 cm at 4.0±0.65; involvement of 1-2 and 3-4 anatomical spaces at 2.61±0.2 and 6.0±0.1 (points) respectively; 6.35±0.18, abundant purulent discharge from the wound at 3.7±0.39, fluctuation of the transitional fold at 2.36±0.24, purulent discharge from the gingival pocket at 4.2±0.33, and painful tooth percussion at 2.81±0.37 (Table 3).

Comparative analysis of general and local symptoms in patients of the 1st and 2nd groups showed that combined treatment using a solution of the probiotic "Probiomiks" contributes to faster normalization of these symptoms.

Changes in the dynamics of local signs were observed during local treatment, which included daily irrigation of the wound with a solution of the probiotic "Probiomiks" until the cessation of purulent discharge.

By the 2nd-3rd day, the patient's complaints had decreased to 4.65±0.11, and the patient's general condition quickly returned to normal. Body temperature normalized to 1.7±0.11, pulse rate was normal at 80 beats per minute, which is 1.35±0.11, and appetite returned.

Locally: skin condition (redness and infiltration resolved) was 3.1±0.27, pain subsided 4.65±0.11, mouth opening in cm was 2.5±0.22. On the 3rd day, purulent discharge from the wound stopped at 1.9±0.22, a small amount of wound exudate separated, spread to the 1-2 and 3-4 anatomical regions was 1.62±0.31 and 3.74±0.4, fluctuation of the transitional fold was not detected. By the 3rd-4th day of treatment, granulation tissue formation began at 1.9±0.25.

By the 4th day of treatment, rapid granulation began in the wound. On the 6th-7th day, the general clinical signs were: complaints of 3.8±0.05, pulse 1.05±0.05, body temperature 1.11±0.07 (which is 36.6±36.9°C).

Local signs: skin condition 2.0±0.1, regional lymph nodes not palpable, restriction of mouth opening 2.0±0.1 to 2.0 cm, spread to 1-2 and 3-4 anatomical spaces 1.31±0.13 and 1.8±0.48, pain completely ceased 4.05±0.05, spread of pus in bone tissue 1.35±0.2, no purulent discharge 1.55±0.67. By the 6th day, epithelialization began.

As indicated above, the regression of local clinical symptoms in the 2nd group using the probiotic "Probiomix" solution clearly appeared by the third day, while with traditional treatment, the main dynamics were observed only on the 6th-7th day.

Conclusion. The conducted research demonstrates that the local application of the probiotic solution "Probiomix" in patients with maxillofacial phlegmons leads to a significantly faster reduction of inflammatory phenomena compared to traditional antiseptic therapy. In the main group, the following was observed:

- Accelerated cessation of purulent discharge (by the 3rd day vs 4th day in the control group);
- Early appearance of granulation tissue (on days 3-4 versus day 6);
- Reduction in epithelialization time (6 days vs 7-8 days).

The obtained data are consistent with studies confirming the immunomodulatory and regenerative effects of probiotics. A promising direction is the further study of the mechanisms of probiotic interaction with wound microbiota and the optimization of their concentrations.

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