

**EFFECTIVENESS OF A PATENTED OZONE- AND ULTRASOUND-BASED
CONSERVATIVE PROTOCOL IN CHRONIC TONSILLITIS MANAGEMENT**

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Abstract. Chronic tonsillitis remains a common otorhinolaryngological condition characterized by recurrent inflammation, persistent microbial biofilms, and frequent exacerbations. Conventional conservative therapy often provides only temporary relief, while surgical treatment is associated with functional loss and potential complications. To evaluate the clinical effectiveness of a patented multistep conservative treatment method for chronic tonsillitis aimed at deep intralacunar sanitation, suppression of microbial biofilms, and prolongation of clinical remission. The study included patients with clinically confirmed chronic tonsillitis. The proposed treatment protocol consisted of staged intralacunar sanitation using ozonated isotonic solution combined with low-frequency ultrasound exposure, application of a thiol-containing mucolytic agent, adsorption therapy with polyvinylpyrrolidone solution, controlled micro-drying of the tonsillar surface, and subsequent local application of an ozone-based gel followed by a mucoadhesive protective coating. Clinical and pharyngoscopic parameters were assessed before and after treatment. The use of the patented method resulted in significant reduction of pathological lacunar content, improvement of pharyngoscopic signs, and a decrease in the frequency of exacerbations. The method demonstrated high clinical effectiveness and contributed to prolonged remission without the use of systemic antibiotics or surgical intervention. The proposed patented conservative approach represents an effective, organ-preserving method for the treatment of chronic tonsillitis and may be recommended for wide clinical application.

Keywords: chronic tonsillitis, conservative treatment, ozone therapy, ultrasound, biofilm, intralacunar sanitation

Introduction. Chronic tonsillitis is a persistent inflammatory disease of the palatine tonsils characterized by recurrent exacerbations, structural changes of the cryptolacunar apparatus, and impaired local immune defense. The condition is frequently associated with the formation of stable microbial biofilms within the tonsillar lacunae, which significantly reduces the effectiveness of conventional antimicrobial therapy.

Despite the widespread use of conservative treatment methods, many patients experience recurrent episodes requiring repeated courses of antibiotics or surgical removal of the tonsils. However, tonsillectomy is associated with loss of immunological function and potential postoperative complications. Therefore, the development of effective organ-preserving conservative treatment strategies remains a priority in modern otorhinolaryngology.

Recent advances in ozone therapy and low-frequency ultrasound have demonstrated their potential in enhancing antimicrobial effects, improving tissue oxygenation, and disrupting microbial biofilms. Combining these modalities within a single treatment protocol may improve therapeutic outcomes and reduce recurrence rates in patients with chronic tonsillitis.

Aim of the Study. To assess the clinical effectiveness of a patented multistep conservative treatment method for chronic tonsillitis and to evaluate its impact on clinical symptoms, pharyngoscopic findings, and remission duration.

Materials and Methods. A prospective clinical observational study was conducted in patients diagnosed with chronic tonsillitis. Patients with clinically and pharyngoscopically confirmed chronic tonsillitis in the remission or subcompensation stage were included. Exclusion

criteria were acute infectious diseases, decompensated chronic conditions, and indications for immediate surgical treatment.

The patented conservative treatment consisted of the following stages:

- Intralacunar sanitation using ozonated isotonic saline solution.
- Simultaneous low-frequency ultrasound exposure to enhance penetration and biofilm disruption.
- Application of a thiol-containing mucolytic agent to liquefy dense lacunar content.
- Adsorption therapy with polyvinylpyrrolidone solution to remove toxic and microbial components.
- Controlled micro-drying of the tonsillar surface.
- Topical application of an ozone-based gel, followed by
- Formation of a mucoadhesive protective layer to prolong local therapeutic effects.
- The procedures were performed in 3–7 sessions with 1–2 day intervals.

Clinical symptoms (sore throat, foreign body sensation, halitosis), pharyngoscopic signs (hyperemia, lacunar detritus, tonsillar edema), and frequency of exacerbations were evaluated before and after treatment.

Quantitative data were expressed as mean ± standard error ($M \pm m$). Statistical significance was assessed using Student's t-test, with $t > 2$ considered statistically significant.

Results. Evaluation of treatment outcomes revealed a consistent and clinically meaningful improvement in patients' condition following completion of the patented conservative therapy. Both subjective complaints and objective pharyngoscopic parameters demonstrated favorable dynamics, confirming the effectiveness of the applied method.

Analysis of clinical symptom prevalence showed a pronounced decline after treatment (Table 1). Prior to therapy, sore throat was reported by 82.0% of patients; however, following the treatment course, this indicator decreased to 18.0%, reflecting a substantial reduction in inflammatory discomfort. A similar trend was observed for halitosis, the frequency of which declined from 76.0% before treatment to 14.0% afterward.

The most significant improvement was noted in parameters associated with lacunar pathology. The presence of lacunar detritus was recorded in 88.0% of patients prior to therapy, whereas after treatment it persisted only in 12.0% of cases. This finding indicates effective intralacunar sanitation and removal of pathological contents. In parallel, the incidence of tonsillar edema decreased from 70.0% to 20.0%, suggesting regression of inflammatory tissue infiltration.

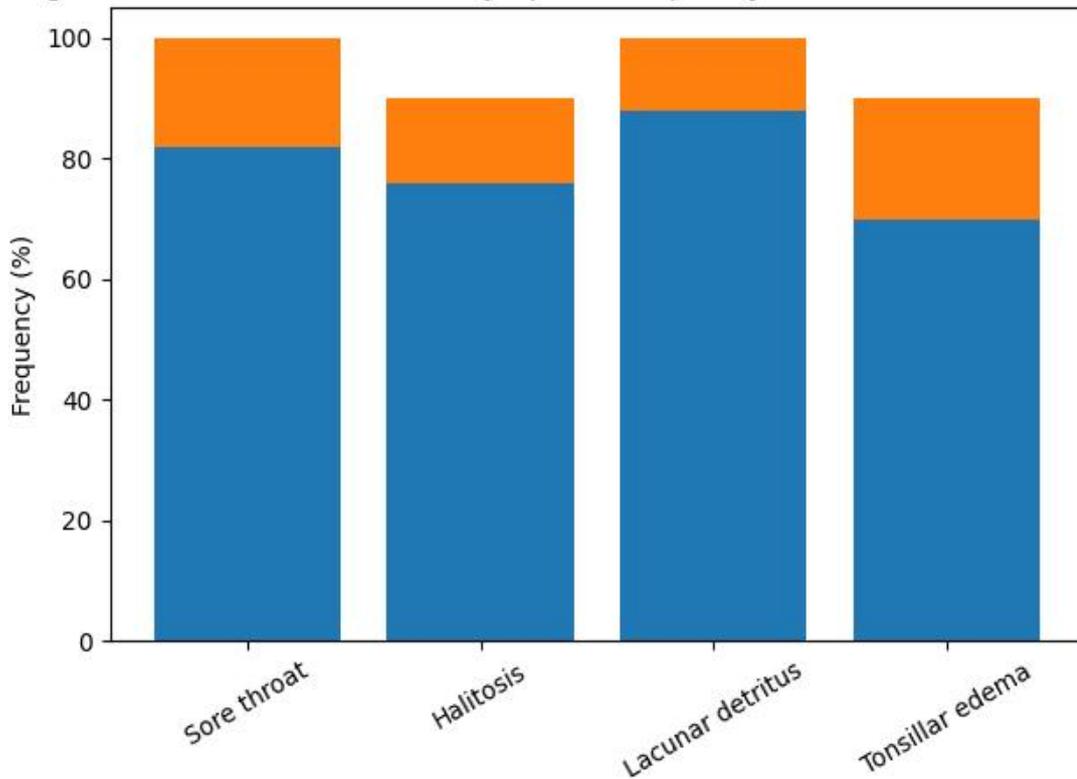
Table 1.

Changes in clinical symptoms before and after treatment

Parameter	Before treatment (%)	After treatment (%)
Sore throat	82.0	18.0
Halitosis	76.0	14.0
Lacunar detritus	88.0	12.0
Tonsillar edema	70.0	20.0

Objective pharyngoscopic examination corroborated the subjective clinical findings. Quantitative assessment of inflammatory signs demonstrated a marked decrease in severity after therapy (Table 2). The mean hyperemia score decreased from 2.6 ± 0.2 before treatment to 0.8 ± 0.1 after treatment, indicating normalization of mucosal color and vascular tone.

Figure 1. Reduction of Clinical Symptom Frequency Before and After Treatment



Additionally, lacunar blockage scores showed a pronounced reduction, declining from 2.9 ± 0.3 to 0.6 ± 0.1 . This reflects restoration of lacunar drainage and resolution of chronic obstructive inflammatory changes.

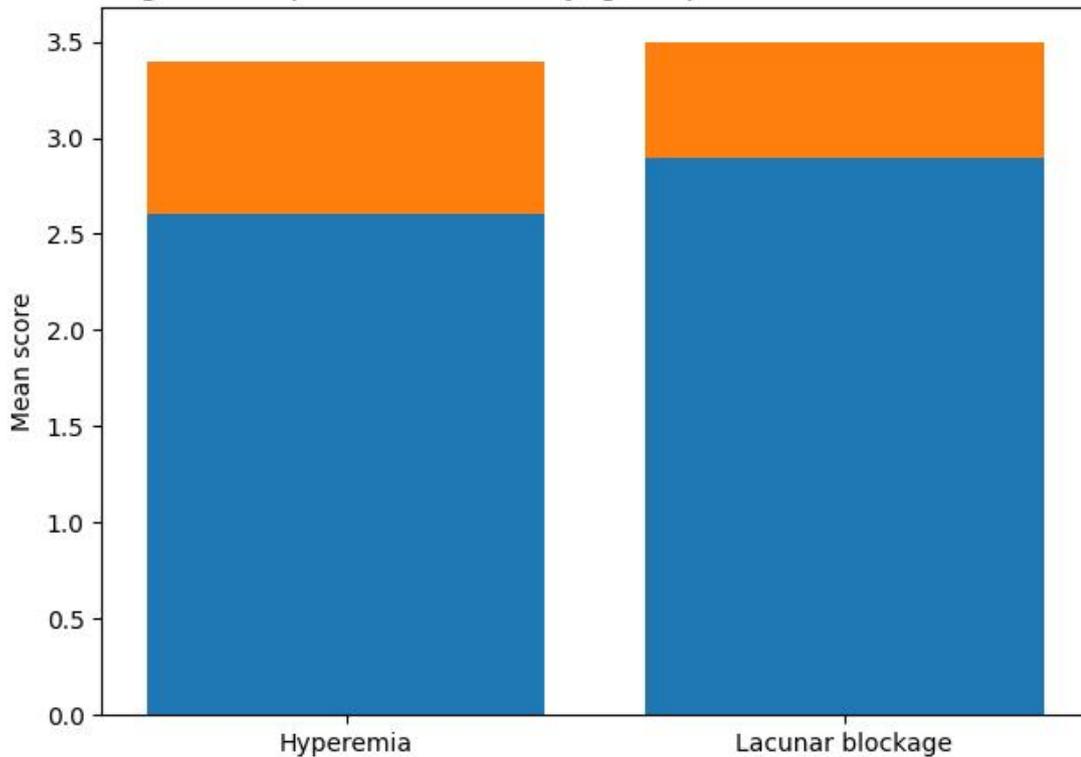
Table 2.

Dynamics of pharyngoscopic findings

Indicator	Before treatment	After treatment
Hyperemia (score)	2.6 ± 0.2	0.8 ± 0.1
Lacunar blockage (score)	2.9 ± 0.3	0.6 ± 0.1

Overall, the obtained results indicate that the patented multistep conservative therapy exerts a pronounced anti-inflammatory effect, ensures effective sanitation of the tonsillar lacunae, and leads to stable improvement in both clinical and pharyngoscopic parameters. The concordance between subjective symptom regression and objective examination data underscores the reliability and clinical significance of the observed therapeutic outcomes. Objective pharyngoscopic assessment further confirmed the clinical effectiveness of the applied therapeutic method. As shown in Table 2, mean scores for inflammatory signs demonstrated a statistically and clinically meaningful decline after treatment.

Figure 2. Improvement of Pharyngoscopic Scores After Treatment



Overall analysis of the obtained clinical and pharyngoscopic data demonstrates that the patented conservative therapy provides a pronounced and stable therapeutic effect in patients with chronic tonsillitis. The treatment course resulted in a consistent reduction of inflammatory manifestations, improvement of local tissue condition, and restoration of tonsillar lacunar drainage, which was confirmed by both subjective and objective assessment criteria.

The marked decrease in the prevalence of key clinical complaints—such as sore throat, halitosis, lacunar detritus, and tonsillar edema—indicates effective suppression of chronic inflammatory activity and elimination of pathological substrates within the tonsillar tissue. Of particular clinical importance is the significant reduction in lacunar detritus, as persistent intralacunar pathological content is considered one of the main factors maintaining chronic infection and recurrent exacerbations in tonsillitis.

Objective pharyngoscopic evaluation further substantiated these findings, revealing a statistically and clinically meaningful improvement in inflammatory scores. The reduction in hyperemia severity reflects normalization of mucosal microcirculation and regression of chronic vascular congestion. Simultaneously, the decrease in lacunar blockage scores confirms the restoration of physiological self-cleaning mechanisms of the tonsils, which is essential for long-term remission and prevention of disease progression.

The concordance between subjective symptom relief and objective examination results highlights the reliability and reproducibility of the therapeutic effect achieved by the patented method. Importantly, the observed improvements were achieved without surgical intervention, supporting the organ-preserving concept of the proposed treatment strategy. This is particularly relevant for patients with chronic tonsillitis who have contraindications to tonsillectomy or prefer conservative management.

In summary, the comprehensive analysis of clinical symptoms and pharyngoscopic parameters indicates that the patented conservative therapy not only alleviates inflammatory

manifestations but also addresses key pathogenetic mechanisms of chronic tonsillitis. The overall outcomes suggest that this approach can be considered an effective and clinically justified alternative to traditional conservative regimens, with the potential to reduce the need for surgical treatment and improve patients' quality of life.

References

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