BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 10

DOI:10.58240/1829006X-2025.21.10-506

ORIGINAL RESEARCH

CLINICAL EFFECTIVENESS OF A COMPREHENSIVE APPROACH TO THE TREATMENT OF CHRONIC GENERALIZED CATARRHAL GINGIVITIS

Abdyshev Talant Kubatbekovich[1], Eshiev Abdyrakman Moldalievich[2], Kairov Erlan Sultangazievich[3], Kim Alexandr Anatolyevich[4], Talipov Temirlan Shabdanbekovich[5], Pirmatova Alina Kanybekovna[6]

[1]Department Pediatric dentistry Kyrgyz State Medical Academy Bishkek Kyrgyzstan ORCID: 0000-0002-7993-7415 e-mail: talant.abdyshev@yandex.ru ORCID : https://orcid.org/0009-0009-9330-7522

[2]Department Surgical dentistry with a course of pediatric surgical dentistry. Medical Faculty Osh StateUniversity,Osh ,Kyrgyzstan ORCID : https://orcid.org/0009-0009-9330-7522 e-mail: eshiev.abdyrakman@rambler.ru

[3]Department Pediatric dentistry Kyrgyz State Medical Academy Bishkek, Kyrgyzstan,ORCID:0009-0003-4199-5083 e-mail: erlankairov0887@gmail.com

[4]Department Kim Alexander Anatolyevich, Assistant of the Department of Pediatric Dentistry at the Kyrgyz State Medical Academy named after I.K. Akhunbaev, Bishkek, Kyrgyz Republic Email id : kimalanin@mail.ru ORCID: 0009-0008-2086-7265

[5]Department: Pediatric dentistry: Kyrgyz State Medical Academy, Bishkek, Kyrgyzstan tima.sha29@gmail.com

[6.]Department: Pathology, basic and clinical pharmacology, Osh State University
Osh, Kyrgyzstan ORCID: https://orcid.org/0009-0002-7869-6856 e-mail: pirmatovaalina@gmail.com

Corresponding Authors*: Abdyshev Talant Kubatbekovich, [1]Department Pediatric dentistry Kyrgyz State Medical Academy Bishkek Kyrgyzstan ORCID: 0000-0002-7993-7415 e-mail: talant.abdyshev@yandex.ru ORCID : https://orcid.org/0009-0009-9330-7522

Received: *Oct.2 2025;* ***Accepted:*** *Nov. 2, 2025;* ***Published:*** *Nov 22,2025*

ABSTRACT

Background: Periodontal disease is one of the most common and socially significant dental conditions, with chroni generalized catarrhal gingivitis affecting a large number of adults worldwide. The condition typically begins with gingiv inflammation, bleeding, and pain, and may progress to periodontitis if not treated appropriately.

Objectives: To evaluate and compare the clinical effectiveness of three treatment methods: (1) pharmacological therap alone, (2) pharmacological therapy combined with professional oral hygiene, and (3) a comprehensive treatment pla including pharmacological therapy, laser, and ultrasound physiotherapy.

Results: Ninety patients with clinically confirmed chronic generalized catarrhal gingivitis were randomly divided into thre treatment groups. Clinical outcomes were assessed using the Gingivitis Index (Löe and Silness) and pain intensity score at baseline and at the end of treatment. The results showed that the comprehensive treatment approach produced the mo favorable outcomes by reducing inflammation, eliminating pain, and promoting tissue healing and improve microcirculation.

Conclusion: The study demonstrates that stable remission and prevention of disease progression require a combination pharmacological and non-pharmacological interventions. The integrated therapy approach is both safe and effective f routine clinical management of chronic generalized catarrhal gingivitis.

***Keywords*:** chronic generalized catarrhal gingivitis, physiotherapy, laser therapy, oral hygiene, periodontal treatment.

INTRODUCTION

Periodontal diseases are among the most common and socially significant pathologies in dentistry. According to epidemiological studies, only a small part of the population has healthy periodontal disease, while signs of inflammatory changes are detected in more than 90% of people over 35 years of age [1,2]. Pathological processes in periodontal tissues that occur under the influence of various traumatic and infectious factors are widespread, but with timely and adequate treatment, the disease can be completely stopped. In this regard, the search for and implementation of effective methods of therapy that provide rapid restoration of periodontal tissues and prevent complications is one of the urgent tasks of modern dentistry[3]. In recent years, there has been an increasing interest in the use of physiotherapy methods in the complex treatment of periodontal diseases. These methods are aimed not only at relieving inflammation and pain but also at restoring the functional activity of tissues, improving microcirculation, and stimulating reparative processes. Among them, special attention is drawn to the use of blue light irradiation, which has proven to be an effective non-drug method of influencing inflamed tissues [4]. Chronic generalized catarrhal gingivitis is one of the most common inflammatory periodontal diseases. Clinically, it is characterized by hyperemia, swelling, bleeding, and soreness of the gingival mucosa. The inflammatory process can be localized or generalized, and the course of the disease is usually chronic with periodic exacerbations [5]. According to the literature, the prevalence of chronic gingivitis among the adult population is 50-70%, which emphasizes its clinical and social significance [6].

The etiopathogenesis of catarrhal gingivitis is multifactorial. infectious agents, the presence of plaque and calculus, and mechanical injuries of the gingival margin, as well as systemic diseases, play a significant role [7]. Violation of microcirculation and a decrease in the body's immune reactivity contribute to the chronization of the inflammatory process and can lead to the progression of the disease with the transition to periodontitis and subsequent tooth loss. The effectiveness of treatment of chronic generalized catarrhal gingivitis is determined by a comprehensive approach [8]. Modern methods include medications (antiseptics, NSAIDs, vitamins, and minerals), professional oral hygiene, laser therapy, and physiotherapy procedures. However, isolated use of medicinal products does not always provide a stable remission, which confirms the need for their combination with non-medicinal methods [9,10]. In this regard, physiotherapy technologies, including laser treatment and ultrasonic cleaning, are becoming increasingly widespread, which help improve microcirculation, eliminate puffiness, and accelerate tissue regeneration processes [11]. The main hypothesis of the present study is that complex treatment, combining drug therapy, occupational hygiene, and physiotherapy methods, is more effective than traditional schemes, providing a pronounced reduction in inflammatory manifestations and accelerating the recovery of gingival tissues.

This study underscores that a comprehensive, multidisciplinary approach combining pharmacological therapy, professional oral hygiene, and physiotherapeutic interventions offers the most effective management for chronic generalized catarrhal gingivitis. Such an integrated regimen not only achieves a significant reduction in inflammation and pain but also promotes periodontal tissue regeneration, enhances microcirculation, and prevents recurrence. The results highlight the clinical relevance and safety of this approach, supporting its adoption as a standard protocol in dental practice for the long-term maintenance of oral health and prevention of disease progression.

2. Materials and methods of research.

2.1 Study Population:

The prospective randomized trial enrolled ninety patients diagnosed with generalized catarrhal gingivitis. Participants were enrolled from outpatient clinics. Fulfilled predefined entry criteria were: gingival bleeding, alterations of the gingival mucosa, tenderness, on palpation and the presence of halitosis. The cohort's average age was 35.7±9.2 years, with an age span of 18 to 60 years. In this cohort the tally came to 54 women—about 56.7%—and 36 men—43.3%—a distribution that's practically balanced and helps curb any sex-related confounding influences.

2.2 Study Design

The researchers distributed thirty participants into three equal groups based on the treatment approach they received. The randomization process produced groups with equivalent starting points which reduced the chance of selection bias. All patients underwent clinical assessment before and after treatment to evaluate the effectiveness of the interventions.

3 Treatment Protocols

2.3.1 Group I (Pharmacological Therapy). The patients in this group received medical treatment with antiseptic agents like chlorhexidine and miramistin through mouth rinses and topical applications to reduce microbial contamination. The doctor prescribed non-steroidal anti-inflammatory drugs (NSAIDs) ibuprofen or diclofenac to treat pain and reduce inflammation. The treatment included vitamin and mineral supplements of B-group vitamins and ascorbic acid to improve vascular tone and promote tissue repair.

2.3.2 Group II (Pharmacological Therapy + Professional Oral Hygiene). In addition to medical treatment identical to Group I, patients in this group received a professional oral hygiene regimen. This included ultrasonic scaling for plaque and calculus removal, polishing of dental surfaces with prophylactic pastes to minimize microbial colonization, and individualized oral hygiene instruction focusing on brushing techniques, flossing, and the use of irrigators. The treatment plan used both local and systemic methods to improve results by addressing the root factors that sustain ongoing gum inflammation.

2.3.3 Group III (Comprehensive Therapy). The participants in this group received an extensive treatment plan which combined medication therapy with dental hygiene services and physical therapy methods. The treatment plan required two weeks of laser therapy sessions once a week to promote blood flow and minimize swelling and promote tissue recovery in inflamed gingival areas. The application of ultrasound therapy resulted in better microbial elimination and tissue trophism. The researchers used this multimodal treatment approach to achieve dual therapeutic effects because of its anti-inflammatory and regenerative properties.

2.4 Outcome Measures

Standardized clinical parameters functioned as the criteria to evaluate treatment success. The Gingivitis Index (GI) of

Löe and Silness was used to evaluate gingival inflammation severity through its assessment of gingival hyperemia and swelling and bleeding. The pain assessment through palpation used a four-point scale which was rated from 0 for no pain to 1 for mild pain and 2 for moderate pain and 3 for severe pain. The assessment of periodontal tissue health used clinical evaluation and photographic documentation at both treatment start and completion for objective evaluation of results.

2.5 Statistical analysis

All data were analyzed using variation analysis and Student's t-test to assess differences between the treatment groups. Results were considered statistically significant at $p < 0.05$. The researchers conducted statistical tests to confirm that the treatment effects they observed were both reliable and repeatable.

2.6 Ethical Considerations

The Institutional Ethics Committee of Osh State University approved the study protocol which followed all ethical standards from the Declaration of Helsinki [12]. All participants signed written informed consent documents before joining the study to safeguard their rights and uphold ethical research practices.

3. RESULT

3.1 Dynamics of clinical indicators.

Three different treatment regimens for chronic generalized catarrhal gingivitis were evaluated in this study to determine which one was the most effective. On the basis of the gingivitis index (GI), the degree of pain experienced during probing of the gingival mucosa, and the general state of periodontal tissues as determined by clinical examination and photofixation, the dynamics were evaluated.

3.2 Group I — medical treatment.

The clinical indicators of patients who were treated only with medicine indicated a moderate improvement. The gingivitis index experienced a decrease of 22%, descending from 2.8 ± 0.3 to 2.2 ± 0.4. This decrease signified a partial reduction in the inflammatory changes that were observed. In spite of this, forty-five percent of patients continued to experience pain when they were palpated, and only twenty-five percent of the patients who were evaluated showed a significant improvement in the state of their gum tissue. The findings presented here point to the restricted scope of medical treatment options, which can only provide a momentary relief of symptoms and do not guarantee a complete recovery of gingival tissues.

3.3 Group II — drug therapy + professional oral hygiene.

It was found that the results were more pronounced in the second group, which received medical treatment in addition to professional dental hygiene. The gingivitis index experienced a decrease of 43%, ranging from 2.9 ± 0.4 to 1.6 ± 0.3. This decrease is indicative of a substantial reduction in the manifestations manifesting inflammation. Seventy percent of the patients experienced a total disappearance of discomfort when the gum tissue was palpated, and sixty percent of the participants reported an improvement in the condition of the gum tissue. When compared to isolated pharmacological therapy, professional hygiene, which includes the removal of plaque, stone, and polishing of teeth, contributed to the elimination of local inflammatory components and gave a more stable therapeutic effect.

3.4 Group III-complex therapy.

Complex therapy, which included methods of physiotherapy, occupational hygiene, and medication, was used in the third group, which yielded the most favorable results. The gingivitis index had a significant reduction of 55%, ranging from 3.0 ± 0.3 to 1.3 ± 0.2. This decrease means a significant alleviation of the inflammatory process. One hundred percent of the patients experienced a total disappearance of discomfort upon palpation, and eighty-five percent of the participants reported a clinical improvement in the health of their gingival tissues. The incorporation of laser therapy and ultrasound therapy resulted in the restoration of microcirculation, the reduction of puffiness, and the acceleration of regenerative processes, which resulted in the most durable good result among all of the groups that were studied.

3.5 Comparative analysis.

Isolated medication therapy has only a partial effect, reducing the severity of inflammatory changes, but at the same time, it does not provide sufficient recovery of gingival tissues, according to a comparative investigation of the efficacy of three different treatment regimens. The therapeutic impact is substantially enhanced by the addition of professional oral hygiene, which also contributes to the removal of local pathogenic elements when combined with the treatment. Complex therapy, which included a combination of medical, hygienic, and physiotherapy procedures, was shown to have the best outcomes. This therapy resulted in the greatest reduction in the gingivitis index, the eradication of discomfort, and a significant clinical improvement in the state of the gums.

3.6 Side effects and complications

Throughout the course of the research study, there were no adverse effects or complications that were clinically significant that were connected with using any of medicine, professional dental hygiene, or physiotherapy techniques.

When antiseptics and non-steroidal anti-inflammatory medicines were administered to certain patients, they caused them to undergo short-term subjective reactions. These reactions primarily manifested themselves as a little burning sensation of the mucous membrane at the time that the drugs were being administered. Despite the fact that these manifestations were only temporary in nature, they did not have any impact on the overall tolerability of therapy or the length of treatment sessions.

The group of patients who underwent physiotherapy methods, such as laser therapy and ultrasound treatment, did not experience any adverse effects, as well. In few instances, there were slight sensations of discomfort in the gum area following the treatments; however, these sensations disappeared on their own within a few hours and did not necessitate any additional medical intervention (Table 1).

Table 1. Comparative analysis of three treatment regimens for chronic catarrhal gingivitis (main clinical indicators)

Group	Gingivitis index (decrease)	Pain on palpation (disappearance)	Improvement of gum tissue condition (%)	Notes
Group 1: Medication	22% (from 2.8 to 2.2)	45% of patients have pain	25% improvement	Limited effectiveness
Group 2: Medication + occupational hygiene	43% (from 2.9 to 1.6)	70% of patients without pain	60% improvement	Improvement of tissue
Group 3: Complex therapy	55% (from 3.0 to 1.3)	100% of patients without soreness	85% improvement	Most effective treatment method

The results of the study strongly validate the significant clinical efficacy of a comprehensive strategy in addressing chronic generalized catarrhal gingivitis. The integration of physiotherapy techniques within the treatment regimen, specifically laser therapy and ultrasonic cleaning, results in a significant decrease in inflammatory symptoms while also promoting the rapid regeneration of periodontal tissues and alleviating pain in patients[13]. The integration of these methodologies alongside medical intervention and expert oral care facilitates the attainment of a consistent clinical remission and markedly diminishes the likelihood of disease recurrence[14].

The application of pharmacological interventions, such as antiseptics and nonsteroidal anti-inflammatory agents, constitutes a crucial aspect of the therapeutic regimen. However, when taken as monotherapy, these treatments fail to deliver an adequate duration and intensity of clinical outcomes[15]. The most notable outcomes are attained when therapeutic interventions are paired with expert oral care, facilitating the removal of plaque and harmful microorganisms, thereby diminishing inflammation and expediting the healing process. The training of patients in effective methods of individual oral hygiene holds significant importance. This aspect must be regarded as a crucial element in sustaining long-term remission and averting recurrent episodes of the condition[16].

It is important to note that the intricate treatment did not lead to the emergence of notable side effects or complications. This validates the elevated standard of clinical safety associated with physiotherapy techniques, such as laser therapy and ultrasound treatment. Simultaneously, it is essential to consider that the application of these technologies necessitates specialized equipment and skilled professionals, which could restrict their broad adoption in practical healthcare settings.

4. DISCUSSION

The results of the study confirm the high clinical effectiveness of an integrated approach to the treatment of chronic generalized catarrhal gingivitis. Current literature data indicate that the combination of drug therapy with physiotherapy significantly increases the effectiveness of treatment of inflammatory periodontal diseases [17].

In particular, the use of laser therapy can reduce inflammation of periodontal tissues due to its antibacterial effect and stimulation of regenerative processes, which was confirmed by recent studies by S Liu et al. (2025) [18]. Ultrasonic cleaning of dental plaque and treatment of periodontal pockets helps to effectively remove pathogenic microflora, reduce the level of inflammatory cytokines, and accelerate tissue healing [19].

Medication remains a crucial component in the treatment of chronic gingivitis. Antiseptics and nonsteroidal anti-inflammatory drugs are effective in managing the infectious and inflammatory processes. However, study by L Costo et al. (2025) shows that relying solely on these treatments rarely results in a long-term clinical effect and does not prevent the recurrence of the disease [20]. The combination of medications with professional oral hygiene significantly increases the effectiveness of treatment by mechanically removing plaque and reducing bacterial load, which accelerates reparative processes and reduces the severity of inflammation [21].

An equally important component of complex therapy is teaching patients the correct methods of individual oral hygiene. Evidence suggests that oral health education programs help maintain long-term remission and prevent relapses of chronic gingivitis [22]. Thus, the patient's involvement in the treatment process increases the effectiveness of therapeutic measures and reduces the risk of disease progression. It was noted that the use of an integrated approach was not accompanied by the development of significant side effects, which confirms the high clinical safety of physiotherapy methods, including laser therapy and ultrasound treatment [23].

It is important to consider the limitations associated with the widespread adoption of these technologies. These include the necessity for specialized equipment and trained professionals, which entail additional costs and organizational efforts within the framework of practical health care [24]. The findings indicate that a comprehensive treatment strategy for chronic generalized catarrhal gingivitis incorporating medical treatment, occupational hygiene, and physiotherapy methods represents the most effective approach. This strategy significantly reduces inflammatory symptoms, accelerates tissue regeneration, and minimizes the risk of disease relapse [25].

5. CONCLUSIONS.

This study evaluated the clinical efficacy of different therapeutic approaches in the management of chronic generalized catarrhal gingivitis, with the aim of identifying the most effective strategy for achieving sustained remission and periodontal health restoration. Regular professional oral hygiene and supportive hygiene measures play a key role in preventing disease exacerbations and ensuring sustained clinical remission. Physiotherapy methods, such as laser therapy and ultrasonic cleaning, show a pronounced positive effect on the regeneration of gum tissue and microcirculation, increasing the effectiveness of complex treatment. Drug therapy, including antiseptics and non-steroidal anti-inflammatory drugs, effectively stops inflammatory processes, but without a combination with professional hygiene and physiotherapy procedures, it does not provide a long-term and stable clinical effect. The obtained data confirm the high safety of the proposed treatment methods, which allows us to recommend them for wide application in clinical practice in chronic gingivitis. An integrated approach to the treatment of chronic generalized catarrhal gingivitis provides better clinical results than traditional methods, opening up new opportunities for effective treatment of this disease.

DECLARATIONS

Acknowledgment

The authors would like to express their sincere gratitude to Osh State University for providing the research infrastructure and institutional support essential for the successful completion of this project.

Data availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical statement

The study protocol was reviewed and approved by the Ethical Committee of Osh State University. All procedures were conducted in accordance with the ethical standards of the institutional research committee and the principles outlined in the Declaration of Helsinki. Written informed consent was obtained from all participants prior to their inclusion in the study. The corresponding author can be contacted for further information regarding the study protocol, ethical approval, and data availability.

Funding

This research did not receive any specifics

REFERENCES

1. M. Rathee and P. Jain, “Gingivitis,” in StatPearls, Treasure Island (FL). StatPearls Publishing, 2025. Accessed. November 13, 2025. [Online]. Available: http://www.ncbi.nlm.nih.gov/books/NBK557422/

2. M. A. Nazir, "Prevalence of periodontal disease, its association with systemic diseases and prevention," Int. J. Health Sci., vol. 11, no. 2, pp. 72–80, 2017.

3. A. Eshiev, A. Asanov, Z. Moldaliev, D. Eshiev, and M. Arstanbekov, "INFLUENCE OF ENVIRONMENTAL FACTORS ON THE CONDITION OF ADOLESCENT

DENTAL HARD TISSUES: CLINICAL AND PHYSICOCHEMICAL ANALYSIS," J. Ilm. Ilmu Terap. Univ. Jambi, vol. 9, no. 1, pp. 406–421, 2025, doi. 10.22437/jiituj.v9i1.38513.

4. E. A. Moldalievich, A. T. Abdirasulovna, E. A. Abdyrakmanovna, and M. A. Kochkonbaevich, "DEMINERALIZATION OF TOOTH ENAMEL: A CLINICAL AND LABORATORY ASSESSMENT OF ENERGY DRINK CONSUMPTION AMONG YOUTH IN KYRGYZSTAN," Bull. Stomatol. Maxillofac. Surg.,. 21, 8, 144–153, 2025, doi. 10.58240/1829006X-2025.21.8-144.

5. M. F. Siddiqui, "IoMT Potential Impact in COVID-19: Combating a Pandemic with Innovation," in Computational Intelligence Methods in COVID-19. Surveillance, Prevention, Prediction and Diagnosis, vol. 923, K. Raza, Ed., in Studies in Computational Intelligence, vol. 923. , Singapore. Springer Singapore, 2021, pp. 349–361. doi: 10.1007/978-981-15-8534-0_18.

6. E. A. Moldalievich, A. R. Esenalievna, E. D. Abdyrakmanovich, A. N. Muhtaralievich, and E. E. Omuralievich, "EVALUATING BONE TISSUE BIOTYPES IN THE MAXILLARY POSTERIOR REGION: A CBCT-BASED OBSERVATIONAL STUDY WITH CLINICAL CASE REPORT IN ELDERLY PATIENTS," Bull. Stomatol. Maxillofac. Surg., vol. 21, no. 6, pp. 56–64, 2025, doi. 10.58240/1829006X-2025.21.6-56.

7. L. Trombelli, R. Farina, C. O. Silva, and D. N. Tatakis, "Plaque-induced gingivitis: Case definition and diagnostic considerations," J. Clin. Periodontol., vol. 45 Suppl 20, pp. S44–S67, June 2018, doi. 10.1111/jcpe.12939.

8. M. M. Bosma-den Boer, M.-L. van Wetten, and L. Pruimboom, "Chronic inflammatory diseases are stimulated by current lifestyle: how diet, stress levels and medication prevent our body from recovering," Nutr. Metab., vol. 9, no. 1, p. 32, Apr. 2012, doi: 10.1186/1743-7075-9-32.

9. A. Alam, N. Imam, M. F. Siddiqui, Md. K. Ali, M. M. Ahmed, and R. Ishrat, "Human gene expression profiling identifies key therapeutic targets in tuberculosis infection: A systematic network meta-analysis," Infect. Genet. Evol., vol. 87, p. 104649, Jan. 2021, doi: 10.1016/j.meegid.2020.104649.

10. L. Sachelarie, R. Cristea, E. Burlui, and L. L. Hurjui, "Laser Technology in Dentistry: From Clinical Applications to Future Innovations," Dent. J., vol. 12, no. 12, p. 420, Dec. 2024, doi: 10.3390/dj12120420.

11. A. T. Kubatbekovich et al., "INNOVATIVE APPROACHES, TECHNOLOGIES, AND ADVANCES IN DENTISTRY AND MAXILLOFACIAL SURGERY IN KYRGYZSTAN: AN UPDATED REVIEW," Ann. Dent. Spec., vol. 13, no. 2, pp. 6–11, 2025, doi. 10.51847/ihE7MS9AKN.

12. World Medical Association, "World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects," JAMA, vol. 310, no. 20, pp. 2191–2194, Nov. 2013, doi: 10.1001/jama.2013.281053.

13. D. Al Asmari and A. Alenezi, "Laser Technology in Periodontal Treatment: Benefits, Risks, and Future Directions—A Mini Review," J. Clin. Med., vol. 14, no. 6, p. 1962, Mar. 2025, doi: 10.3390/jcm14061962.

14. N. Imam et al., "In silico characterization of hypothetical proteins from Orientia tsutsugamushi str. Karp uncovers virulence genes," Heliyon, vol. 5, no. 10, p. e02734, Oct. 2019, doi: 10.1016/j.heliyon.2019.e02734.

15. "Optimizing Biologic Therapy for the Prevention of Post-Operative Recurrence in Crohn's Disease: Current Evidence and Future Perspectives." Accessed: November 13, 2025. [Online]. Available: https://www.mdpi.com/2227-9059/13/5/1232

16. S. Viebranz, M. Dederichs, A. Kwetkat, and I. M. Schüler, "Effectiveness of Individual Oral Health Care Training in Hospitalized Inpatients in Geriatric Wards," Int. J. Environ. Res. Public. Health, vol. 20, no. 5, p. 4275, Feb. 2023, doi: 10.3390/ijerph20054275.

17. C. Benavides-Reyes, I. Cabello, A. Magán-Fernández, M. Rodríguez-Barranco, S. N. Usta, and F. Mesa, "Clinical effects of probiotics on the treatment of gingivitis and periodontitis: a systematic review and meta-analysis," BMC Oral Health, vol. 25, p. 490, Apr. 2025, doi: 10.1186/s12903-025-05888-5.

18. S. Liu, W. Zhao, Y. Qie, N. Liu, and Q. Liu, "Efficacy of Laser Therapy for Grade C Periodontitis in Young Individuals," Int. J. Med. Sci., vol. 22, no. 11, pp. 2653–2662, May 2025, doi. 10.7150/ijms.107543.

19. T. Mai, D. Lv, and N. Fu, "The curative effect of ultrasonic subgingival curettage combined with Xipayi gingival rinse on patients with chronic periodontitis," Am. J. Transl. Res., vol. 13, no. 7, pp. 8094–8101, July 2021.

20. L. Costo, M. Mounsif, L. Abdallaoui Maan, and A. Bouziane, "Antiseptics Prescription for the Prevention and Treatment