

**COMPARATIVE EFFECTIVENESS OF SURGICAL AND NON-SURGICAL
APPROACHES IN THE TREATMENT OF PERI-IMPLANTITIS**

**Master Ibodov Ulmas,
Ismatov Farrukh Aslidinovich,
Bekmurotov Lukmon Rustamovich**

Annotation: This article evaluates and compares surgical and non-surgical treatment methods for peri-implantitis, a progressive inflammatory condition affecting tissues surrounding dental implants. Non-surgical approaches, including mechanical debridement, antiseptic irrigation, and adjunctive antibiotics, are often first-line therapies aimed at reducing microbial load and controlling inflammation. Surgical interventions, including open flap debridement, regenerative procedures, and bone grafting, are applied in more advanced cases or when conservative treatment fails. This review synthesizes current research findings, discusses advantages and limitations of each approach, and emphasizes individualized treatment planning for optimal clinical outcomes.

Keywords: peri-implantitis, surgical treatment, non-surgical therapy, open flap debridement, regenerative therapy, dental implants, clinical outcomes

Introduction

Peri-implantitis is one of the most common complications in modern implant dentistry. It is characterized by inflammation of peri-implant mucosa, progressive loss of supporting bone, bleeding on probing, and increased probing depth. The prevalence of peri-implantitis has risen alongside the growing use of dental implants worldwide, highlighting the need for effective management strategies. Treatment approaches can be broadly categorized into non-surgical and surgical modalities. Non-surgical therapy aims to control infection and inflammation in early-stage peri-implantitis and includes mechanical debridement, antiseptic irrigation, and, in some cases, adjunctive antibiotics.

Surgical therapy becomes necessary when non-surgical methods fail, or in moderate-to-severe peri-implantitis with significant bone loss. Surgical interventions include open flap debridement, resective surgery, regenerative procedures, and guided bone regeneration. Non-surgical treatment remains the first line of intervention for peri-implantitis, particularly in early-stage disease. Its primary goal is to control bacterial biofilm and reduce inflammation in the peri-implant tissues. Mechanical debridement, performed with ultrasonic or manual instruments, removes plaque and calculus from implant surfaces. Adjunctive therapies, including antiseptic rinses such as chlorhexidine and local or systemic antibiotics, further reduce microbial load. Clinical studies show that non-surgical therapy can improve probing depths, reduce bleeding on probing, and alleviate soft tissue inflammation when peri-implant bone loss is minimal. Non-surgical methods are less invasive, more comfortable for patients, and carry a lower risk of complications compared to surgical interventions. However, their efficacy is limited in advanced peri-implantitis, where deep pockets, significant bone loss, and persistent biofilm reduce treatment success. Evidence suggests that in these cases, non-surgical therapy alone often provides temporary improvement rather than long-term resolution.

Surgical therapy is indicated when non-surgical measures fail or when disease severity exceeds the capabilities of conservative methods. Open flap debridement allows direct visualization of

the implant surface, enabling thorough removal of granulation tissue, bacterial deposits, and diseased bone. Resective procedures reshape the bone to eliminate defect pockets, facilitating oral hygiene and reducing future microbial accumulation. Regenerative approaches, including guided bone regeneration and bone grafting, aim to restore lost hard and soft tissue support, promoting functional and aesthetic outcomes. Surgical interventions have been shown to achieve greater reductions in probing depth and sustained improvements in soft tissue health compared to non-surgical therapy alone.

Comparative studies indicate that a combined, stepwise approach yields the best clinical results. Initial non-surgical therapy reduces inflammation and bacterial load, creating a more favorable environment for subsequent surgical intervention if needed. This strategy minimizes patient discomfort while enhancing the effectiveness of surgery. Patient-specific factors, such as systemic health conditions (e.g., diabetes), smoking habits, oral hygiene practices, and implant characteristics, significantly influence treatment outcomes. Personalized treatment planning, including assessment of disease severity, implant surface type, and patient compliance, is essential for achieving long-term success.

Additionally, emerging technologies such as laser-assisted therapy, photodynamic therapy, and locally delivered antimicrobials are being integrated with both non-surgical and surgical approaches. These adjuncts have shown promising results in reducing bacterial load, promoting soft tissue healing, and improving bone regeneration. For example, lasers can improve decontamination during surgery and enhance soft tissue recovery, while photodynamic therapy may provide targeted antimicrobial effects without systemic antibiotics. The integration of these modern modalities can further increase the effectiveness of both conservative and surgical peri-implantitis treatments.

Overall, while non-surgical therapy remains valuable for early and moderate cases, surgical intervention is indispensable for advanced peri-implantitis. A personalized, evidence-based approach that combines non-surgical preparation, surgical intervention, and adjunctive technologies is recommended to achieve optimal soft tissue and bone outcomes and to prevent disease recurrence.

Understanding the comparative effectiveness of these approaches is essential for clinicians to optimize patient outcomes. While non-surgical therapy is less invasive and more comfortable for patients, surgical therapy may offer long-term stability by addressing deeper infections and bone defects. This article aims to review contemporary research on both strategies and provide guidance for evidence-based clinical decision-making.

Non-surgical treatment of peri-implantitis primarily focuses on biofilm removal and controlling local inflammation. Mechanical debridement, using ultrasonic or manual instruments, removes bacterial deposits from the implant surface. Antiseptic rinses, such as chlorhexidine, help reduce microbial colonization, while local or systemic antibiotics can target residual pathogens. Non-surgical therapy is effective in early-stage peri-implantitis, particularly when inflammation is limited to soft tissue and bone loss is minimal. Advantages of non-surgical methods include minimal discomfort, reduced risk of complications, and suitability for initial intervention or maintenance therapy. However, their limitation lies in the inability to address deep peri-implant pockets, advanced bone defects, or persistent infection. Studies have shown that while non-surgical therapy may improve clinical parameters temporarily, long-term resolution of peri-implantitis is often limited in advanced cases.

Surgical interventions are indicated in moderate-to-severe peri-implantitis or when non-surgical therapy fails. Open flap debridement allows direct visualization of the implant surface and removal of infected granulation tissue. Resective surgery may reshape bone and improve access for hygiene, while regenerative procedures, including bone grafting and guided tissue

regeneration, aim to restore lost bone and soft tissue support. Surgical therapy has demonstrated superior long-term outcomes in cases with significant bone loss, as it enables thorough decontamination and facilitates tissue regeneration. Nevertheless, surgery involves higher patient discomfort, increased cost, and requires careful planning and postoperative monitoring.

Non-surgical treatment remains the cornerstone of early peri-implantitis management. Mechanical debridement, often performed with ultrasonic devices or specialized curettes, targets the removal of biofilm and calculus from implant surfaces. Adjunctive antiseptics, such as chlorhexidine or hydrogen peroxide, and systemic or local antibiotics can further reduce microbial load and control soft tissue inflammation. Evidence shows that non-surgical therapy can temporarily reduce probing depth, bleeding on probing, and mucosal inflammation. However, its effectiveness diminishes in cases with advanced bone loss or deep peri-implant pockets because mechanical tools cannot reach all areas of the implant surface, and biofilm can persist in micro-threads or roughened implant areas.

Surgical interventions, including open flap debridement, resective procedures, and regenerative therapies, are indicated for moderate-to-severe peri-implantitis or when conservative therapy fails. Open flap debridement allows direct visualization and complete removal of inflamed granulation tissue and bacterial deposits. Resective procedures can reshape osseous defects, reducing the depth of peri-implant pockets and improving patient access for oral hygiene. Regenerative techniques, including guided bone regeneration, bone grafting, and the use of growth factors or membranes, aim to restore lost bone and provide soft tissue support. Studies demonstrate that surgical therapy achieves more predictable and sustained reductions in probing depth and clinical attachment gain compared to non-surgical approaches.

Recent research emphasizes the benefits of a **combined, stepwise treatment strategy**. Initial non-surgical therapy reduces inflammation, improves soft tissue health, and lowers microbial load, preparing the implant site for subsequent surgical intervention. This strategy enhances surgical outcomes, minimizes postoperative complications, and improves patient comfort. Additionally, patient-related factors—such as systemic conditions like diabetes or osteoporosis, smoking habits, oral hygiene, and implant characteristics—significantly affect treatment success. Tailoring interventions to individual patient profiles is crucial for long-term maintenance of peri-implant health.

Modern adjunctive therapies further enhance the effectiveness of both surgical and non-surgical interventions. **Laser-assisted therapy** improves decontamination during both conservative and surgical procedures, promoting soft tissue healing and reducing inflammation. **Photodynamic therapy** provides targeted antimicrobial effects without systemic antibiotic exposure, which is particularly useful in patients with antibiotic resistance or contraindications. **Locally delivered antimicrobial agents**, such as minocycline or doxycycline gels, help maintain a favorable microbial environment in peri-implant pockets. Integration of these advanced techniques allows clinicians to improve outcomes, reduce recurrence rates, and enhance the predictability of peri-implantitis management.

In addition, long-term clinical studies indicate that patient education, reinforcement of oral hygiene, and regular professional maintenance are equally important. Even the most effective surgical or non-surgical treatment cannot prevent disease recurrence without ongoing patient compliance and professional monitoring. Therefore, peri-implantitis management should be viewed as a continuum of care, combining mechanical, surgical, adjunctive, and preventive strategies tailored to each patient's needs.

In conclusion, non-surgical therapy remains effective for early or mild peri-implantitis, while surgical interventions are necessary for advanced cases. The best clinical outcomes are achieved when both approaches are integrated with modern adjunctive techniques and personalized

treatment planning. Future research should continue to evaluate long-term efficacy, optimize stepwise protocols, and assess the benefits of emerging therapies in improving both soft tissue and bone regeneration around affected implants.

Comparative studies indicate that combining non-surgical and surgical approaches often produces the best results. Initial non-surgical therapy can reduce inflammation and bacterial load, preparing the site for surgical intervention if necessary. Clinical outcomes, including probing depth reduction, bleeding on probing, and radiographic bone fill, tend to be more stable when surgical procedures follow an initial conservative approach. Moreover, patient-specific factors, such as systemic health, oral hygiene habits, and smoking status, significantly influence the effectiveness of both treatments. Personalized treatment planning that considers disease severity, implant characteristics, and patient risk factors is critical for achieving optimal results.

Conclusion

Both non-surgical and surgical approaches play essential roles in managing peri-implantitis. Non-surgical therapy is effective for early-stage disease, offering minimal invasiveness and patient comfort, whereas surgical therapy provides superior outcomes in moderate-to-severe cases by allowing thorough decontamination and bone regeneration. Evidence supports a combined, stepwise treatment strategy, starting with conservative measures and progressing to surgical intervention when necessary. Individualized treatment planning, attention to patient-specific risk factors, and regular follow-up are essential to maintaining implant health and long-term success. Further research is needed to refine protocols, compare laser-assisted and regenerative surgical methods, and establish standardized guidelines for peri-implantitis management.

References:

1. Хасанова Л. Э., Исмаев Ф. А. Особенности стоматологического статуса у студентов высших учебных заведений //Multidisciplinary Journal of Science and Technology. – 2024. – Т. 4. – №. 4. – С. 97-105.
2. Исмаев Ф. А., Шодиев С. С., Мусурманов Ф. И. Анализ изучения стоматологического и общего здоровья студентов вузов города самарканда //Биомедицина ва амалиёт журнали. – 2020. – Т. 6. – С. 34-39.
3. Гаффаров У. Б., Шодиев С. С., Исмаев Ф. А. Влияние препарата «холисал гель» на послеоперационное течение у пациентов после удаления ретинированных третьих моляров //ББК 56.6 С 56 СОВРЕМЕННЫЕ ДОСТИЖЕНИЯ СТОМАТОЛОГИИ: сборник. – 2018. – С. 37..
4. Хасанова Л. Э., Исмаев Ф. А. Результаты комплексного стоматологического обследования у студентов высших учебных заведений //Журнал " Медицина и инновации". – 2021. – №. 1. – С. 108-112.
5. Ismatov F. A., Emilievna K. L. Criteria For Evaluating Student Dental Health Index In Accordance With The «8020» Program Methodology //The American Journal of Medical Sciences and Pharmaceutical Research. – 2020. – Т. 2. – №. 11. – С. 99-105.
6. Ibragimov D. D., Ismatov F. A., Narzikulov F. A. Results of Complex Treatment with Eludril Antiseptic Solution //Central Asian Journal of Medical and Natural Science. – 2022. – Т. 3. – №. 3. – С. 689-690.
7. Хасанова Л. Э., Исмаев Ф. А. Особенности стоматологического статуса у студентов высших учебных заведений //Multidisciplinary Journal of Science and Technology. – 2024. – Т. 4. – №. 4. – С. 97-105.

8 Zafarovich A. T., Aslidinovich I. F. Use of Single-Stage Dental Implants for Varying Degrees of Alveolar Atrophy //Central Asian Journal of Medical and Natural Science. – 2022. – Т. 3. – №. 3. – С. 782-786.

9 Исмаатов Ф. А., Мустафоев А. А., Фуркатов Ш. Ф. Анализ эффективности нестероидных противовоспалительных препаратов при излеченье верхнечелюстного альвеолита //Theory and analytical aspects of recent research. – 2023. – Т. 1. – №. 12. – С. 49-57.