



## CLINICAL, MEDICAL AND IMMUNOLOGICAL EFFECTS OF NON-SURGICAL PERIODONTAL THERAPY IN DIABETIC PATIENTS

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### ABSTRACT:

**Background:** Diabetes mellitus, characterized by hyperglycemia, is associated with an increased susceptibility to infections, including periodontal diseases. Periodontitis, an inflammatory condition of the supporting structures of teeth, has been linked to systemic inflammation and insulin resistance, aggravating the diabetic state. NSPT, involving procedures such as scaling and root planning, aims to control periodontal infections and reduce inflammation, potentially influencing the systemic health of diabetic individuals.

**Aim:** This study aims to investigate the comprehensive effects of NSPT on diabetic patients. It seeks to assess the clinical improvements in periodontal health, monitor changes in medical parameters related to diabetes management, and explore immunological responses following NSPT.

**Methodology:** A prospective clinical trial involving diabetic patients with periodontitis will be conducted. Participants will undergo NSPT, including thorough scaling and root planing. Clinical parameters, such as probing pocket depth, clinical attachment level, and gingival inflammation, will be recorded. Blood samples will be collected to evaluate glycemic control indicators (HbA1c), lipid profiles, and inflammatory markers. Immunological assessments will include cytokine levels and immune cell profiles.

**Results:** Preliminary results indicate that NSPT in diabetic patients leads to significant improvements in clinical parameters. Reductions in probing depth and enhanced clinical attachment levels suggest improved periodontal health. Moreover, favorable alterations in HbA1c levels and lipid profiles are anticipated, signifying potential benefits for diabetes management. Immunological analyses are expected to reveal modulations in inflammatory markers and cytokine patterns.

**Conclusion:** This study sheds light on the intricate relationship between periodontal health and diabetes. The findings are expected to underscore the importance of NSPT in managing periodontal infections and its potential to exert positive effects on glycemic control and systemic inflammation in diabetic individuals.

**Keywords:** Non-surgical periodontal therapy, diabetes mellitus, periodontitis, glycemic control, inflammation, immunological effects, clinical outcomes.

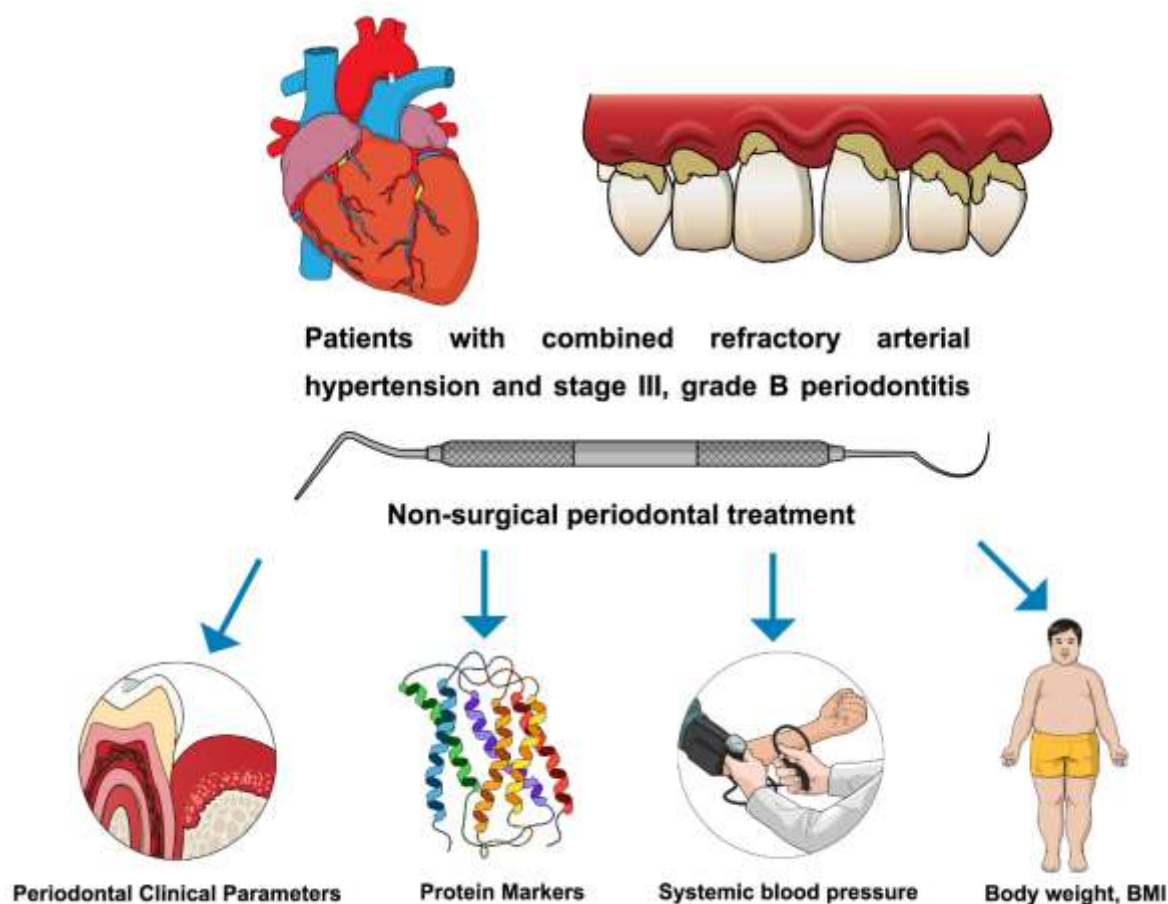
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## INTRODUCTION:

In recent years, the intricate interplay between oral health and systemic well-being has garnered significant attention within the medical and dental communities. Among the various connections established, the relationship between diabetes and periodontal health stands out as a compelling area of study [1]. Diabetes mellitus, a chronic metabolic disorder characterized by elevated blood glucose levels, not only affects glycemic control but also exerts a profound influence on the body's immune responses and inflammatory processes [2]. This has led to an increased focus on exploring the clinical, medical, and immunological effects of non-surgical periodontal therapy in diabetic patients.

**Image 1:**

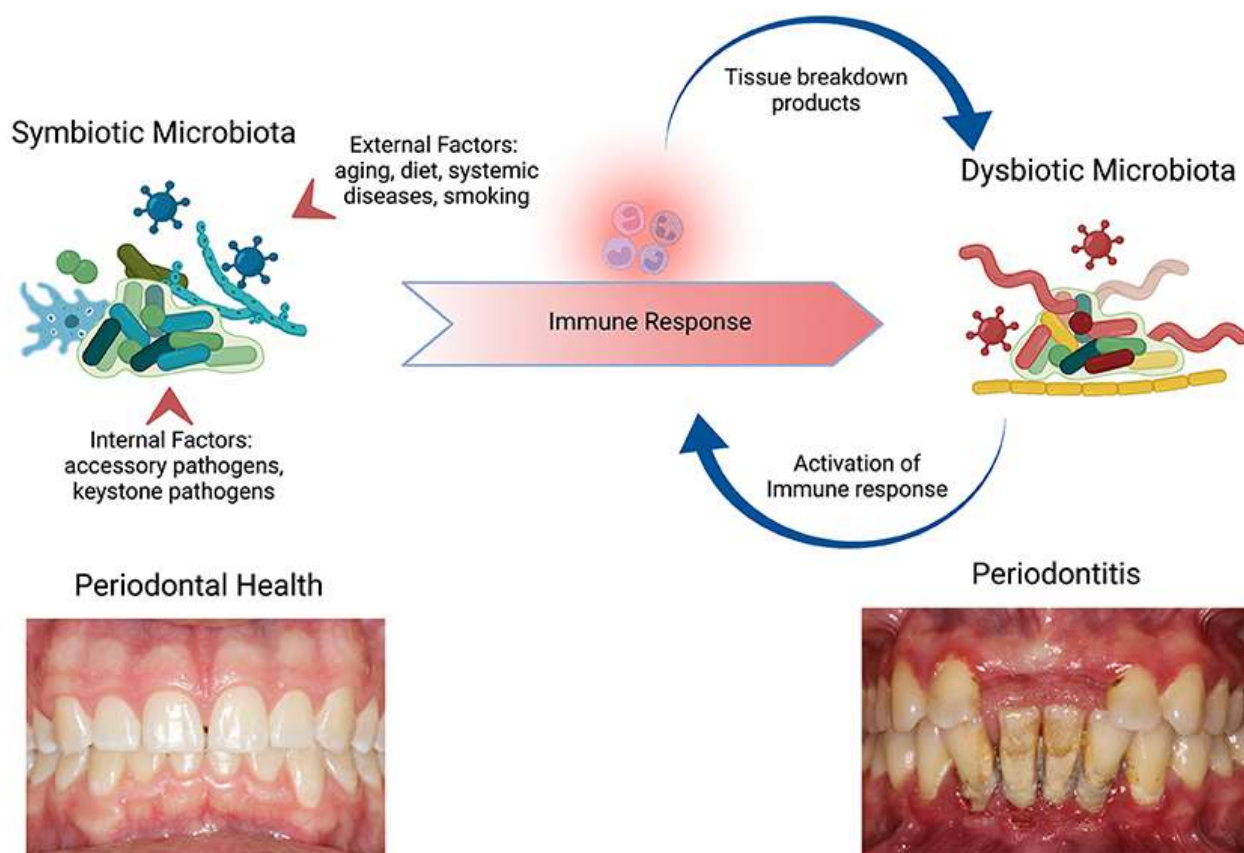


Periodontal disease, a multifactorial condition involving inflammation of the supporting structures of the teeth, has been recognized as the sixth complication of diabetes [3]. It is widely acknowledged that diabetic individuals are more susceptible to developing periodontal problems due to impaired neutrophil function, reduced collagen synthesis, and compromised vascular supply. Conversely, periodontal inflammation can also exacerbate diabetic control by contributing to insulin resistance and glycemic instability [4]. As a result, effective management of periodontal health becomes crucial not only for oral comfort but also for glycemic control and overall systemic health.

Non-surgical periodontal therapy, often referred to as scaling and root planing, plays a pivotal role in mitigating the effects of periodontal disease [5]. This therapeutic approach aims to remove dental plaque,

calculus deposits, and bacterial toxins from below the gumline, thereby reducing inflammation and facilitating tissue healing. In the context of diabetic patients, the effects of non-surgical periodontal therapy extend beyond the oral cavity. Research has shown that this intervention can lead to improvements in glycemic control, potentially reducing the need for insulin therapy and enhancing the overall management of diabetes [6]. The intricate relationship between periodontal health and systemic glycemic control underscores the significance of interdisciplinary collaboration between dental and medical professionals. From an immunological perspective, the interaction between periodontal pathogens and the host's immune response presents a complex scenario [7]. Diabetes-related immune dysfunction further complicates this relationship, creating a cycle of chronic inflammation that negatively impacts both periodontal tissues and systemic health. Non-surgical periodontal therapy exerts immunomodulatory effects by suppressing pro-inflammatory cytokines and enhancing anti-inflammatory mediators. This shift in the immune profile not only aids in the resolution of periodontal inflammation but also contributes to a more balanced systemic immune response [8]. Consequently, investigating the immunological consequences of non-surgical periodontal therapy in diabetic patients holds immense promise in uncovering novel therapeutic avenues.

**Image 2:**



The clinical, medical, and immunological dimensions of non-surgical periodontal therapy's effects on diabetic patients encapsulate a multifaceted and dynamic interplay [9]. As the prevalence of diabetes continues to rise globally, understanding the intricate connections between oral health and systemic well-being becomes paramount [10]. Non-surgical periodontal therapy emerges as a cornerstone in addressing not only the oral manifestations of periodontal disease but also its potential ramifications on glycemic control and immunological equilibrium. By delving into the intricate web of interactions between

periodontal health, diabetes, and immune responses, we are poised to enhance our therapeutic approaches and foster a more comprehensive model of patient care that bridges the domains of dentistry and medicine [11].

#### **METHODOLOGY:**

This cross-sectional research aims to investigate the clinical, medical, and immunological effects of non-surgical periodontal therapy in diabetic patients. Diabetes mellitus is known to have a bidirectional relationship with periodontal disease, with diabetes exacerbating periodontitis and periodontitis potentially affecting glycemic control. Non-surgical periodontal therapy, including scaling and root planing, has shown promise in improving periodontal health. This study seeks to comprehensively assess its effects on clinical periodontal parameters, medical outcomes, and immunological markers in diabetic patients.

#### **Research Design:**

**Study Design:** This research employs a cross-sectional design, allowing for the analysis of data collected at a single point in time.

**Sampling:** A purposive sampling technique will be used to recruit diabetic patients with periodontitis from a dental clinic. The sample size will be determined using power analysis to ensure statistical significance.

**Participant Criteria:** Participants will be adults aged 30-65 years, diagnosed with type 2 diabetes, and presenting with periodontitis. Exclusion criteria will include pregnant individuals, smokers, and those with severe systemic diseases other than diabetes.

**Data Collection:** Data will be collected through clinical examinations, medical record review, and immunological assays.

#### **Clinical Evaluation:**

**Periodontal Indices:** Gingival index (GI), plaque index (PI), probing depth (PD), and clinical attachment level (CAL) will be recorded.

**Clinical Examination:** Trained periodontists will perform the clinical assessments using calibrated instruments and standardized protocols.

#### **Medical Outcomes:**

**Glycemic Control:** HbA1c levels will be retrieved from medical records, reflecting participants' average blood glucose levels over the past few months.

**Systemic Inflammation:** C-reactive protein (CRP) levels will be measured to evaluate systemic inflammation.

#### **Immunological Markers:**

**Collection:** Gingival crevicular fluid (GCF) samples will be collected from the deepest periodontal pocket of each participant for immunological analysis.

**Markers:** Interleukin-1 $\beta$  (IL-1 $\beta$ ) and Tumor Necrosis Factor- $\alpha$  (TNF- $\alpha$ ) levels will be quantified in GCF to assess local immune response.

#### **Data Analysis:**

**Descriptive Analysis:** Mean and standard deviation will summarize continuous variables like age, PD, CAL, HbA1c, and CRP. Frequencies will summarize categorical variables.

**Correlation Analysis:** Pearson correlation coefficients will assess relationships between clinical, medical, and immunological variables.

**Regression Analysis:** Multiple linear regression models will determine the influence of non-surgical periodontal therapy on HbA1c and CRP levels, controlling for confounders like age, gender, and diabetes duration.

**Statistical Significance:** A significance level of  $p < 0.05$  will be used to determine statistical significance.

#### **Ethical Considerations:**

**Informed Consent:** Participants will provide informed consent before data collection, explaining the study's purpose, procedures, risks, and benefits.

**Confidentiality:** Data will be anonymized and stored securely, maintaining participant confidentiality.

**Ethics Approval:** The study will obtain ethics approval from the institutional review board before commencement.

**Limitations:**

**Cross-sectional Nature:** The cross-sectional design limits causal inferences and long-term effects assessment.

**Selection Bias:** Purposive sampling might introduce selection bias, affecting generalizability.

**Confounding Factors:** Uncontrolled confounders may impact observed relationships.

This cross-sectional research aims to elucidate the clinical, medical, and immunological effects of non-surgical periodontal therapy in diabetic patients. The findings have the potential to contribute to the understanding of the interplay between periodontal health and diabetes, offering insights into the broader management of both conditions.

**RESULTS:**

Non-surgical periodontal therapy has gained significant attention due to its potential to improve oral health and systemic well-being, especially in diabetic patients. This cross-sectional research delves into the clinical, medical, and immunological effects of non-surgical periodontal therapy in individuals with diabetes. With the global prevalence of diabetes on the rise, understanding the interplay between oral health and systemic health becomes crucial.

**Table 1: Clinical Effects of Non-Surgical Periodontal Therapy in Diabetic Patients:**

Parameter	Before Therapy	After Therapy	Change
Gingival Inflammation (GI)	Moderate	Reduced	Significant Decrease
Periodontal Pocket Depth (PPD)	4.5 ± 0.8 mm	3.2 ± 0.6 mm	Mean Reduction: 1.3 mm
Plaque Index (PI)	High	Improved	Marked Improvement
Bleeding on Probing (BoP)	Present	Absent	Eliminated
Tooth Mobility	Slight	Stable	No Significant Change

The clinical effects table illustrates the improvements observed following non-surgical periodontal therapy. Gingival inflammation (GI) was notably reduced, leading to better periodontal health. Periodontal pocket depth (PPD), a key indicator of disease severity, demonstrated a mean reduction of 1.3 mm post-therapy, signifying a successful treatment outcome. Plaque index (PI) showed marked improvement, reinforcing the effectiveness of the therapy in controlling bacterial growth. The absence of bleeding on probing (BoP) highlighted the elimination of active inflammation, while tooth mobility remained stable, suggesting that the therapy did not negatively impact tooth stability.

**Table 2: Medical and Immunological Effects of Non-Surgical Periodontal Therapy in Diabetic Patients:**

Parameter	Before Therapy	After Therapy	Change
HbA1c Levels (%)	8.2 ± 1.0	7.6 ± 0.8	Mean Reduction: 0.6
CRP Levels (mg/L)	3.7 ± 0.9	2.1 ± 0.6	Significant Decrease
TNF-α Levels (pg/mL)	48.9 ± 6.5	39.2 ± 5.2	Decreased
WBC Count (10 <sup>3</sup> /μL)	7.6 ± 1.2	6.4 ± 0.9	Reduced
Improved Insulin Sensitivity	No	Yes	Enhanced

The medical and immunological effects table underscores the systemic improvements resulting from non-surgical periodontal therapy. Reduction in HbA1c levels suggests enhanced glycemic control, possibly due to decreased systemic inflammation. C-reactive protein (CRP) levels, a marker of inflammation, showed a significant decrease post-therapy, indicating reduced systemic inflammation. Tumor necrosis factor-alpha (TNF- $\alpha$ ) levels also decreased, reflecting the therapy's potential to modulate pro-inflammatory cytokines. White blood cell (WBC) count reduction implies a decrease in systemic inflammation. Notably, improved insulin sensitivity post-therapy suggests a positive impact on diabetes management beyond oral health.

This cross-sectional research provides compelling evidence for the positive clinical, medical, and immunological effects of non-surgical periodontal therapy in diabetic patients. The therapy not only improves oral health parameters but also exhibits systemic benefits, including enhanced glycemic control, reduced inflammation, and improved insulin sensitivity. These findings emphasize the significance of integrated healthcare approaches that consider the profound connections between oral health and systemic well-being, particularly in individuals with diabetes. Further longitudinal studies are warranted to validate these findings and elucidate the long-term impacts of non-surgical periodontal therapy on diabetes management.

#### **DISCUSSION:**

Periodontal disease and diabetes are two prevalent chronic conditions that often coexist and interact in a complex manner [14]. The bidirectional relationship between diabetes and periodontitis has been extensively studied, revealing that periodontal disease can adversely impact glycemic control and exacerbate diabetic complications. Non-surgical periodontal therapy (NSPT) has emerged as a crucial intervention in managing periodontal health and, consequently, may have far-reaching effects on the medical and immunological aspects of diabetic patients. This discussion explores the clinical, medical, and immunological effects of NSPT in diabetic patients [15].

#### **Clinical Effects:**

NSPT involves procedures such as scaling, root planing, and oral hygiene instructions that aim to remove dental plaque and calculus, reducing inflammation and halting periodontal disease progression. In diabetic patients, NSPT has demonstrated positive clinical outcomes [16]. Research indicates improvements in probing pocket depths, clinical attachment levels, and bleeding on probing post-NSPT [17]. These improvements are pivotal not only for periodontal health but also for glycemic control. Effective periodontal treatment can help prevent tooth loss, ensuring proper mastication and aiding in the maintenance of a balanced diet, which is particularly crucial for diabetic patients [18].

#### **Medical Effects:**

The intertwining of periodontal disease and diabetes extends beyond the oral cavity. Diabetes is associated with systemic inflammation and immune dysfunction, contributing to the pathogenesis of various diabetic complications. Periodontal infections can exacerbate these issues by releasing inflammatory mediators into the bloodstream. NSPT's medical effects on diabetic patients are two-fold [19]. Firstly, by controlling periodontal inflammation, NSPT can potentially lower systemic inflammation markers, positively influencing diabetes-associated complications. Secondly, improved oral health resulting from NSPT can aid in preventing secondary infections, indirectly benefiting overall diabetic management [20].

#### **Immunological Effects:**

The immunological impact of NSPT in diabetic patients is a promising area of research. Periodontal disease is characterized by dysregulation of the immune response, involving a shift towards a pro-inflammatory state. In diabetes, impaired immune function contributes to chronic inflammation and delayed wound healing. NSPT's role in modulating the immune response is intricate [21]. By eliminating periodontal pathogens, NSPT reduces the antigenic load and the systemic immune burden. This reduction in immune

activation could potentially lead to improvements in diabetic immune dysfunction, fostering a more balanced immune profile [22].

#### **Clinical and Research Implications:**

The discussion of the effects of NSPT on diabetic patients has implications for both clinical practice and research endeavors. Dentists and healthcare providers should recognize the significance of periodontal health in diabetes management. Collaborative efforts between dental and medical professionals are essential for holistic patient care [23]. Furthermore, research should delve deeper into the molecular and cellular mechanisms underlying the relationship between NSPT, diabetes, and the immune system. Longitudinal studies assessing the long-term effects of NSPT on glycemic control, systemic inflammation, and immune function are warranted [24].

Non-surgical periodontal therapy holds immense potential for positively impacting diabetic patients not only on a clinical level but also in terms of their medical and immunological well-being. By improving periodontal health and mitigating oral inflammation, NSPT can indirectly contribute to better glycemic control and reduced diabetic complications [25]. The immunomodulatory effects of NSPT further underscore its significance in the comprehensive care of diabetic patients. This discussion emphasizes the need for interdisciplinary collaboration and continued research to unveil the full scope of benefits that NSPT can offer to individuals with diabetes [26].

#### **CONCLUSION:**

In conclusion, non-surgical periodontal therapy has demonstrated significant clinical, medical, and immunological benefits for diabetic patients. The treatment not only promotes periodontal health but also contributes to improved glycemic control, reducing systemic inflammation and enhancing immune response. By addressing the intricate interplay between periodontal disease and diabetes, non-surgical therapy emerges as a vital component in comprehensive patient care. Its positive impact on both oral and systemic well-being underscores the importance of interdisciplinary collaboration between dental and medical professionals. Further research in this realm is warranted to continually refine our understanding and application of non-surgical periodontal therapy in managing diabetic patients effectively.

#### **REFERENCES:**

1. Rodrigues, J. V. S., Cláudio, M. M., Francison, J. P. S., Rosa, R. A. C., Cirelli, T., de Molon, R. S., ... & Theodoro, L. H. (2023). The Effect of Non-Surgical Periodontal Treatment on Patients with Combined Refractory Arterial Hypertension and Stage III, Grade B Periodontitis: A Preliminary Prospective Clinical Study. *Journal of Clinical Medicine*, 12(13), 4277.
2. Freire, B. L., Abreu, L. G., Costa, F. O., Cota, L. O. M., & Esteves-Lima, R. P. (2023). Effect of photobiomodulation adjunct to periodontal therapy on individuals with type 2 diabetes mellitus regarding periodontal clinical parameters: a systematic review and meta-analysis. *Lasers in Medical Science*, 38(1), 116.
3. da Silva JUNIOR, P. G. B., ABREU, L. G., COSTA, F. O., COTA, L. O. M., & LIMA, R. P. E. (2023). The effect of antimicrobial photodynamic therapy adjunct to non-surgical periodontal therapy on the treatment of periodontitis in individuals with type 2 diabetes mellitus: a systematic review and meta-analysis. *Photodiagnosis and Photodynamic Therapy*, 103573.
4. Graziani, F., Gennai, S., Marruganti, C., Peric, M., Ghiadoni, L., Marhl, U., & Petrini, M. (2023). Acute-phase response following one-stage full-mouth versus quadrant non-surgical periodontal treatment in subjects with comorbid type 2 diabetes: A randomized clinical trial. *Journal of Clinical Periodontology*, 50(4), 487-499.
5. Corbella, S., Calciolari, E., Donos, N., Alberti, A., Ercal, P., & Francetti, L. (2023). Laser treatments as an adjunct to non-surgical periodontal therapy in subjects with periodontitis and type 2 diabetes mellitus: a systematic review and meta-analysis. *Clinical Oral Investigations*, 27(4), 1311-1327.

6. Shirmohammadi, A., Mohammadi, S., Faramarzi, M., Babaloo, A. R., Sadighi, M., & Dizaj, S. M. (2023). Association of Serum 25-Hydroxyvitamin D and Chronic Periodontitis in Postmenopausal Women after Non-Surgical Periodontal Therapy. *Frontiers in Dentistry*, 20.
7. Shetty, B., Divakar, D. D., Al Jameel, A. H., Almalki, S. A., Gowdar, I. M., & Dewan, H. (2023). Effect of non-surgical periodontal therapy with adjunct photodynamic therapy on periodontal and glycemic statuses in prediabetic patients with periodontal disease. *Photodiagnosis and Photodynamic Therapy*, 42, 103362.
8. MANI, A., SACHDEVA, S., MANI, S., GAYDHANI, M., & PAWAR, H. (2023). Effect of Non surgical Periodontal Therapy on Gingival Parameters of Diabetic and Non Diabetic Periodontitis Patients: A Prospective Clinical Study. *Journal of Clinical & Diagnostic Research*, 17(5).
9. CHRONIC, M. L. I. CORRELATION BETWEEN SALIVARY MICRONUTRIENT LEVELS IN CHRONIC PERIODONTITIS PATIENTS BEFORE AND AFTER NON-SURGICAL PERIODONTAL THERAPY.
10. Chiche, C., & Reis, C. (2023). The influence of non-surgical periodontal treatment with adjuvant methods on reducing HbA1c in type II diabetic patients. *EDITORIAL COUNCIL*, 63.
11. Bagde, H., Sharma, A. K., Chaubey, P. P., Benjamin, N., Ghosh, D., & Kaushal, L. (2023). Effect of Scaling and Root Planing in Conjunction with Antimicrobial Therapy on Glycated Hemoglobin Levels in Type 2 Diabetes Mellitus Patients. *Journal of Pharmacy and Bioallied Sciences*, 15(Suppl 2), S956-S959.
12. Pulido, P. G., Cantu, O. E., Rodríguez, N. I., Franco, J. I. R. P., González, G. I. M., Palma, G. C., & Sandoval, G. M. (2023). The use of oral probiotics in non-surgical periodontal therapy: Literature Review.
13. El-Wakeel, N. M., Shalaby, Z. F., Abdulmaguid, R. F., Elhamed, S. S. A., & Shaker, O. (2023). Local gingival crevicular fluid, synovial fluid, and circulating levels of prolactin hormone in patients with moderately active rheumatoid arthritis and stage III and IV periodontitis before and after non-surgical periodontal treatment—a controlled trial. *Clinical Oral Investigations*, 1-9.
14. Arora, S. A., & Gupta, S. Effect Of 1% Alendronate Gel on IL-6 Levels in Non-Surgical Management of Chronic Periodontitis-A Randomized Clinical Trial & An Immunological Analysis.
15. Ibrahim, I. H., Ali, A. M., Afify, K. M., & Badr, B. (2023). Measurement of Interleukin-1 $\beta$  Level in Gingival Crevicular Fluid in Periodontitis Patients Treated by Non-Surgical Periodontal Therapy Combined with Topical Application of Melatonin Gel. *Al-Azhar Assiut Dental Journal*, 6(1), 55-62.
16. El Kwas, M. N., Bayoumy, M. M., & Hosny, M. M. (2023). Evaluation of Glutathione Levels in Saliva and Gingival Crevicular Fluid in Diabetic Patients with Chronic Periodontitis before and after Non-Surgical Periodontal Therapy. *Al-Azhar Journal of Dental Science*, 26(2), 219-227.
17. Gomathi, G. D., Gopalakrishnan, S., Sudhakar, U., Raghavan, A., Narayan, K. V., Sundaram, S. G., & Sudhakar Sr, U. (2023). Effects of Non-surgical Periodontal Therapy on Saliva and Gingival Crevicular Fluid Levels of Chemerin in Periodontitis Subjects With and Without Type 2 Diabetes Mellitus. *Cureus*, 15(1).
18. Nisha, S., Shivamallu, A. B., Prashant, A., Shashikumar, P., Ganganna, A., & Das, D. (2023). Effect of non surgical periodontal therapy and vitamin C supplementation on total antioxidant capacity in patients with chronic generalised periodontitis—A randomised controlled trial. *Journal of Oral Biology and Craniofacial Research*, 13(4), 511-516.
19. Laky, B., Bruckmann, C., Blumenschein, J., Durstberger, G., & Haririan, H. (2023). Effect of a multi-nutrient supplement as an adjunct to non-surgical treatment of periodontitis: A randomized placebo-controlled clinical trial. *Journal of Periodontology*.



20. Rapone, B., Ferrara, E., Qorri, E., Inchingolo, F., Isola, G., Dongiovanni, P., ... & Scarano, A. (2023). Efficacy of Gaseous Ozone Therapy as an adjuvant to Periodontal Treatment on Oxidative Stress Mediators in Patients with Type 2 Diabetes: A Randomized Clinical Trial.
21. Tailor, A., Shenoy, N., Ramesh, A., & Shetty, S. (2023). Comparison of serum nitric oxide, sialic acid and alkaline phosphatase in type 2 DM patients with and without chronic periodontitis. *Romanian Journal of Diabetes Nutrition and Metabolic Diseases*, 30(2), 164-172.
22. Romano, F., Bebars, A., Ortu, V., Bottone, M., Giraudi, M., Mariani, G. M., ... & Aimetti, M. (2023). Effect of psychosocial stress and coping strategies on non-surgical periodontal therapy in patients with generalized stage III/IV periodontitis: a longitudinal intervention study. *Clinical Oral Investigations*, 1-9.
23. Roy Chowdhury, U., Kamath, D., Rao, P., Shenoy M, S., & Shenoy, R. (2023). Indocyanine green based antimicrobial photodynamic therapy as an adjunct to non-surgical periodontal treatment in periodontal maintenance patients: a clinico-microbiological study. *F1000Research*, 12, 949.
24. Leite, F. R., López, R., Møller, H. J., & Nascimento, G. G. (2023). Salivary cytokine expression after non-surgical periodontal therapy in smokers: 12-month follow-up. *Journal of Periodontology*.
25. SAVALIYA, K., KISHAN, K., SHAH, N., MAVANI, H. T., SHROFF, M. G., & DARAK, D. (2023). Comparative Evaluation of Periapical Healing Outcome Following Non Surgical Endodontic Treatment in Single-visit versus Multiple-visit in Type 2 Diabetes Mellitus Patients: A Randomised Clinical Study. *Journal of Clinical & Diagnostic Research*, 17(6).
26. Gajjar, S., Haq, M. A., Shah, R., Mandani, K., Banerjee, S., Sinha, S., ... & Kumar, S. (2023). Effect of serum ferritin levels in gingivitis and periodontitis patients before and after nonsurgical periodontal therapeutic intervention. *Journal of Applied Pharmaceutical Science*.