

# Is Non-Surgical Treatment Sufficient for Stage IV Periodontitis ? Report of Three Cases

## Evre IV Periodontitis İçin Cerrahisiz Tedavi Yeter Mi ? Üç Olgu Sunumu

Demet EFE

İrem ÇOLAK

Nurcan Gülsüm BUDUNELİ

<https://orcid.org/0009-0005-2447-5371>

<https://orcid.org/0009-0006-8504-0782>

<https://orcid.org/0000-0002-1590-5801>

Department of Periodontology Ege University Faculty of Dentistry, Izmi

**Citation:** Efe D, Çolak İ, Buduneli NG. Is Non-Surgical Treatment Sufficient for Stage IV Periodontitis? Report of Three Cases. *Int Arc Dent Sci.* 2025; 46(2): 151-157.

### ABSTRACT

Periodontal diseases are chronic inflammatory conditions that begin and progress as a result of the interactions between bacteria in the microbial dental plaque and the host's immune system, with the course being influenced by factors such as environmental risk factors, genetics, and systemic conditions. Chronic infection caused by plaque bacteria leads to tissue destruction via immune response, and the severity of destruction increases if left untreated. Patients diagnosed with Stage IV periodontitis characterized by periodontal pocket formation and clinical attachment loss, and classified as Grade C, which exhibits a high rate of progression not proportional to the amount of biofilm, leads aesthetic concerns, masticatory dysfunction, secondary occlusal trauma, and severe bone defects. Rehabilitation of these cases is challenging for clinicians and requires complex treatment procedures. The present report presents the clinical periodontal findings before and after non-surgical periodontal treatment of three patients diagnosed with Stage IV Grade C periodontitis.

**Keywords:** Nonsurgical Periodontal Treatment, Periodontitis, Stage IV

### ÖZ

Periodontal hastalıklar, mikrobiyal dental plak bakterileri ile konağın immün sistemi arasındaki etkileşimler sonucu başlayan ve ilerleyen, çevresel risk faktörleri, genetik ve sistemik durumlar gibi etiyopatolojik faktörlerin varlığında seyri değişebilen kronik iltihabi hastalıklardır. Plak bakterileri tarafından oluşturulan kronik enfeksiyona verilen bu immün yanıt sonucunda doku yıkımı ortaya çıkar ve tedavi edilmezse zamanla ilerler. Periodontal cep oluşumu ve klinik ataşman kaybı ile karakterize olan periodontitisin en ileri aşaması olan Evre IV ve yıkım miktarının mevcut biyofilm ile orantılı olmadığı yüksek ilerleme hızına sahip Derece C tanısı almış periodontitis hastalarında estetik sorunlar, çiğneme disfonksiyonu, sekonder oklüzal travma ve şiddetli kret defektleri görülmektedir. Klinisyenleri teşhis ve tedavi sırasında oldukça zorlayan bu olguların rehabilitasyonunda karmaşık tedavi işlemlerine ihtiyaç duyulmaktadır. Bu raporda, kliniğimize tedavi için başvuran, ağız bakımı yetersiz ve çok fazla miktarda supragingival ve subgingival diş taşlarına sahip Evre IV, Derece C periodontitis teşhisi konulmuş üç hastanın tedavi öncesi ve cerrahisiz periodontal tedavi sonrası klinik periodontal bulguları sunulmaktadır.

**Anahtar Kelimeler:** Cerrahisiz Periodontal Tedavi, Evre IV, Periodontitis

Corresponding author: demet.efe@ege.edu.tr

Received Date: 05.03.2024

Accepted Date: 28.08.2024

## INTRODUCTION

Periodontitis is a chronic inflammatory disease characterized by relatively short episodes of exacerbation, accompanied by signs and symptoms such as gingival recession, drifting, hypermobility, and tooth loss. These are followed by some natural repair processes and prolonged intervening periods of remission.<sup>1</sup> In periodontal inflammation, signalling pathways of the innate and acquired immune responses, which occur due to the pathogenicity of microbial dental plaque bacteria, take place through mediators and cytokines secreted from the resident cells of periodontium or from those cells migrated in response to bacterial stimulation. Unless gingivitis is treated and the inflammatory reaction is controlled, matrix metalloproteinases (MMPs) are upregulated with the stimulation by interleukin-1 beta (IL-1 $\beta$ ) and tumour necrotizing factor-alpha (TNF- $\alpha$ ), extracellular matrix destruction increases, bone loss initiates, and the condition evolves into periodontitis.<sup>2</sup>

The current classification for periodontal diseases and conditions was developed by the American Academy of Periodontology and the European Federation of Periodontology during the 2017 World Workshop.<sup>3</sup> This classification of periodontitis is based on a staging and grading system derived from the unique characteristics of each case, considering the data obtained. Staging indicates the severity of the disease and the complexity of the required treatment (Stage I,II,III,IV) while grading reveals the rate of disease progression, prognosis, assessed additional biological features, and existing risk factors (Grade A,B,C).<sup>4</sup>

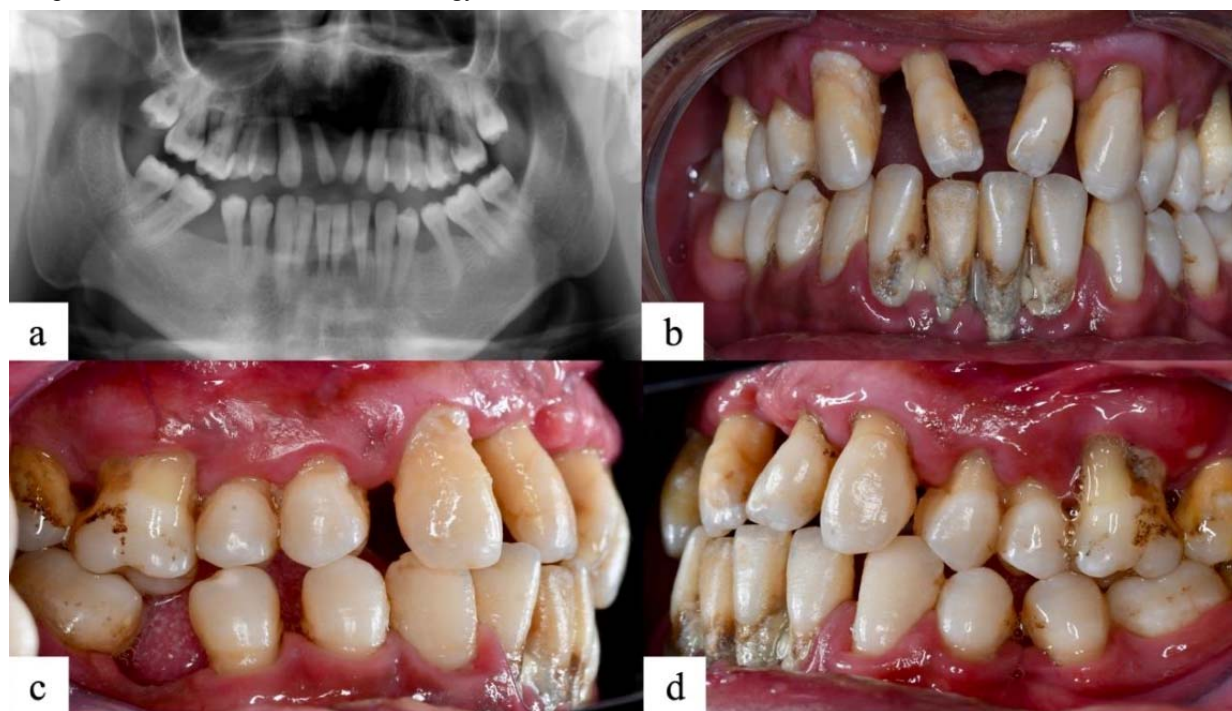
In the clinical practice guidelines published by the European Federation of Periodontology in 2020,

treatment protocols for Stages I-III periodontitis are discussed. A significant distinction in the treatment of periodontitis Stages III and IV lies in the requirement for Stage IV patients to maintain or re-establish a functional dentition and the necessity for a rigorous supportive care program prior to, throughout, and following the rehabilitation phase of care.<sup>5</sup> Non-surgical periodontal treatment aims to disrupt the microbial dental biofilm by means of supragingival and subgingival instrumentation, remove deposits on the tooth surfaces, and provide motivation and instruction for optimal home care. Successful outcomes of non-surgical periodontal treatment are reduction of pocket depths and elimination of clinical signs of inflammation.<sup>6</sup> Clinical outcomes of non-surgical periodontal treatment are evaluated by conventional parameters such as probing depth (PD), clinical attachment level (CAL), and bleeding on probing (BOP). Sites with PD  $\geq$  5 mm and presence of BOP after active periodontal therapy are termed as residual pockets.<sup>7</sup>

The present report demonstrates that significant success can be achieved through comprehensive non-surgical periodontal treatment followed by a rigorous supportive periodontal therapy phase in patients diagnosed with Stage IV Grade C periodontitis.

## CASES

A 25-year-old male patient presented with complaints of heavy calculus build-up, tooth mobility, and gingival bleeding. The patient was systemically healthy and a non-smoker (Figure 1a,b,c,d).



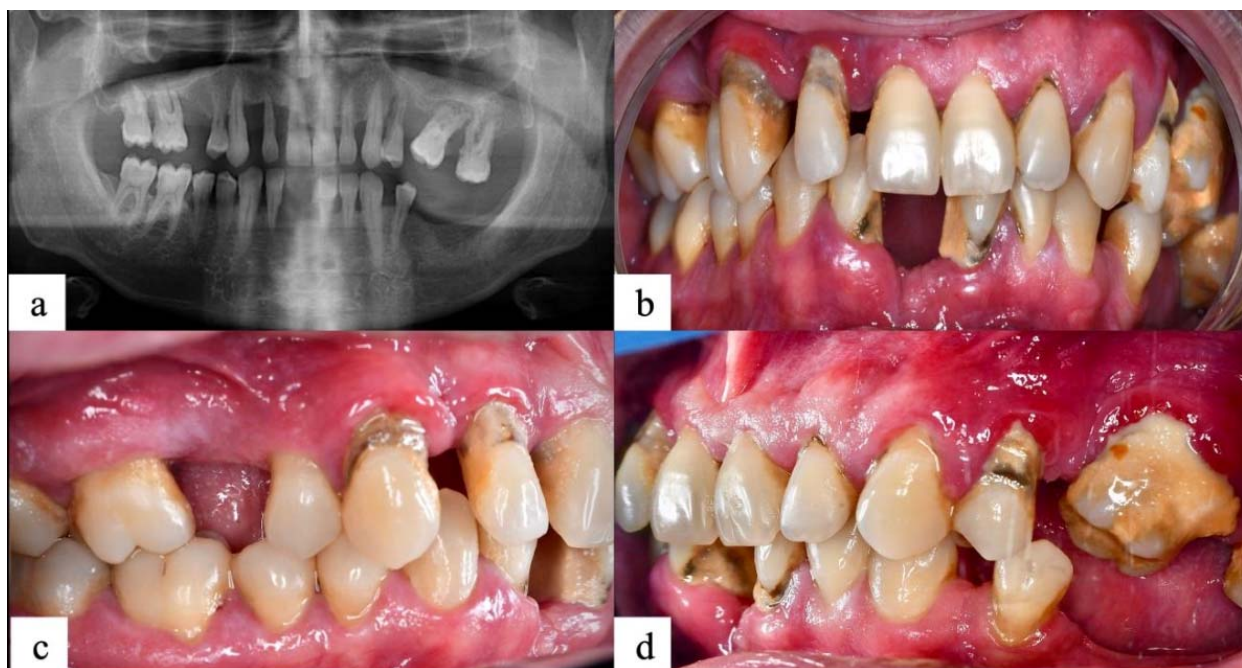
**Figure 1.** Case 1 baseline



**Figure 2.** Case 1 third month control

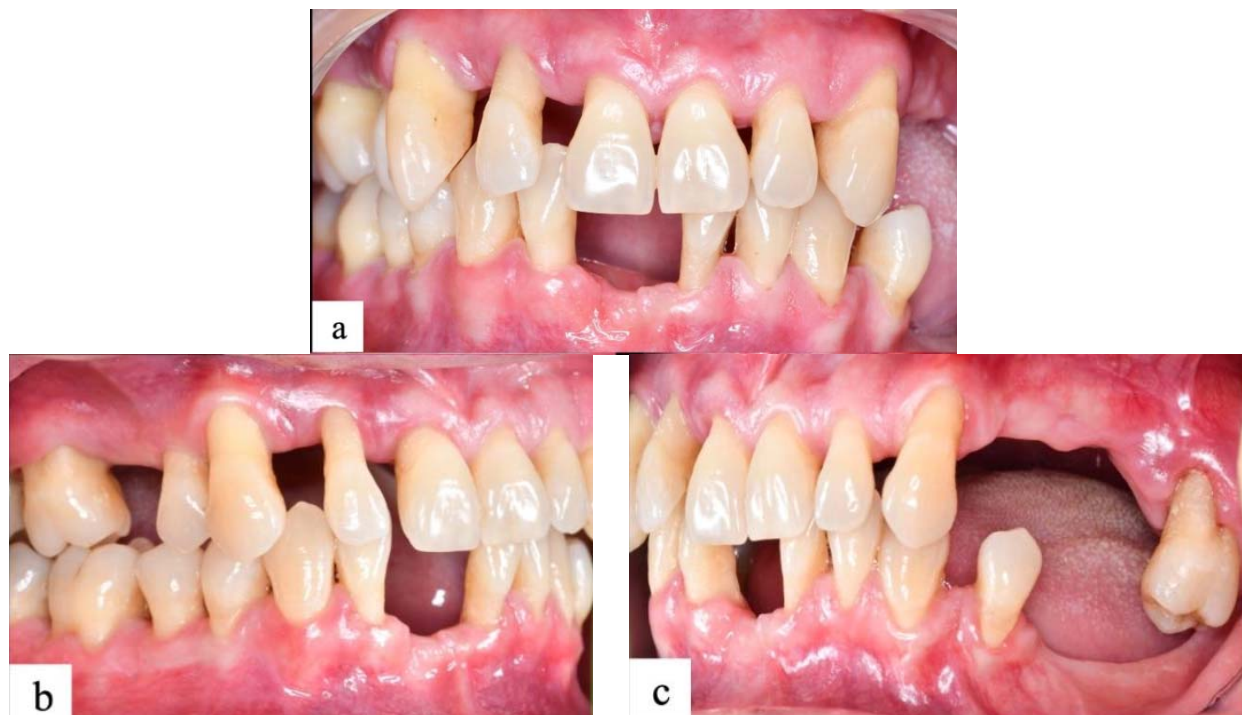
Another systemically healthy male patient, who was 43 years old was seeking treatment due to tooth mobility, gingival bleeding, and difficulty in chewing. This patient was a smoker, smoking 10 cigarettes daily (Figure 3 a,b,c,d). The third patient was 52 years old and male

presenting with heavy calculus build-up, tooth mobility, gingival bleeding, and pus discharge on the upper left central incisor tooth. The patient was systemically healthy and smoking 20 cigarettes/day (Figure 5 a,b,c,d).

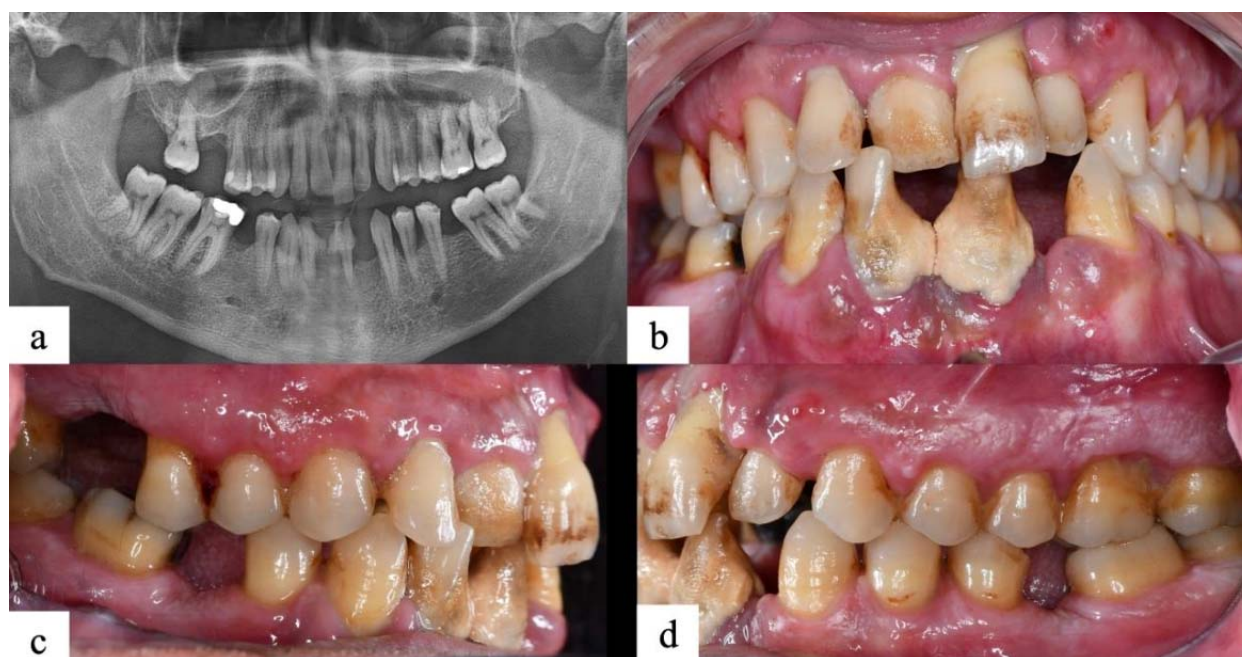


**Figure 3.** Case 2 baseline





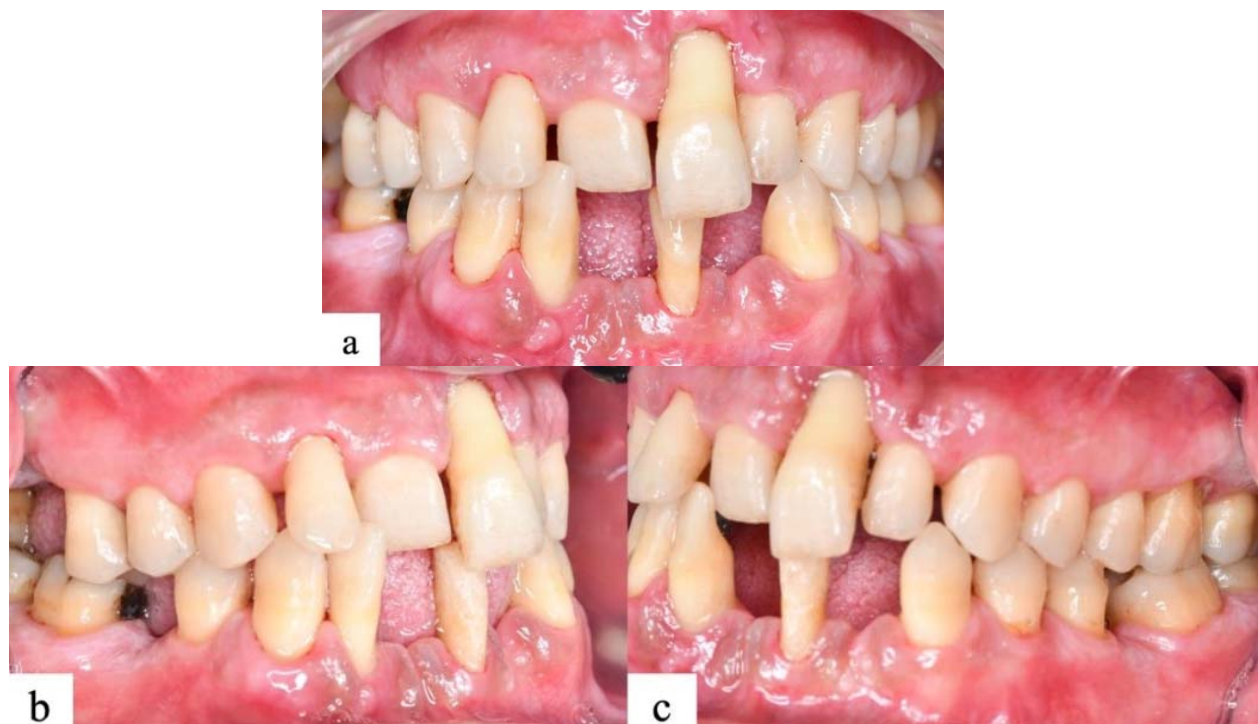
**Figure 4.** Case 2 third month control



**Figure 5.** Case 3 baseline

All three cases were diagnosed to have Stage IV periodontitis due to attachment loss exceeding 5 mm, mobility exceeding grade 2 (Miller Mobility Classification, 1993), more than 5 teeth lost due to periodontal reasons (cases 2 and 3), and the ratio of bone loss/age in the area with the deepest bone destruction being greater than 1. Moreover, these two cases had Grade C periodontitis due to smoking habits of 10 or

more cigarettes/day. Following non-surgical periodontal treatment, PD, CAL measurements at six sites/tooth, and whole-mouth bleeding scores were recorded using a Williams probe at baseline and at the 3-month follow-up visits. Dichotomous (+/-) plaque index (PI) and BOP scores were recorded at six sites/tooth at baseline and at the 3-month follow-up visits (Table 1,2).



**Figure 6.** Case 3 third month control

**Table 1.** Probing depth (PD) measurements at baseline and three months after completion of non-surgical periodontal treatment.

	PD (mm) n (%)					
	Baseline			3-Month Control		
	0-3 mm	4-6 mm	7 mm	0-3 mm	4-6 mm	7 mm
Case 1	12 (8.5)	57 (41.5)	69 (50)	71(51.5)	60 (43.5)	7 (5)
Case 2	45 (37.5)	59 (49)	16 (13)	96 (80)	21(17.5)	3 (2.5)
Case 3	29 (23)	76 (60)	21(17)	69 (54.5)	50 (40)	7 (5.5)

**Table 2.** Full-mouth bleeding on probing (BOP), plaque index (PI), and clinical attachment level (CAL) measurements at baseline and three months after completion of non-surgical periodontal treatment.

	BOP (%)		PI (%)		CAL median (mm)	
	Baseline	3-Month Control	Baseline	3-Month Control	Baseline	3-Month Control
Case 1	95	8	85.7	7.2	7.12	5.49
Case 2	93	4	88.1	5.7	5.21	3.35
Case 3	86	6	86.3	6.8	5.49	3.62

Patients signed informed consent forms and non-surgical periodontal treatment initiated in the first session (baseline). Supragingival cleaning was performed using ultrasonic scalers, and motivation and instruction for optimal oral hygiene including efficient and regular tooth brushing, interdental cleaning techniques was provided

in detail. In the subsequent sessions, root surface planing was performed using Gracey curettes (Hu-Friedy Mfg., Chicago, IL, USA). At each follow-up appointment, plaque control was assessed, and motivational reinforcement for oral hygiene was provided as required. No antimicrobial agents were used during the treatment

of the cases. The second patient received occlusal adjustment due to the presence of secondary occlusal trauma in the upper right canine tooth. After the removal of all supragingival and subgingival deposits, planing of root surfaces, and ensuring the patients' compliance with oral hygiene, they were placed in a supportive periodontal therapy program. At the three-month follow-up control, all three patients exhibited proper clinical periodontal outcomes (Table 2) with continuing high quality home care and there was no need for any further periodontal treatment.

## DISCUSSION

The clinical signs and symptoms of periodontal diseases include changes in the colour, stiffness, and volume of the gingiva; gingival bleeding; formation of periodontal pockets; tooth hypermobility; loss of attachment and alveolar bone; and eventually tooth loss. Non-surgical periodontal treatment (NPT) involves oral hygiene instruction (OHI), scaling and root planing (SRP) using ultrasonic instruments and curettes, and the application of antimicrobial agents if necessary.<sup>8</sup> The response of soft tissues to NPT reflects the effectiveness of the treatment. It has been reported that various follow-up intervals ranging from two weeks to six months are used to evaluate the clinical outcomes after NPT. Healing of the junctional epithelium occurs within two weeks following NPT, yet the granulation tissue remains immature and is not replaced by collagen fibers.<sup>9</sup> It is recommended to frequently assess motivation and adherence to self-performed supragingival plaque removal and risk factor control in patients with Stage IV periodontitis to optimise the outcomes of treatment.<sup>10</sup> Oral hygiene of the patients were checked regularly 2, 4, and 8 weeks after completion of the SRP. The clinical periodontal measurements were recorded and intraoral photographs were obtained at baseline and also at the 3-month follow-up visits. The three cases presented in this report were meticulously monitored for effective plaque

control at each session throughout the active periodontal therapy.

During nonsurgical periodontal treatment for patients with Stage 4 Grade C periodontitis, multidisciplinary treatment approaches should be implemented simultaneously. These may include addressing secondary occlusal trauma causing excessive mobility, planning prosthetic treatment to restore lost aesthetics and function, resolving endodontic issues, and correcting inappropriate restorations.<sup>10</sup> In the treatment planning of Stage 4 Grade C periodontitis cases, retaining natural teeth that suffer from attachment loss should be considered as the primary goal. Firstly, the option of tooth retention needs to be evaluated, and alternatives should be justified for the specific case ideally basing on factors such as individual tooth prognosis, technical feasibility, patient expectations, and preferences, and cost-benefit assessments.

The re-evaluation visit should be scheduled 6-8 weeks after completion of NSP and PD, CAL, BOP, PI measurements should be recorded for the entire dentition. Based on this data, a decision is made whether to initiate the supportive periodontal therapy phase. Supportive periodontal treatment plays a critical role in achieving long-term success particularly in the treatment of Stage III and IV periodontitis.

## CONCLUSION

In this report, three patients with Stage IV, Grade C periodontitis received non-surgical periodontal treatment solely including mechanical interventions with close follow-up of home care and good patient-doctor co-operation. Thus, the present report emphasises the importance and power of meticulous conventional mechanical non-surgical periodontal therapy. All three cases of Stage IV, Grade C periodontitis presented proper clinical outcomes without using any adjunctive chemicals and there was no requirement for any surgical periodontal intervention.

## REFERENCES

1. Anwar A, Amir Q, Khan M. Chronic periodontitis, a silent hazardous disease. *Biomedica* 2014; 30:34-39.
2. Çekici A, Kantarcı A, Hastürk H, Van Dyke TE. Inflammatory and immune pathways in the pathogenesis of periodontal disease. *Periodontology* 2000 2014; 64:57-80.
3. Chapple ILC, Mealey BL, Van Dyke TE, Bartold PM, Dommisch H, et al. Periodontal health and gingival diseases and conditions on an intact and a reduced periodontium: Consensus report of workgroup 1 of the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. *J Clin Periodontol* 2018;45 Suppl 20:68-77.
4. Tonetti MS, Greenwell H, Kornman KS. Staging and grading of periodontitis: Framework and proposal of a new classification and case definition. *J Clin Periodontol* 2018; 45 Suppl 20:149-61.
5. Ravid A, Qazi M, Troiano G, Saleh MHA, Greenwell H, Kornman K, Wang HL. Using periodontal staging and grading system as a prognostic factor for future tooth loss: A long-term retrospective study. *J Periodontol* 2020; 91: 454-61.
6. Suvan J, Leira Y, Moreno Sancho FM, Graziani F, Derks J, et al. Subgingival instrumentation for treatment of periodontitis. A systematic review. *J Clin Periodontol* 2020; 47 Suppl 22: 155-175.

7. Graziani F, Karapetsa D, Mardas N, Leow N, Donos N. Surgical treatment of the residual periodontal pocket. *Periodontology* 2000 2018; 76: 150-163.
8. Heitz-Mayfield LJ, Trombelli L, Heitz F, Needleman I, Moles D. A systematic review of the effect of surgical debridement vs. non-surgical debridement for the treatment of chronic periodontitis. *J Clin Periodontol* 2002; 29: 92-102; discussion 160.
9. Segelnick SL, Weinberg MA. Reevaluation of initial therapy: When is the appropriate time? *J Periodontol* 2006; 77:1598-601.
10. Herrera D, Sanz M, Kebschull M, Jepsen S, Sculean A, Berglundh T, Papapanou PN, Chapple I, Tonetti MS. Treatment of stage IV periodontitis: The EFP S3 level clinical practice guideline. *J Clin Periodontol* 2022; 49: 4-71.