Case Report

Orthodontic Management of Anteriorly Displaced Incisors Secondary to Stage III, Grade C Periodontitis in a Young adult Female Patient: a Case Report

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KEY WORDS
Periodontitis;
Tooth Displacement;
Orthodontics;
Malocclusion;
Case reports;

Received: 1 December 2025;
Revised: 26 April 2026;
Accepted: 10 May 2026;

ABSTRACT

Grade C periodontitis is characterized by rapid and severe periodontal destruction, mostly affecting young healthy individuals. In moderate to severe cases (Stage III to IV), the decreased periodontal support can result in the development of secondary malocclusions, urging young patients to seek orthodontic treatment to reestablish a healthy and functional dentition. This case report presents a 17-year-old female patient, referred to the orthodontic department by her periodontist after managing and controlling her generalized Stage III, Grade C periodontitis, with chief complaint of prominent inter-incisal gaps. The clinical examination revealed a skeletal class III malocclusion (Wits appraisal= -7mm) with bilateral class III molar and canine relationship, proclined maxillary incisors with angular bone resorption reaching the middle third of the root, and tongue thrust dysfunction. The patient underwent orthodontic treatment, with fixed multibracket appliance and personalized biomechanics using light forces. Regular visits with her periodontist were scheduled along the course of treatment to provide thorough guidance on oral hygiene and control of periodontal disease. The treatment objectives were achieved, providing a stable class I occlusion with an acceptable overjet and overbite, coordinated midlines and acceptable profile esthetics.

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Cite this article as:

Introduction

Stage III/IV, Grade C periodontitis, formerly classified as aggressive periodontitis is a form of periodontitis characterized by rapid and severe periodontal destruction without significant plaque or calculus accumulation, mostly affecting young healthy individuals [1-3]. The mismatch between the number of local factors and that of periodontal destruction is a key supporting feature used in their diagnosis.

The prevalence of Grade C periodontitis shows wide variation across races and ethnic groups, ranging from 0.1% to 15% [3-4], reaching a significantly higher value in subjects of African descent. In Morocco, a North African country, a high prevalence among adolescents has also been observed [5].

The generalized form of stage III/IV grade C periodontitis is characterized by the involvement of four or more teeth with attachment loss exceeding 3 mm, with at least two of the affected teeth being second molars, canines, or premolars [6].

The loss of interproximal attachment is the leading factor to secondary tooth migration, especially incisors, clinically manifesting as proclination, extrusion, rotation and inter-incisors diastema causing premature contact of occlusion, accelerating the loss of periodontal supporting structures and negatively affecting dental esthetics urging young patients to seek orthodontic treatment to reestablish a healthy and functional dentition [7].

The aim of our paper is to report the orthodontic management of a 17-year-old female patient showing

Class III malocclusion with anteriorly displaced incisors due to history of Stage III, Grade C periodontitis. This report has been written in line with the case report guidelines (CARE) criteria [8].

Case Presentation

Diagnosis and etiology

A 17-year-old female patient was referred to orthodontics department by her periodontist, with a chief complaint of displaced front teeth due to Stage III, Grade C periodontitis.

During the joint interdisciplinary consultation, the patients' clinical records were reviewed and discussed. The initial intra-oral periodontal examination revealed moderate oral hygiene with no missing teeth; anteriorly displaced maxillary incisors showed gingival recession on buccal and lingual surfaces, accompanied by probing pocket depth exceeding 6mm and Grade II mobility. Attachment loss and probing depth exceeding 5mm were also noted around the upper first molars and second premolars, as well as the lower left first molar and second premolar.

Initial radiographs showed vertical bone resorption extending beyond the middle-third of the root (Grade III) in the upper incisors and first molars (except lower right first molar). The remaining teeth exhibited horizontal bone resorption of approximately one-third of the root (Grade II).

A diagnosis of generalized Stage III, Grade C periodontitis was established, followed by non-surgical periodontal therapy that included oral hygiene instructions, full mouth supragingival scaling, and subgingival scaling and root planning. Three Reevaluation visits over a 6-month period were scheduled to confirm complete healing of affected periodontal tissues and stability of alveolar bone levels prior to orthodontic treatment. Anterior incisor mobility was reduced to grade 1 (except for upper right central incisor), pocket depths decreased to healthy values, and no signs of active bone loss were observed on radiographs.

Table 1 presents the periodontal charting report before orthodontic treatment. Table 2 shows the pre-orthodontic treatment radiographic bone loss assessment. The patient had no relevant medical history, and the family history showed no similar maxillofacial deformities.

Frontal orthodontic clinical examination revealed a symmetrical round-shaped face, with harmonious facial

Table 1: Full mouth periodontal charting – comparative parameters before and after orthodontic treatment

				17	16	15	14	13	12	11	21	22	23	24	25	26	27
Upper arch		M	T1	0	0	0	0	0	1	2	1	1	0	0	0	1	0
			T2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Buccal	GM	T1	0/0/-1	0/0/-2	-1/0 /0	0/0/0	0/0/0	0/0/ -1	-3/-2/-2	-2/-2/-2	-2/-1/0	0/0/0	0/0/0	O/O/-1	-2/0 /0	0/0/0
			T2	0/0/0	0/-1/-2	-1/0 /0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-3/-2/0	0/0/0
		PPD	T1	2/2/2	2/3/3	3/3/2	2/2/2	3/2/2	2/3/3	3/3/3	3/3/2	3/2/3	0/0/0	2/2/2	2/3/3	3/3/3	3/2/1
			T2	2/3/3	3/3/3	3/3/2	2/2/2	2/2/3	3/3/3	3/3/3	3/3/3	3/3/3	3/2/2	2/2/3	2/3/3	3/2/3	3/2/2
		CAL	T1	././.	././5	4/./.	././.	././.	././4	6/5/5	5/5/4	5/./.	././.	././.	././4	5/./.	././.
			T2	././.	./4/5	4/./.	././.	././.	././.	././.	././.	././.	././.	././.	././4	6/4/.	././.
	Palatal	GM	T1	0/0/0	0/0/-1	0/0/0	0/0/0	0/0/0	0/0/-1	-2/-2/-1	-1/-1/-2	-1/0 /0	0/0/0	0/0/0	0/0/0	-1/0 /0	0/0/0
			T2	0/0/0	0/0/-1	-1/0 /0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-1/-1/0	0/0/0
		PPD	T1	1/2/2	2/3/3	2/2/1	1/1/1	2/1/1	1/2/2	2/2/2	2/3/2	3/3/2	2/2/2	2/1/1	1/2/3	3/2/2	2/1/1
			T2	2/2/3	3/3/3	3/2/2	2/2/2	2/2/2	3/2/3	3/3/3	3/3/3	3/2/2	3/2/2	2/2/3	2/2/2	3/2/3	2/2/2
		CAL	T1	././.	././4	././.	././.	././.	././.	4/4/.	./.4/4	4/./.	././.	././.	././.	4/./.	././.
			T2	././.	././4	4/./.	././.	././.	././.	././.	././.	././.	././.	././.	././.	4/./.	././.
				47	46	45	44	43	42	41	31	32	33	34	35	36	37
Lower arch		M	T1	0	0	0	0	0	0	0	0	0	0	0	0	1	0
			T2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Buccal	GM	T1	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-2/-1/0	0/0/0
			T2	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-2/0 /0	0/0/0
		PPD	T1	2/2/3	2/2/3	2/2/2	2/2/3	3/2/2	2/1/2	2/1/2	2/1/2	2/1/2	2/2/2	3/2/2	2/3/3	3/3/2	2/2/1
			T2	2/3/3	3/2/3	3/2/2	2/2/2	2/2/2	2/2/2	2/1/2	2/1/2	2/2/3	2/2/3	3/3/2	2/2/3	3/3/2	2/2/1
		CAL	T1	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././4	5/4/.	././.
			T2	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././4	5/./.	././.
	lingual	GM	T1	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-1/0 /0	0/0/0
			T2	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/0	0/0/-1	-1/0 /0	0/0/0
		PPD	T1	2/2/2	2/2/3	2/2/2	2/2/2	2/2/2	2/1/2	2/1/2	2/1/2	2/1/2	2/2/2	2/2/2	2/2/2	3/3/2	2/2/1
			T2	2/1/2	2/2/3	3/2/2	2/2/2	2/1/2	2/1/2	2/1/2	2/1/2	2/1/2	2/2/2	3/2/2	2/2/3	3/3/3	2/1/1
		CAL	T1	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	4/./.	././.
			T2	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././.	././4	4/./.	././.

M: Mobility; GM: gingival margin; PPD: Probing pocket depth; CAL: clinical attachment loss; T1: before orthodontic treatment ; T2: after orthodontic treatment

Table 2: Radiographic bone loss assessment: Pre- and post-orthodontic treatment

		17	16	15	14	13	12	11	21	22	23	24	25	26	27
% RBL	T1	15-33%	≥33%	15-33%	15-33%	15-33%	≥33%	≥33%	≥33%	≥33%	15-33%	15-33%	15-33%	≥33%	15-33%
	T2	≥33%	≥33%	15-33%	15-33%	15-33%	≥33%	≥33%	≥33%	≥33%	15-33%	15-33%	15-33%	≥33%	15-33%
		47	46	45	44	43	42	41	31	32	33	34	35	36	37
% RBL	T1	15-33%	15-33%	15-33%	15-33%	15-33%	≤15%	≤15%	≤15%	≤15%	15-33%	15-33%	15-33%	≥33%	15-33%
	T2	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	15-33%	≥33%	15-33%

Radiographic bone loss (RBL) (%): Bone height/root length ×100
Stage I: ≤15%; coronal third
Stage II: 15-33%; middle third
Stage III: ≥33%; beyond middle third
T1: before orthodontic treatment ; T2: after orthodontic treatment

thirds, and slightly pronounced nasolabial folds. Upon smiling, the patient displayed a subtle and symmetrical dental smile uncovering anterior inter-incisor diastemas.

The clinical evaluation of the profile revealed a flat profile, a normal cervical-chin distance, a prominent labiomental fold, and a reduced nasolabial angle.

Oral examination showed good oral health, with the periodontal condition well controlled. The mandibular dental-arch was perfectly aligned with symmetrical canines and molars. The maxillary arch presented inter-incisal diastemas with clear rotation of the upper first molars.

Inter-arch analysis revealed a 3mm overjet and a 2mm overbite, with a bilateral Class III molar and canine relationship in maximum intercuspation. The maxillary and mandibular midlines were aligned with the median sagittal line. The functional examination revealed anterior tongue thrust.

Assessment of the temporomandibular joint showed normal centric occlusion and no history of joint or associated muscles discomfort.

Panoramic imaging showed complete dentition, including third molars, except for lower right third molar. Cephalometric analysis showed a skeletal Class III sagittal relationship (Wits appraisal: -7mm), a hyperdivergent vertical growth pattern (cranial base - mandibular base angle (GoGN/SN)= 37°), and proclined maxillary incisors. The vertical pattern masked the sagittal discrepancy resulting in a normal position of the maxilla relative to the mandible. The soft tissue assessment showed a flat profile with hypertonicity of labial and buccal muscles.

Figure 1 shows pre-treatment extraoral and intraoral photographs, and pretreatment radiographs. Table 3 resumes pre-treatment cephalometric analysis.

Treatment objectives

The treatment objectives for this patient were as follows:

- To close gaps between teeth and reduce maxillary incisors proclination.
- To establish positive overjet and overbite with a good functional class I occlusion bilaterally.
- To treat tongue thrust and to normalize orofacial functions.
- To maintain the stabilized periodontium and improve facial balance with pleasing smile and profile.

Treatment alternatives

Camouflage orthodontic treatment without extraction was considered as the main treatment manoeuvre. This treatment modality would aid in resolving the patient chief complaint of maxillary inter-incisal gaps and proclination. The treatment plan was discussed with the patient, considering all the advantages and disadvantages and her consent was obtained.

Treatment progress

A periodontal re-examination was performed by the periodontist before starting the orthodontic treatment (at T1) to ensure stability of the periodontal tissue and patient's obedience to hygiene instructions. Sessions dedicated to lingual re-education were set up to treat tongue thrust and to normalize orofacial functions.

The orthodontic treatment was started by bonding the upper arch with Roth prescription brackets (0.022 ×0.028 -inch slot sizes) and buccal tubes on the first molars. Taking the state of the patient's periodontal tissue into account, a biomechanically cautious approach was adopted, using light, continuous orthodontic forces tailored to the reduced alveolar bone height, since the apical shift of the center of resistance of periodontally compromised teeth increases the moment-to-force ratio, favors uncontrolled tipping and increases the risk of external apical root resorption.

The following sequence of nickel titanium (NiTi) arch wires was used to align the teeth in the upper arch: round section NiTi archwires of 0.012-inch diameter,

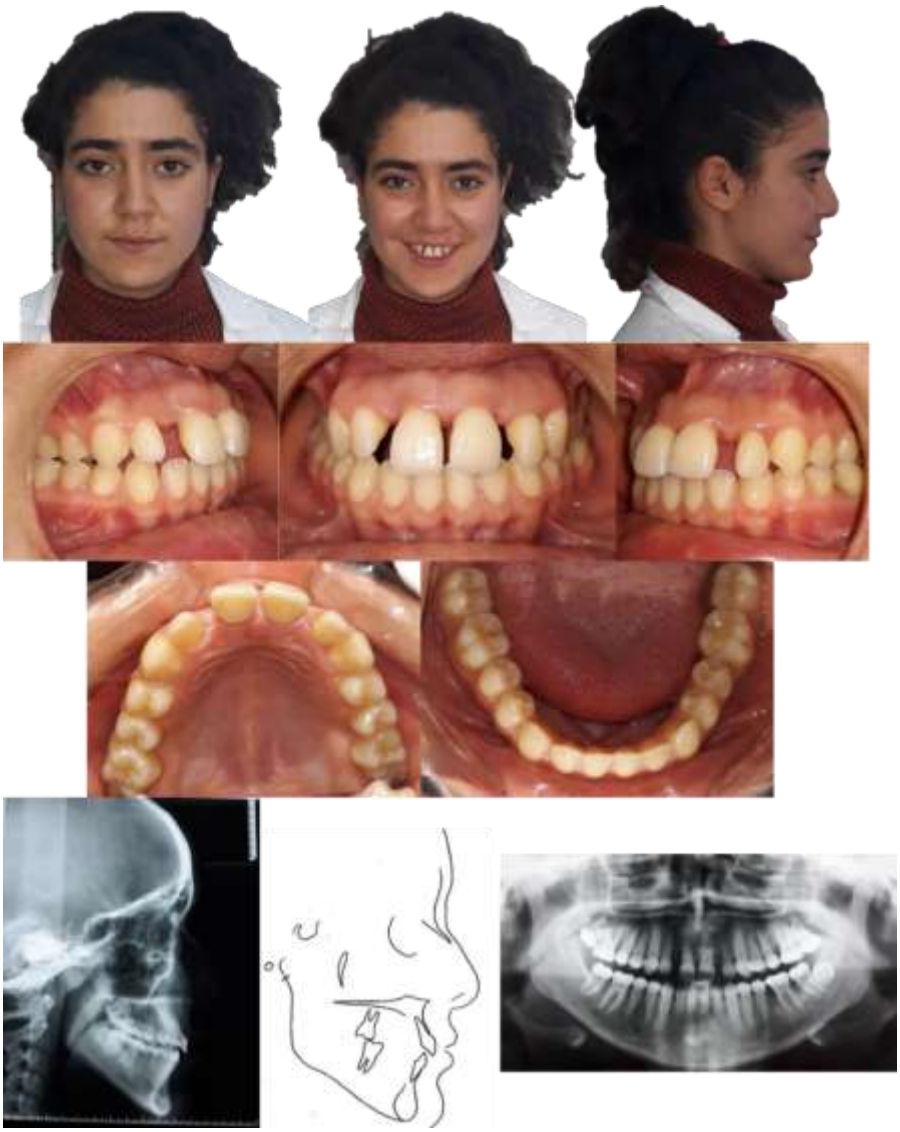

Figure 1: Pre-treatment extraoral, intraoral photographs and radiographs

Table 3: pre-treatment and post-treatment cephalometric measurements

		T1	T2
SNA(°)	82±2	76	76
SNB(°)	80±2	76	76
ANB(°)	2±2	0	0
Wits(mm)	0±2	-7	-6
SND(°)	76±2	72	72
I/to NA(mm)	4±1	8	5
I/to NA(°)	22±2	29	22
i/ to NB(mm)	4±1	4	4
i/ to NB(°)	25±2	20	25
Pog to NB (mm)		2	2
I / to / i(°)	131±5	135	132
Occl/SN(°)	14	12	12
GoGn/SN(°)	32±5	37	39
SL(mm)	51±2	47	47
SE(mm)	22±2	17	17
FMA(°)	25±3	32	35
FMIA(°)	67±3	65	54
IMPA(°)	88±3	82	91

T1: before orthodontic treatment ; T2: after orthodontic treatment

0.014-inch diameter, then 0.016-inch diameter, followed by a rectangular archwire with a diameter of 0.016× 0.022-inch for early torque expression and control. Afterwards, progressively heavier stainless steel archwires of 0.016×0.022-inch followed by 0.017×0.025-inch diameter and 0.018×0.025-inch diameter were placed. Anterior gaps closure and torque-controlled incisors retraction were achieved using an elastic power chain extending from the right to the left canine, including the central incisors, with the addition of lingual root torque-bending progressively incorporated into the rectangular archwires, aiming for close to center of resistance force application. Once the target amount of maxillary anterior teeth retraction was achieved and canines were righteously positioned, premolars were then mesialized followed by molars, moving one tooth at a time to ensure preservation of anterior anchorage.

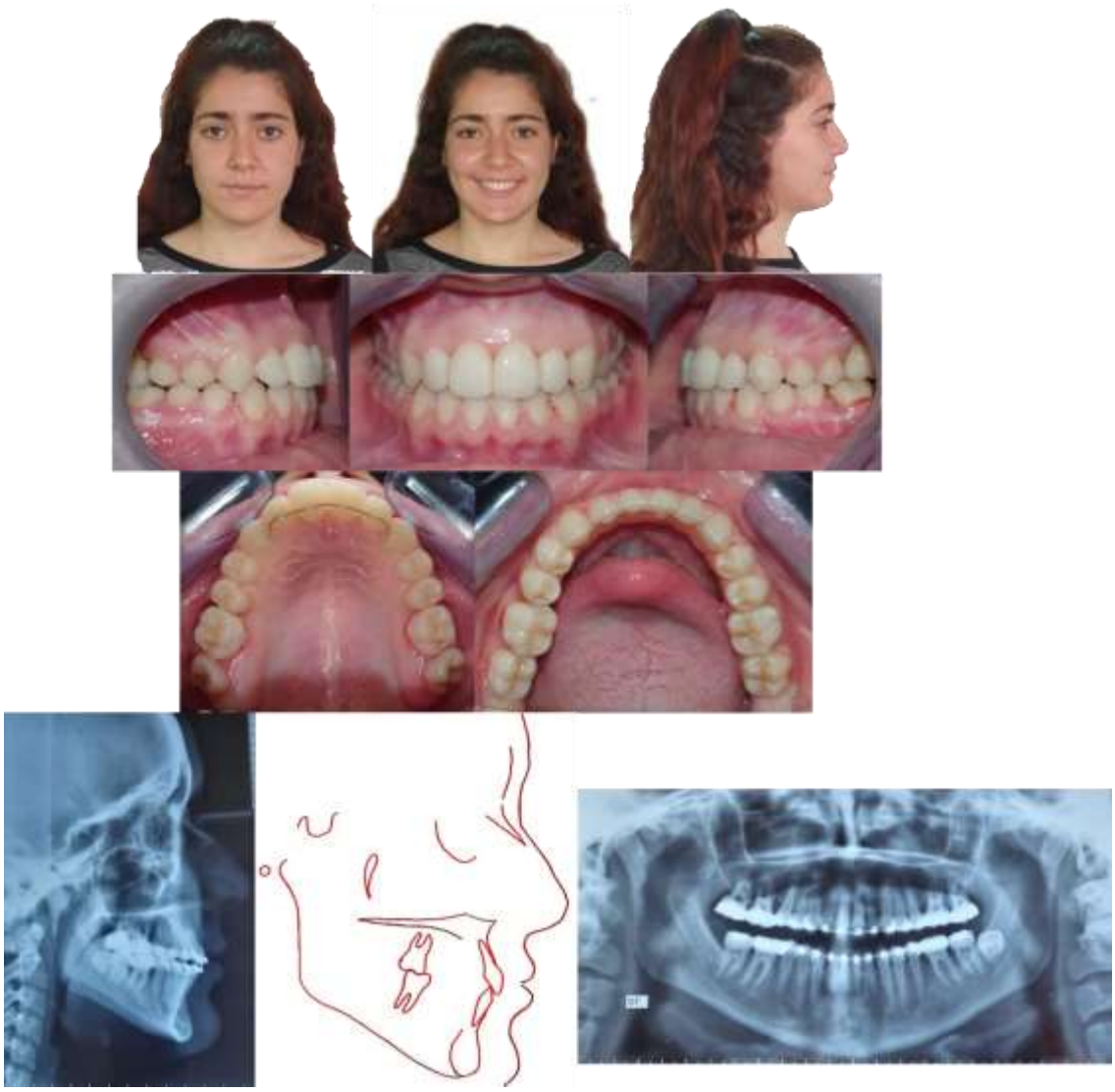

Figure 2: Post-treatment extraoral, intraoral photographs and radiographs

Mandibular leveling and alignment were later performed once all maxillary anterior gaps were closed, and light Class III intermaxillary elastics were prescribed to complement upper arch premolars and molars mesialization and lower arch slight distalization to obtain perfect occlusal Class I relationship. Class I inter maxillary elastics were then placed to ensure the settling of the occlusion.

A final detailing of the upper and lower dental arches was performed to refine intercuspation, coordinate arch's midlines and finalize overbite and overjet relationships. The appliance was removed after a total treatment time of 25 months. Bonded canine to canine (3-3) permanent retainers were placed in both arches in addition to removable retainers to maximize retention. Figure 2 show post-treatment extraoral, intraoral photographs and radiographs.

During active orthodontic treatment, the patient had regular periodontal maintenance appointments every 3 to 4 months to reassess periodontal health and stability and detect any disease regression at initial stages.

Treatment results

The treatment was successful in addressing the patient's chief complaint. She was satisfied with her final look as improvements in facial aesthetics and occlusal function were achieved.

Post-treatment extra-oral examination (T2) showed a well-proportioned facial contour and facial thirds. Smile analysis showed reduced buccal corridors and maxillary incisors properly aligned relative to the upper and lower lip.

Occlusally, both arches were aligned with complete space closure. Ideal overjet and overbite were established and Class I canine and molar relationships were

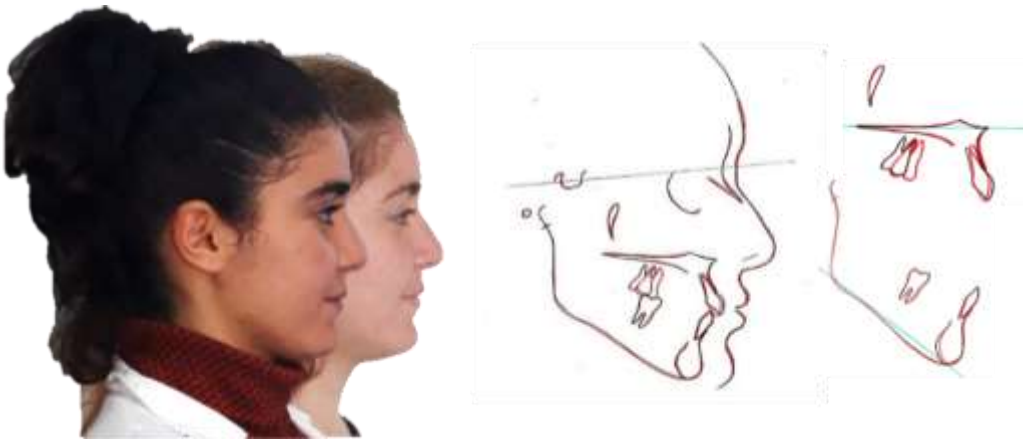

Figure 3: Cephalometric and profile superimposition

achieved on both sides with coordinated midlines.

The final interdisciplinary orthodontic and periodontal re-evaluation (T2) was conducted, with both clinical and radiographic measures compared to baseline (T1). Significant gains in clinical attachment level and gingival margin level were achieved in the anterior teeth, alongside stable probing pocket depth measurements overall.

No evidence of significant external apical root resorption was detected on post-treatment radiographic examination, suggesting that the applied biomechanical forces were adequately controlled and well tolerated by the periodontal tissue. Furthermore, the alveolar bone levels remained stable throughout orthodontic treatment.

Figure 3 show cephalometric and profile superimposition. Table 1 presents the periodontal charting report before and after orthodontic treatment. Table 2 presents the radiographic bone loss assessment pre- and post-orthodontic treatment. Table 3 show pre-treatment versus post-treatment cephalometric measurements.

Discussion

In cases of moderate to severe periodontitis, the decreased periodontal support can result in the development of secondary malocclusions [9]. The loss of interproximal attachment is regarded as the primary factor in pathologic tooth migration [7], and can be further influenced by forces from mastication, tongue activity, and lip pressure. When anterior teeth are affected, the reduction in alveolar bone height moves the center of resistance apically, increasing shear stress on the alveolar bone. This shift causes occlusal forces to progressively tip and extrude incisors, perpetuating a detrimental cycle of tooth migration and shearing forces that ultimately lead to traumatic occlusion and compromised esthetics [9].

For patients seeking treatment, satisfactory results cannot be achieved through periodontal and prosthodontic therapy alone. Orthodontic intervention becomes a necessity to fully address these challenges and achieve stable, long-lasting results.

This paper describes the orthodontic treatment of a 17-year-old female patient presenting a Class III malocclusion with anteriorly displaced central incisors due to Stage III, Grade C periodontitis. She was referred by her periodontist with stabilized periodontal tissue and sufficient oral hygiene maintenance.

The orthodontic management of this periodontally compromised case consisted of the application of light forces delivered by superelastic NiTi archwires, starting with a 0.012-inch diameter section. Progressive sequences of NiTi archwires were placed as the treatment progressed, followed by stainless steel archwires reaching a 0.018×0.025-inch diameter. Light-force Class III intermaxillary elastics were implemented early in treatment to facilitate interarch tooth movement and correction of the existing Class III malocclusion.

Regular control visits were scheduled in coordination with the patient's periodontist to provide thorough guidance on oral hygiene and control of periodontal disease. No evidence of progression of gingival recession or alveolar bone resorption was recorded throughout the course of active orthodontic treatment.

Given the high risk of recurrent secondary tooth migration, particularly when alveolar bone loss extends to the middle third of the root in anterior teeth, lifelong permanent 3-3 fixed retainers were prescribed, supplemented by removable retainers for nighttime wear.

Periodontal maintenance visits were scheduled with initial follow-ups every 3 months for the first year, transitioning to bi-annual visits in subsequent years to ensure long-term stability and monitor oral health.

At the one-year post-treatment follow-up, the patient expressed satisfaction with the results, as the enhanced facial aesthetics combined with a well stabilized occlusion were maintained. About periodontal health, as the patient was highly compliant and adhered to self-performed oral hygiene practices, no recurrence of Grade C periodontitis was reported.

A combined periodontal-orthodontic therapy can provide comprehensive orthodontic care once periodontal inflammation is effectively controlled, and the patient demonstrates both the ability and motivation to maintain sufficient personal oral hygiene [10]. The primary goals are to improve personal and professional oral hygiene, minimize plaque-retentive areas by relieving crowding, and establish a stable functional occlusion by eliminating traumatic contacts and reducing overbite and overjet. This creates a favorable environment for periodontal tissue healing. Additionally, the patients' chief esthetics concerns are addressed by closing existing diastema, retracting flared anterior teeth, and improving gingival contours to achieve a more pleasing smile [11].

Managing malocclusion in patients with a history of periodontitis requires individualized orthodontic interventions. The primary difficulty lies in the reduced vertical height of the alveolar bone, which complicates the mechanics of tooth movement [12]. Therefore, careful analysis of force direction, magnitude, and application point is essential to design a force system capable of avoiding undesired tooth displacements [13-14].

Published studies underlined the importance of favoring feasible treatment strategies and realistic objectives rather than prolonged orthodontic procedures to ensure effective and efficient patient care [15-17]. Chhibber *et al.* [18] discovered an inverse relationship between the duration of orthodontic treatment and the post-treatment periodontal improvements, suggesting that shorter treatment durations are more beneficial.

Fixed orthodontic appliances are most used in patients with a history of periodontal disease, due to their ability to control tooth movement accurately. These appliances acts as splints, enhance anchorage stability, and deliver light continuous force [4].

Regarding removable appliances, clear aligners have gained popularity among patients due to their superior aesthetic compared to fixed orthodontic appliances. While teeth with moderate mobility can be safely moved using fixed appliances, which provide stabilization and allow them to withstand oblique forces [19], clear aligner therapy may not be suitable for teeth with excessive mobility. The forces applied during insertion and removal of aligners can exacerbate tooth mobility [20].

A systematic review and meta-analysis by Papageorgiou *et al.* [19] reported that current evidence does not support the clinical use of aligners as an equally effective treatment modality for periodontitis patients compared to fixed orthodontic appliances. The review stated that aligner treatment was associated with poorer outcomes in adult patients.

Given the possibility of Grade C periodontitis to recur and progress during orthodontic treatment, continuous professional periodontal maintenance is essential. Depending on the severity of periodontal alteration, regular scaling and root planing sessions should be scheduled, along with a structured supportive periodontal follow-up plan [4, 21].

Furthermore, a study by Naranjo *et al.* [22] found that plaque accumulation tends to worsen after the placement of brackets, leading to a shift in pathogenic species in both supra and subgingival microflora. Three months after bracket placement, the study observed a significant increase in the counts and frequencies of *Porphyromonas gingivalis, Tannerella forsythia, Prevotella intermedia/Prevotella nigrescens, and Fusobacterium* species. Therefore, the expert consensus on orthodontic treatment of patients with periodontal disease [11] recommended using a simple orthodontic system and avoiding overly complex treatment procedures to minimize plaque buildup and improve patients' ability to maintain oral hygiene.

According to recent systematic reviews, periodontitis patients benefit from superior clinical outcomes when managed with combined periodontal-orthodontic therapy [23-25]. Papageorgiou *et al.* [24] study with 40 included studies and a total of 1608 Stage IV periodontitis patients, revealed that combined periodontal-orthodontic treatment offers significant advantages over periodontal treatment alone, including increased clinical

attachment levels, greater periodontal probing depth reduction, greater radiographic alveolar bone loss improvement, less treatment failure, and improved patient reported outcomes. Erbe *et al.* [23] study also found improvements of periodontal parameters after orthodontic treatment.

Regarding long-term effects, numerous studies have reported no harm to periodontal prognosis [23, 25]. Equally importantly, Roccuzzo *et al.* [26] found in a 10-year follow-up study a very low rate of teeth lost after periodontal treatment, guided tissue regeneration of bony defects, and orthodontic alignment of pathologically migrated teeth. Zhang *et al.* [27] found similar results with fewer relapses of periodontal inflammation/migration in patients treated by periodontal-orthodontic therapy compared to patients who received periodontal monotherapy. Furthermore, during the 11-year period of supportive periodontal therapy, Aimetti *et al.* [28] study reported no loss of anterior teeth due to periodontitis recurrence. Tietmann *et al.* [29] and Re *et al.* [3] showed similar results too.

Informed consent for publication of this case report was obtained from the patient, including clinical photographs.

Conclusion

Orthodontic management of patients with a history of Stage III, Grade C periodontitis can be notably challenging due to the disease's early appearance and swift progression, mostly affecting the young adult population. For patients with controlled periodontitis, favorable treatment outcomes can be achieved without any deleterious effects on the compromised tooth. This can be accomplished through personalized and individualized treatment planning, proper selection of orthodontic appliances and force management, and sustained patient compliance throughout the process.

Due to bone loss, the stability of orthodontic results can be critical. Lifelong retention with appropriately designed passive fixed retainers, as well as lifelong regular periodontal and orthodontic follow-up visits are essential to maintain periodontal health and occlusal balance, despite the countless potential changes that may occur.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of patient consent

Informed consent was obtained from the patient for publication of this case report (including clinical photographs), and authors endeavoured to ensure anonymity.

Financial support and sponsorship

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

There are no conflicts of interest

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