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Case Report

Ortho – perio synergistic approach for an orthodontic patient with gingival recession: A case report

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Abstract

This case report highlights the interdisciplinary management of post-adolescent female patient requiring orthodontic and periodontal care. A synergistic approach was adopted to address malocclusion and compromised periodontal health simultaneously. Comprehensive treatment planning and coordinated interventions led to improved function, esthetics and stability, emphasizing the importance of collaborative ortho-perio strategies in complex cases.

Keywords: Gingival recession, Ortho – perio synergistic approach, Orthodontics.

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1. Introduction

Interdisciplinary collaboration between different specialities is fundamental in addressing complex dental conditions that encompass both functional and aesthetic dimensions. The growing emphasis on integrated dental care highlights the necessity for coordinated efforts between disciplines to optimize patient outcomes. Orthodontic interventions primarily aim to rectify malocclusion and achieve precise dental alignment, while periodontics focuses on preserving the health and structural integrity of the periodontal tissues. When these fields intersect, particularly in cases involving adult patients or those with compromised periodontal health, a synergistic approach is critical.[1]

This interrelationship is particularly evident in clinical scenarios such as pathological tooth migration, advanced periodontal disease, gingival recession, and alveolar bone loss. Orthodontic tooth movement within a periodontally affected environment can exacerbate attachment loss and compromise therapeutic outcomes. Therefore, establishing periodontal stability before initiating orthodontic treatment and maintaining it throughout the treatment duration is of paramount importance.[2]

The efficacy of such interdisciplinary care hinges on meticulous diagnostic evaluation, comprehensive treatment planning, and effective communication between specialists. Periodontal conditions exert significant influence on orthodontic biomechanics. Additionally, orthodontic treatment contributes to periodontal health by improving dental alignment, reducing plaque accumulation, facilitating enhanced oral hygiene, and supporting improved periodontal outcomes. Notably, evidence suggests that orthodontic tooth movement, in conjunction with appropriate periodontal therapy, can stimulate alveolar bone regeneration.[3,3]

This case report exemplifies the efficacy of an integrated approach in the management of a patient presenting with severe dental malalignment and localized gingival recession. It emphasizes the successful amalgamation of periodontal and orthodontic principles to achieve holistic rehabilitation, underscoring the significance of interdisciplinary collaboration, precision in force application, and continuous periodontal monitoring to ensure optimal therapeutic results.

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2. Case Summary

A 15-year-old post-adolescent female presented with a chief complaint of dental malalignment affecting both the maxillary and mandibular anterior segments. She presented with incompetent lips, a non-consonant smile arc, compromised smile esthetics, and a maxillary dental midline deviation of 2 mm to the left in relation to the facial midline (**Figure 1**).

Dental evaluation demonstrated a bilateral Angle's Class I molar and canine relationship, accompanied by a thin periodontal biotype, inadequate width of keratinized gingival tissue, and Cairo's RT1 gingival recession affecting the mandibular left central incisor. Model analysis confirmed a mandibular dental midline shift of 1 mm to the left relative to the maxillary dental midline, further contributing to a total deviation of 3 mm in relation to the facial midline. Additionally, significant arch length discrepancies were observed, with 8 mm of crowding in the maxillary arch and 6 mm in the mandibular arch, alongside a deep impinging overbite (**Figure 1**).

Lateral cephalometric evaluation revealed a Class I skeletal relationship between the jaw bones with an average growth pattern. The patient exhibited proclination of both maxillary and mandibular incisors, resulting in protrusive upper and lower lip positions (**Figure 1**,**Table 1**).

2.1. Diagnostic summary

A 15 year old post-adolescent female, in Cervical Vertebral Maturation Index (CVMI) stage 5, with an average growth pattern, diagnosed with skeletal Class I and Angle's Class I malocclusion with an arch-length discrepancies of 8 mm in the maxillary arch and 6 mm in the mandibular arch, a maxillary dental midline deviation of 2 mm to the left, and a mandibular dental midline shift of 3 mm to the left. Additionally, the patient exhibited an impinging deep overbite and Cairo's RT1 gingival recession affecting the mandibular left central incisor.

2.2. Treatment objectives

The following objectives were formulated: (a) Leveling and alignment;(b) Maintaining Class I molar and canine relation bilaterally; (c) Improvement in inclination of upper and lower incisors; (d)Achievement of optimum overbite; (e) Correction of gingival recession w,r,t 31; (f) Improvement in smile esthetics; (g) Finishing and detailing; (h) Retention and periodic follow up.

2.3. Treatment plan

Based on the treatment objectives, a customized treatment plan was formulated in three phases. Phase I: periodontal phase I therapy followed by phase IV periodontal maintenance phase; Phase II: fixed orthodontic mechanotherapy using 0.018" Roth pre-adjusted edgewise appliance with therapeutic extraction protocol of all first bicuspids and closure of extraction spaces utilizing group A anchorage in both the arches; Phase III: periodontal management of gingival recession of mandibular left central incisor.

2.4. Treatment progress

Phase I: Thorough scaling and root planning were carried out, followed by a three-month of periodontal maintenance phase.

Phase II: Anchorage was prepared, followed by therapeutic extractions, and sequential bonding in the maxillary and mandibular arch. Levelling and alignment were initiated using standard archwire sequence. The retraction of maxillary and mandibular canines was carried out using NiTi closed coil springs on 0.016" x 0.022" SS wire. Following the completion of canine retraction, lower incisors were bonded and de-rotation of 31 was carried out using couple biomechanics. Subsequently, closure of maxillary anterior space was initiated using Hilger's asymmetric T-loop (**Figure 2**).

Phase III: Following the alignment of mandibular arch, periodontal examination of 31 revealed Cairo's RT 1 gingival recession with recession height of 6 mm and width of 3 mm which was corrected using coronally advanced flap with connective tissue graft being harvested from the right lateral aspect of the hard palate using Lui Class IA incision (**Figure 3**).

Settling of occlusion was carried out, dental arches were debonded and fixed retainers were given in the maxillary and mandibular arch (**Figure 4**). The patient is kept on a periodic periodontal follow up with oral hygiene instructions.

2.5. Treatment outcome

Orthodontic mechanotherapy resulted in the achievement of all the treatment objectives listed (**Figure 4**, **Table 1**). Periodontal intervention resulted in the rectification of gingival defect w.r.t 31 leading to better periodontal outcome.

Table 1: Lateral cephalometric analysis

Parameters	Pre-treatment	Post-treatment
SNA	84˚	84˚
SNB	81˚	81˚
ANB	3˚	3˚
WITS	+2 mm	+2 mm
Pog – N vert	-2 mm	-2 mm
GoGn-SN	27˚	27˚
FMA	25˚	25˚
UI-NA	36˚(9mm)	24˚(4 mm)
LI-NB	31˚(5mm)	27˚(4 mm)
IMPA	98˚	96˚
Nasolabial angle	102˚	116˚
Lips to E-line	-1/0 mm	-4/-2 mm

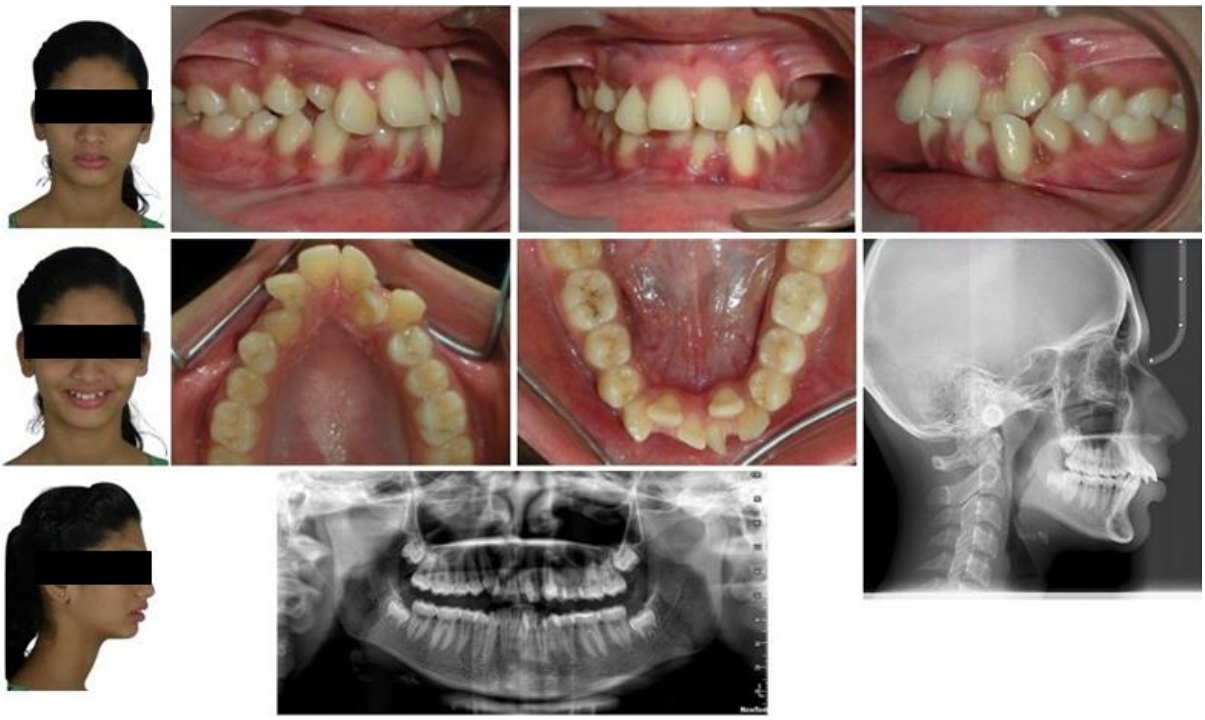

Figure 1: Pre-treatment records

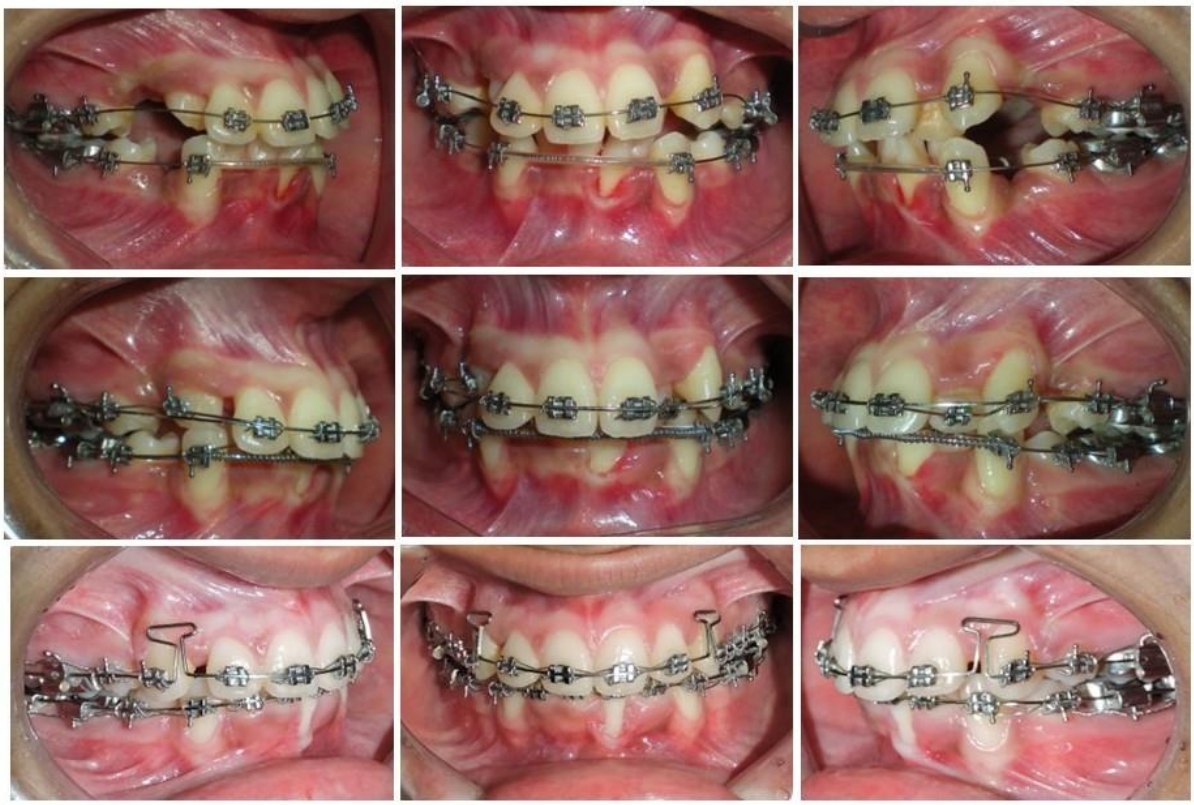

Figure 2: Mid treatment progress

Figure 3: Periodontal therapy (Coronally advanced flap with connective tissue graft)

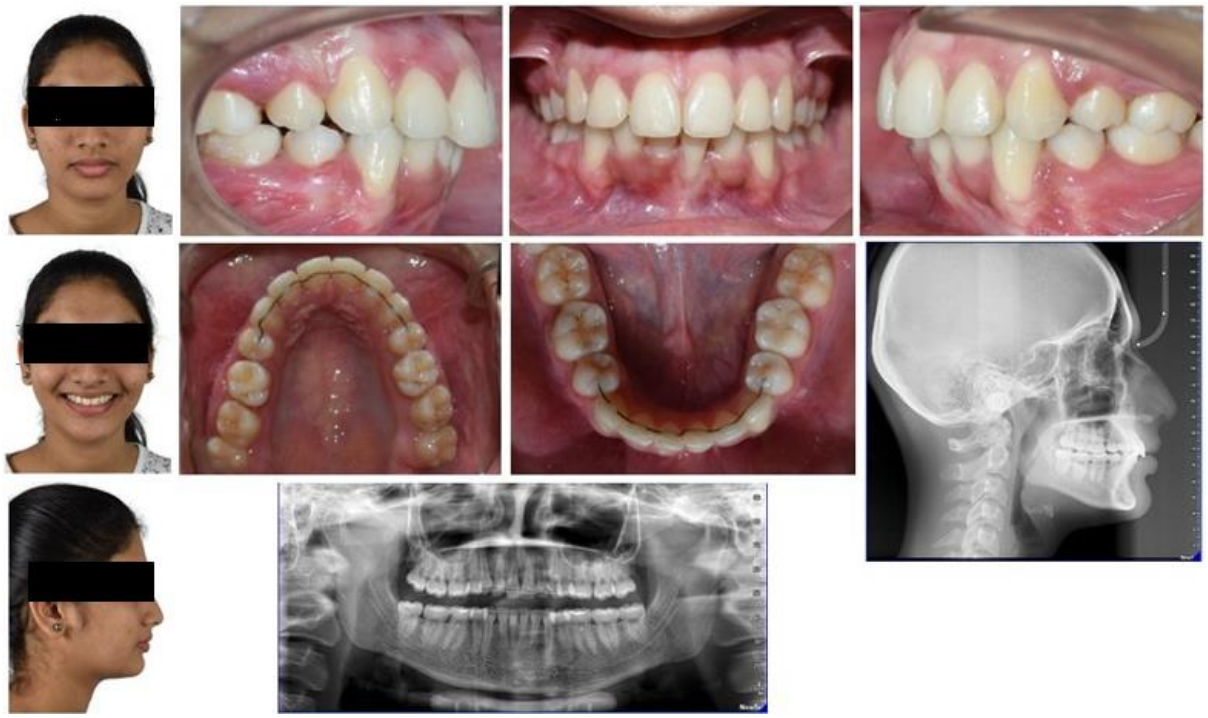

Figure 4: Post-treatment records

3. Discussion

Gingival recession is a common clinical condition characterized by the apical displacement of the gingival margin relative to the cemento-enamel junction (CEJ), resulting in root surface exposure. While its etiology is multifactorial, orthodontic tooth movement plays a pivotal role in either inducing, exacerbating, or unmasking pre-existing recession - particularly when teeth are displaced beyond the alveolar housing. Consequently, precise diagnosis, strategic treatment planning, and interdisciplinary coordination are essential to mitigate or manage gingival recession during orthodontic therapy.[5]

The development of gingival recession associated with orthodontic treatment is inherently multifactorial. Key

contributing factors include a thin periodontal biotype, excessive buccal/labial tooth movement beyond the alveolar envelope, insufficient keratinized tissue width, and underlying periodontal disease.[5,6] In the present case, a pre-existing gingival recession attributed to a thin periodontal biotype was further exacerbated by the buccal displacement of the mandibular incisors during the alignment and leveling phase. Numerous studies have consistently demonstrated a positive correlation between buccal tooth movement and gingival recession, particularly in patients with a thin periodontal phenotype.[7]

Impact of periodontal biotype: Periodontal biotype is a critical determinant of susceptibility to gingival recession following orthodontic movement. Patients with thin, scalloped biotypes exhibit a heightened risk due to reduced tissue resilience against mechanical and inflammatory insults.[8] Pre-treatment assessment in this case identified a thin biotype, necessitating stringent force modulation throughout orthodontic therapy. Despite meticulous planning, the patient remained predisposed to localized recession, reinforcing the importance of biotype evaluation prior to treatment initiation. This highlights the therapeutic value of soft tissue augmentation for at-risk individuals, either as a preventative measure or in conjunction with orthodontic intervention.[3]

Role of orthodontic biomechanics: The nature and magnitude of orthodontic forces exert a profound influence on periodontal health. Excessive force application or uncontrolled tipping movements can precipitate alveolar bone dehiscence and fenestration, thereby heightening the risk of gingival recession.[9] Additionally, treatment duration and appliance design are crucial factors, as they impact plaque retention and oral hygiene maintenance—both of which contribute to soft tissue breakdown. Fixed appliances, in particular, may impede effective plaque control, increasing the likelihood of inflammation and subsequent recession.

Periodontal Diagnosis and treatment strategy: Gingival recession was systematically assessed by measuring the distance from the CEJ to the gingival margin, using Cairo's classification system.[10] This system enables precise prognostic evaluation by considering clinical attachment loss (CAL) at both buccal and interproximal sites. In the present case, the recession was classified as Cairo RT1 (recession without interproximal attachment loss), indicating a favorable prognosis for root coverage procedures.

Post-orthodontic periodontal reassessment facilitated the selection of appropriate surgical interventions for recession correction. Various techniques, including free gingival grafts, coronally advanced flaps (CAF) with subepithelial connective tissue grafts (SCTG), tunnel techniques with connective tissue grafts, and guided tissue regeneration, were considered.[11] Among these, the SCTG in combination with a CAF was determined to be the optimal approach due to its superior aesthetic outcomes, high predictability, and capacity for enhancing tissue thickness and keratinization.[12] In this case, SCTG with CAF was definitively chosen to achieve long-term periodontal stability and optimal soft tissue integration.[13]

3.1. Limitations and challenges

Even with successful outcomes, surgical correction of gingival recession presents challenges and limitations. While predictable in ideal cases, outcomes are contingent upon several factors, including flap tension, the patient's healing response, and adherence to postoperative care. Complete root coverage is not always achievable, particularly in cases with diminished interproximal bone height (e.g., RT2 or RT3 defects) or poor oral hygiene compliance.[13]

In orthodontic contexts, balancing tooth movement goals with periodontal health can be challenging, particularly when significant incisor proclination is required for alignment. Long-term maintenance following successful root coverage is critical to sustaining periodontal health and preserving surgical outcomes.[3] Studies indicate that surgically treated recession defects can remain stable for 5 to 10 years with optimal plaque control and professional care.[14] Therefore, lifelong commitment to periodontal health is essential, particularly for individuals who have undergone both orthodontic and periodontal therapy.

3.2. Future recommendations

Emerging technologies, including acellular dermal matrices, enamel matrix derivatives, and growth factor-enhanced biomaterials, present promising adjunctive solutions for root coverage procedures. Moreover, advancements in digital planning and minimally invasive surgical techniques are significantly improving the precision and patient comfort associated with mucogingival surgeries.

In orthodontics, the advent of clear aligner therapy offers notable advantages, particularly in reducing inflammation and promoting superior plaque control compared to traditional fixed appliances. This may contribute to a reduced risk of gingival recession development.[15] Furthermore, the integration of digital scanning technologies and Cone Beam Computed Tomography (CBCT) imaging provides enhanced visualization of alveolar bone anatomy, facilitating comprehensive treatment planning and minimizing the risk of inadvertent periodontal complications.

4. Conclusion

Management of gingival recession following orthodontic treatment necessitates a meticulous, multidisciplinary approach that addresses both etiological factors and clinical presentations. This clinical scenario underscores the pivotal influence of periodontal biotype, biomechanical considerations of orthodontic forces, and the precision of surgical methodologies in achieving successful root coverage and aesthetic restoration. Furthermore, it highlights the

critical importance of preventive strategies, early diagnosis, and timely intervention in effectively mitigating and managing gingival recession. As advancements in orthodontics and periodontics continue to yield novel techniques and biomaterials, an integrated interdisciplinary approach remains the benchmark for optimizing therapeutic outcomes in cases of orthodontics-associated gingival recession.

5. Source of Funding

None.

6. Conflict of Interest

None.

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