CASE REPORT

Interdisciplinary Managementof Angle's Class I Malocclusion with Spacing.

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Abstract

Spacing is a common complexity, can be seen in both maxillary and mandibular arches. In order to get the ideal smile that everyone aspires to, spacing is a typical difficulty that can be seen in the maxillary and mandibular arches as well as between any tooth. Lack of contact points and interdentally spaces are characteristics of spaced dentition. Depending on how many teeth are involved, spacing can be either regional or generalized.This case report highlights the treatment of a patient by usinginterdisciplinary approach of orthodontic and conservative therapy.

Keywords: Fixed orthodontic, interdisciplinary orthodontics, conservative, crown build up, spacing, retention

Introduction

Space closure is a fundamental phase of orthodontic treatment aimed at eliminating undesirable spaces within the dental arches to achieve optimal esthetics, function, and stability.[1] Spaces may arise due to various etiological factors such as tooth size–arch length discrepancies, congenitally missing teeth, extraction therapy, habits (e.g., tongue thrusting), or periodontal conditions.[2] The correction of these spaces is essential not only for improving smile aesthetics but also for establishing proper occlusion and preventing food impaction and speech difficulties.

Biomechanically, space closure involves controlled tooth movement using techniques such as sliding mechanics (with friction) and loop mechanics (frictionless systems). Anchorage control plays a critical role, as improper management may lead to unwanted tooth movement and compromised treatment outcomes. Modern orthodontics also incorporates temporary

anchorage devices (TADs) and aligner systems to enhance efficiency and predictability of space closure.

From a biological standpoint, space closure depends on bone remodeling through coordinated osteoclastic and osteoblastic activity in response to applied forces. The rate and pattern of closure are influenced by factors such as age, bone density, type of mechanics, and magnitude of force.

Case Report

A 21-year-old female reported to the Department of Orthodontics and Dentofacial Orthopedics Rama Dental College, Hospital & Research Centre, Kanpur with a chief complaint of spacing in the upper and lower front tooth region.

On Intraoral examination

There was minimal spacing in the upper and lower arch along with Angles class I molar relationship bilaterally.

On extra oral examination

Patient had a Mesoprosopic facial form with a convex facial profile.There was neither gross asymmetry nor any facial disproportion.

On smile analysis

the amount of incisor exposure was 100 %, with 2 mm of gingival exposure. On an average the smile line was high with a consonant smile arch. Her upper and lower lip length was normal with a 3 mm of interlabial gap.

Hard tissue examination

- Dentition : Permanent
- Shape of teeth :Normal
- Texture of Enamel : Normal
- Crossbite irt 23
- Rctirt 46
- Peg laterals irt 12,22

Vertical Relationship

- Open bite: Nil
- Overbite: 2 mm

Antero-posterior

- Over jet: 2 mm

Transverse Relationship

- Cross bite: irt 23
- Scissor Bite: Nil
- Midline: non coinciding

Pre-Treatment Extra oral Photographs

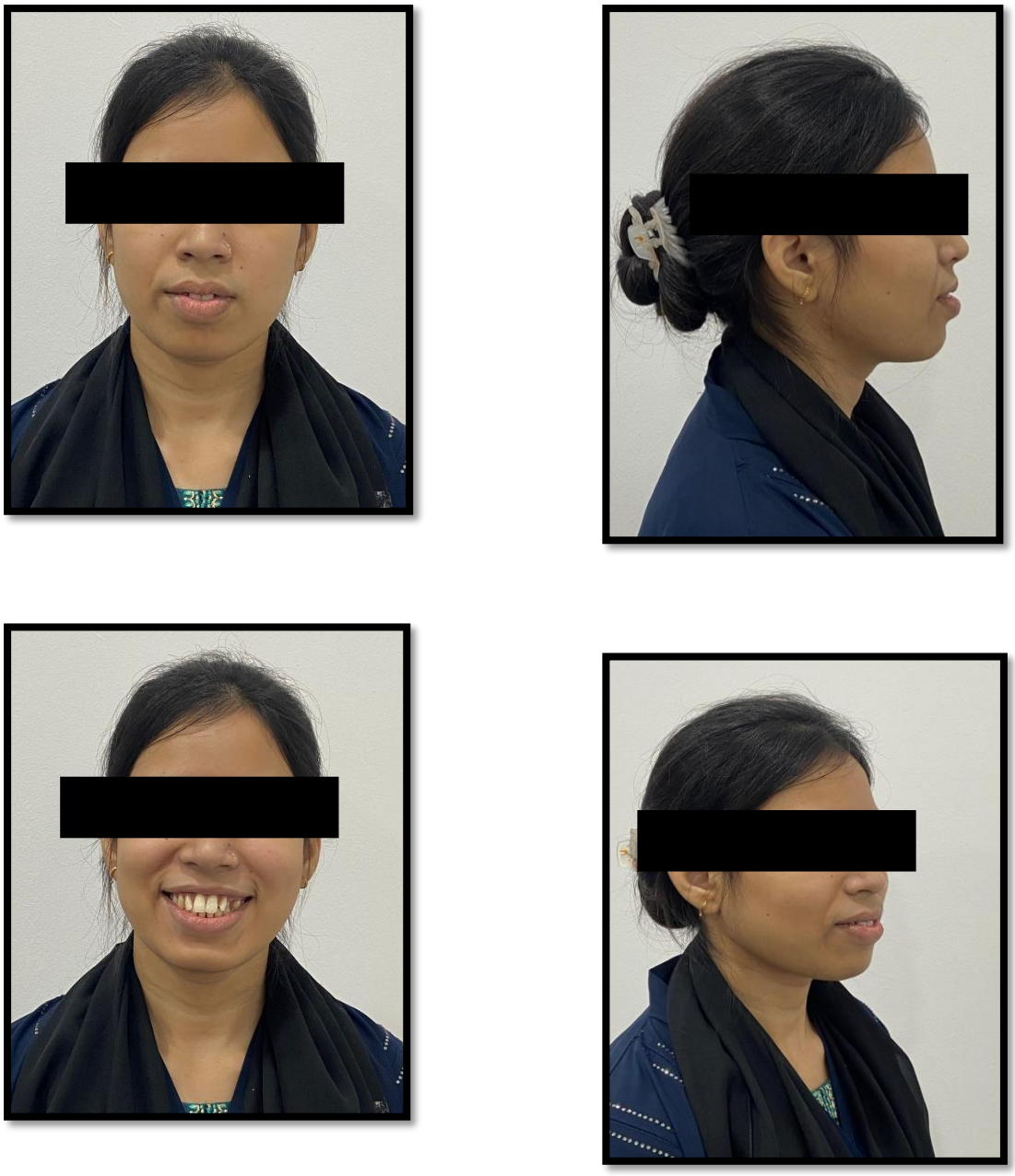
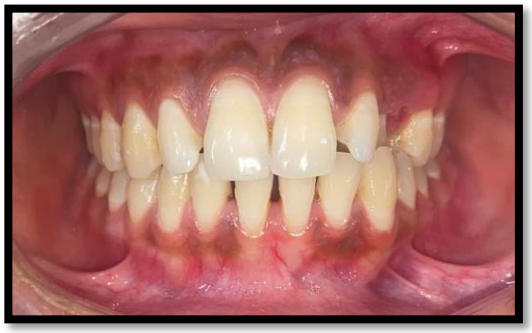
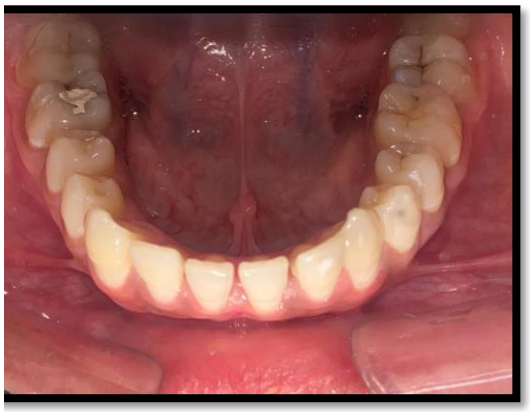
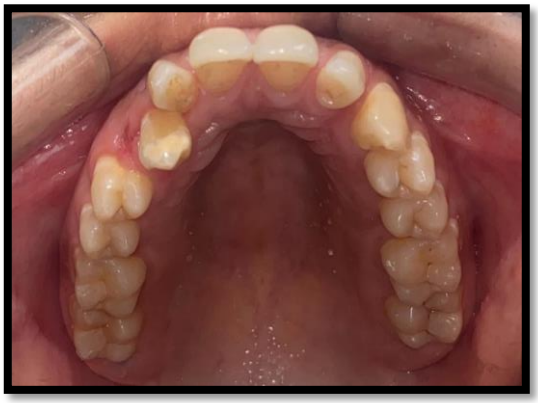


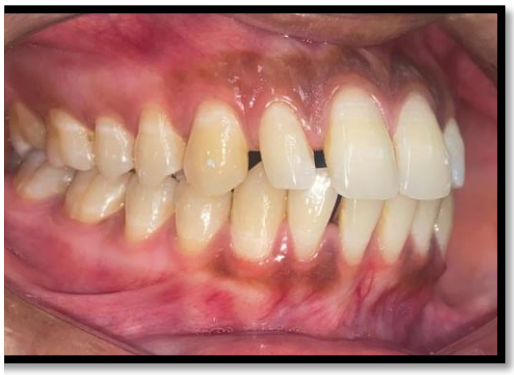
Figure 1: A, Profile View.B, Profile View With Smile.C, Lateral View.D, Profile View With Oblique View.

Pre-treatmentintraoral photographs









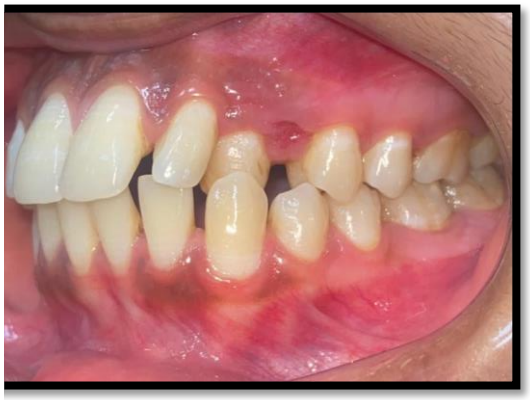
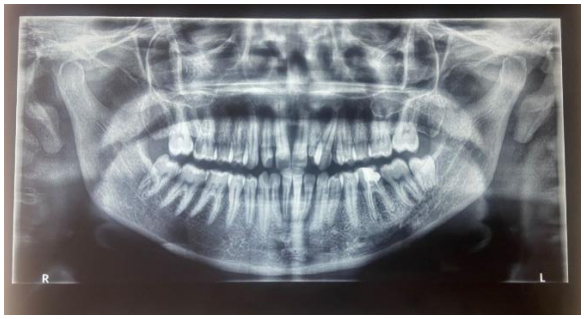


Figure 2: A, Frontal View. B, Maxillary View. C Mandibular View. D, E, Lateral View.

Pre-treatment radiographs



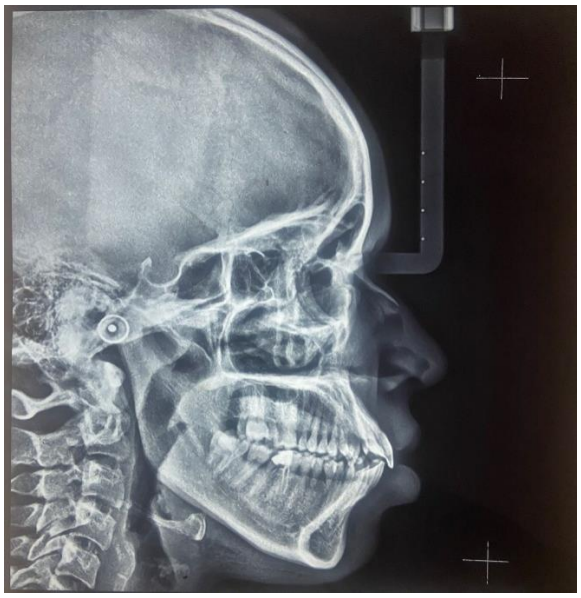


Figure3: Pre-treatment radiographs, A, lateral cephalogram. B, OPG

Table 1: Cephalometric values

Measurement	Pre-treatment
SNA	81
SNB	81
ANB	0
FMA	27
JARABACK'S RATIO	60.17
LOWER 1 TO NB(mm)	10
UPPER 1 TO NA(mm)	12
IMPA	91
Wits Appraisal(Ao-Bo)	-4

Diagnosis

It's a case of skeletal class I jaw base relationship with orthognathic maxilla and orthognathic mandible with vertical growth pattern and Angle's ClassI molar relationship bilaterally with Rickett"s class I canine relation on right side and class II end-on relation on left side and crossbite irt 23. Peg laterals irt 12 and 22

Treatment objective

SOFT TISSUE:

To achieve pleasing and harmonious profile.

To enhance facial esthetics

SKELETAL:

To maintain skeletal class I relationship

DENTAL :

IN THE MAXILLARY DENTITION:

To achieve normal axial inclination and align the teeth in the arch.

To correct proclination

IN THE MANDIBULAR ARCH :

To achieve a normal axial inclination .

IN OCCLUSION :

To maintain molar class I relation

To achieve canine class I relationship

To achieve normal overjet

Treatment plan

Fixed mechanotherapy with extraction treatment modalityirt 14,24,34 and 44, 0.022 slot (MBT prescription) was planned. However, patient refused for extraction so alternative non extraction treatment plan was suggested after explaining the limitations of non-extractiontherapy.Conservative department was involved in the treatment plan for the space management of peg laterals.

Treatment Progression

Bonding in upper and lower teeth till 2nd premolars, anchorage preservation by transpalatal arch in upper and lingual arch in lower arch, Lace backs & bend backs. Biteblock was given for crossbite correction irt 23.Levelling and alignment using 0.014NiTi, 0.016 NiTi, 0.016 SS, 0.018 SS, 0.017x0.025 NiTi, 0.017x0.025 SS,0.019X0.025 NiTi, 0.019 x 0.025 SS.Both the arches were prepared for retraction with posted 0.019×0.025 stainless steel wire.

Conservative department was involved in order for the space management irt 12 and 22. Crown build up was done irt 12 and 22.In upper & lower arch en mass retraction was carried out by using continuous arch mechanics.

At the end of treatment, an optimum over jet and overbite was maintained along with closure of spacing and midline shift. A consonant smile was established by maintaining a proper class I molar and canine class I relation. For retention, fixed lingual retainer was given irt maxillary and mandibular arch.

Post-treatment extraoral Photographs

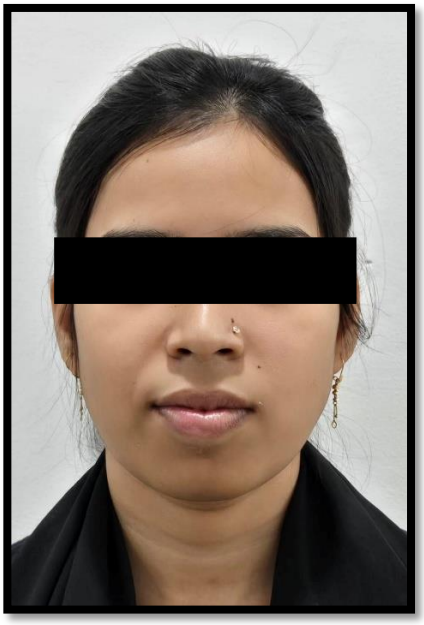
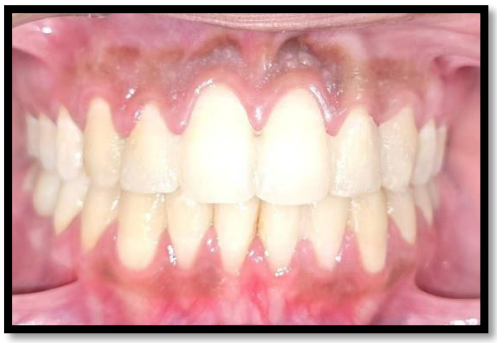


Figure 4: A, Profile view. B, Profile view with smile. C, Lateral view. D, Profile view with Oblique view



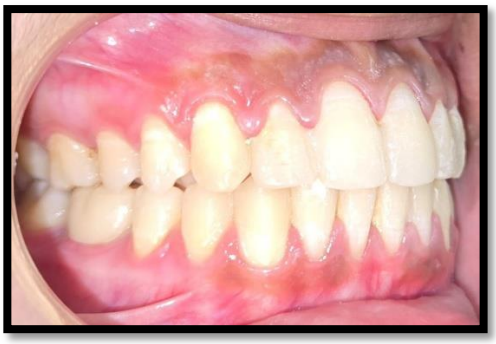


Figure 5: A, Frontal view. B, Lateral view.

Discussion

Spacing in permanent dentition represents a deviation from normal occlusion characterized by excessive interdental spaces, most commonly affecting the maxillary anterior region. The etiology is multifactorial and includes tooth size–arch length discrepancy, congenitally missing teeth, microdontia, abnormal labial frenum attachment, oral habits such as tongue thrusting, and dentoalveolar or skeletal discrepancies.[3]

The prevalence of spacing varies among populations but is reported to range between 5% and 15% in permanent dentition, with midline diastema being the most frequently observed feature.[4,5]While midline spacing may be considered physiological during mixed dentition, its persistence in permanent dentition often indicates underlying etiological factors requiring intervention.

Clinical and cephalometric evaluation plays a crucial role in distinguishing whether the spacing is of skeletal or dental origin. Parameters such as incisor inclination, lip competency, and basal bone relationships must be carefully analyzed. In cases with normal skeletal relationships, spacing is usually dentoalveolar in nature

and can be effectively managed orthodontically.[6]

Treatment of spacing depends largely on etiology and severity. Orthodontic space closure using fixed appliances or clear aligners is the most common approach. Adjunctive procedures such as frenectomy may be indicated in cases with abnormal frenum attachment.[7] Proper anchorage control is essential, especially in generalized spacing cases, to ensure bodily tooth movement and prevent undesirable effects such as flaring or anchorage loss.

A major challenge in the management of spacing is relapse, particularly in cases of midline diastema.[8] The role of gingival and transseptal fibers in reopening spaces has been well documented. Fiberotomy procedures and long-term retention strategies, such as bonded lingual retainers, are often recommended to maintain stability. Retention is a critical phase of treatment in spacing cases.[9]

Overall, successful management of spacing in permanent dentition requires accurate diagnosis, identification of etiological factors, and aninterdisciplinary approach when necessary. Long-term follow-up is essential to ensure stability and patient satisfaction.

Conclusion

Present case report showed with presence of spacing in upper and lower arch and crossbite irt 23 which was corrected by interdisciplinary approach withnon-extraction orthodontic treatment along with crown build up.

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