Management of Skeletal Class II Malocclusion in an 11.5 Year Old Female: A Case Report

Sofia Riaz[1], Noor UL Ain Tariq[1], Zahra Batool Ali Shami[1], Momina Ali[1], Saira Safdar[2], Asma Irfan[2], Maham Khan Niazi[3]

[1]1st Year BDS, Islamabad Medical and Dental College, Islamabad, Pakistan
[2]Department of Physiology, Islamabad Medical and Dental College, Islamabad, Pakistan
[3]Department of Oral Biology, Islamabad Medical and Dental College, Islamabad, Pakistan

Abstract

Skeletal Class II malocclusion is a common orthodontic condition that can adversely affect facial aesthetics and oral function if left untreated. This case report describes the successful management of an 11.5-year-old female presenting with a skeletal Class II malocclusion, Class II molar relationship, increased overjet, traumatic deep bite, and incompetent lips. Comprehensive clinical and radiographic assessment was performed, followed by a two-phase treatment approach consisting of growth modification with a modified Twin Block appliance and comprehensive fixed orthodontic therapy. Treatment resulted in correction of the sagittal discrepancy, reduction of the overjet and deep bite, improved facial profile, proper alignment of the dental arches, and establishment of a stable functional occlusion. This case highlights the importance of timely intervention during the growth period and demonstrates the effectiveness of combining functional appliance therapy with fixed orthodontic treatment in the management of growing patients with skeletal Class II malocclusion.

Key Words: Malocclusion, Skeletal Class II malocclusion, Overjet, Deep bite, Class II molar relationship, Twin Block, Retainers, Occlusion, Orthodontics

Introduction

Class II malocclusion is a common orthodontic problem, representing approximately 20% of malocclusions worldwide.[1] It is frequently associated with an increased overjet, deep bite, and a convex facial profile, which can compromise both aesthetics and oral function. Timely intervention during the growth period is important, as it allows correction of the skeletal discrepancy while utilizing the patient's remaining growth potential.[2]Functional appliances are commonly used in growing patients with skeletal Class II malocclusion to improve the sagittal jaw relationship and achieve favourable skeletal, dental, and soft tissue changes. Among these, the modified Twin Block appliance is widely used because of its effectiveness in reducing excessive overjet, improving facial profile, and correcting the underlying skeletal discrepancy during growth.[2]This case report describes the successful management of an 11.5-year-old female with skeletal Class II malocclusion, increased overjet, traumatic deep bite, and incompetent lips using a two-phase treatment approach consisting of growth modification with a modified Twin Block appliance followed by comprehensive fixed orthodontic therapy.

Case Presentation

M.A., an 11.5-year-old female, presented to the orthodontic department with the chief complaint of forwardly placed upper front teeth and lower teeth contacting the palate during biting. The patient's primary concern was the appearance of her protruding upper teeth as well as the difficulty caused by her deep bite. Clinical examination revealed a Class II skeletal relationship with a Class II molar relationship, an 8 mm overjet, and a traumatic deep bite. The patient's lips were incompetent, and she exhibited a convex facial profile with a deep mentolabial sulcus, an acute nasolabial angle, and a relatively short upper lip. Intraoral examination showed mild proclination of the maxillary incisors, normally inclined mandibular incisors, and mobile deciduous second molars with erupting permanent second premolars. Cephalometric analysis confirmed a skeletal Class II malocclusion with normal vertical facial proportions. The patient's

medical history was non-contributory, and no systemic conditions or contraindications to orthodontic treatment were reported. Based on the clinical and radiographic findings, a diagnosis of skeletal Class II malocclusion with increased overjet, traumatic deep bite, and incompetent lips was established, and comprehensive orthodontic treatment was planned.



Figure 1*: Pre-treatment Extraoral photograph*.



Figure 2*: Pre-treatment Intraoral photograph*.

Investigation

A comprehensive orthodontic diagnostic assessment was carried out to establish the diagnosis and formulate an appropriate treatment plan. Diagnostic records included clinical photographs, radiographic examinations, cephalometric analysis, and study models.

- A **pre-treatment** orthopantomogram (OPG) was obtained to evaluate the developing dentition, eruption status of the permanent teeth, retained deciduous teeth, root morphology, and the supporting alveolar bone. The radiograph confirmed the presence of mobile retained deciduous second molars with erupting second premolars, consistent with the clinical examination. It also aided in assessing the overall dental development and excluding any associated pathology.



Figure 3*: Pre-treatment radiographs.*

- A lateral cephalometric radiograph was taken to assess the skeletal and dental relationships, facial growth pattern, incisor inclination, and soft tissue profile. Cephalometric analysis supported the diagnosis of a Class II skeletal base with a Class II molar relationship, increased overjet, traumatic deep bite, and lip incompetence. Cervical Vertebral Maturation (CVM) assessment indicated that the patient was in an active growth phase, supporting the decision to initiate growth modification with a modified twin block appliance.

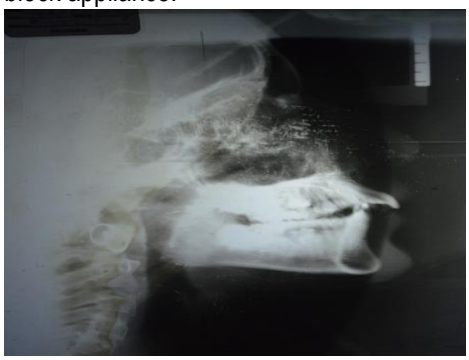


Figure 4*: Pre-treatment Lateral Cephalometric Radiograph.*

- A Bolton tooth size analysis was performed to assess any discrepancy between the mesiodistal tooth widths of the maxillary and mandibular arches. The findings were incorporated into the overall orthodontic diagnosis and treatment planning.

Management

The patient's treatment was carried out in two phases. Before initiating orthodontic therapy, oral hygiene instructions were reinforced, and scaling and polishing were performed to improve oral health. The retained mobile deciduous molars were

extracted to facilitate the eruption of the permanent second premolars. Phase I consisted of growth modification using a modified Twin Block appliance with expansion, with the aim of correcting the sagittal and transverse discrepancies, reducing the excessive overjet, and improving the facial profile. Once satisfactory growth modification had been achieved, Phase II involved comprehensive orthodontic treatment using a pre-adjusted edgewise fixed appliance (0.022 × 0.028-inch slot) with MBT prescription. This phase focused on aligning and levelling both dental arches, correcting tooth inclinations, achieving a normal overjet and overbite, and establishing a functional and stable occlusion.



Figure 5*: Modified Twin Block appliance used for growth modification.*



Figure 6*: Fixed orthodontic appliance used during the comprehensive orthodontic phase.*

Following completion of active treatment, retention was provided using an upper vacuum-formed removable retainer and a lower fixed lingual retainer to maintain the treatment results and reduce the risk of relapse.



Figure 7: *Upper vaccum-formed removeable retainer and lower fixed lingual retainer used during the retention phase.*

Follow-up and Patient Outcome

The patient attended regular follow-up appointments throughout the course of orthodontic treatment. Clinical progress was monitored at each visit, and the orthodontic appliances were adjusted according to the treatment plan. Growth modification with the Twin Block appliance was completed successfully, after which comprehensive fixed appliance therapy was carried out. The treatment progressed satisfactorily, resulting in correction of the increased overjet and traumatic deep bite, improved facial profile, and proper alignment of the dental arches. At the completion of treatment, an upper vacuum-formed retainer and a lower fixed retainer were provided to maintain the achieved results. The key stages of treatment are summarized in Table 1.

Table 1. Summary of Treatment Progress

Period	Treatment Progress
February 2018	Diagnostic records obtained and treatment plan finalized.
March-September 2018	Modified Twin Block appliance delivered and continued with regular follow-up; expansion completed.
October-November 2018	Progress assessed using cephalometric radiograph; Phase I completed and fixed appliance therapy initiated.
December 2018-March 2020	Alignment and leveling completed using sequential archwires with routine orthodontic adjustments.

April-August 2020	Finishing, detailing, and settling elastics used to achieve final occlusion.
September-October 2020	Fixed appliances removed, retainers delivered, and retention phase initiated.



Figure 8*: Post-treatment photographs*.

Discussion

This case demonstrates the importance of early orthodontic intervention in a growing patient with a skeletal Class II malocclusion. Treating the patient during the active growth period allowed the use of growth modification with a modified Twin Block appliance, which helped improve the sagittal jaw relationship and reduce the excessive overjet before comprehensive fixed orthodontic treatment. The patient's increased overjet, traumatic deep bite, and incompetent lips were managed using a two-phase treatment approach. Growth modification was followed by fixed appliance therapy to achieve proper alignment, improve occlusion, and establish a stable functional and aesthetic result. This approach minimized the risk of trauma to the protruded upper incisors while enhancing facial appearance and oral function.

An important learning point from this case is that timely diagnosis and treatment during the mixed dentition stage can improve treatment outcomes. Careful treatment planning, patient cooperation during functional appliance therapy, and regular follow-up visits contributed significantly to the successful completion of treatment. From a clinical perspective, this case highlights that a two-phase orthodontic approach can be an effective option for managing skeletal Class II malocclusion in growing patients. Appropriate retention following active treatment is also essential to maintain the achieved results and reduce the risk of relapse.

Conclusion

This case report demonstrates the successful management of skeletal Class II malocclusion in an 11.5-year-old female using a two-phase orthodontic treatment approach. Growth modification with a modified Twin Block appliance, followed by comprehensive fixed orthodontic therapy, resulted in correction of the increased overjet and traumatic deep bite, improvement in facial profile and lip competence, and establishment of a functional Class I occlusion with satisfactory alignment. Appropriate diagnosis, treatment planning, and timely intervention during the patient's growth period contributed significantly to the favourable treatment outcome. This case highlights the effectiveness of combining functional appliance therapy with fixed orthodontic treatment in achieving stable skeletal, dental, and aesthetic improvements in growing patients with Class II malocclusion.

References

1. Al Subaie H, Alturki G, Alsulaimani F, Ghoneim S, Baeshen H. Assessment of dental, skeletal, and soft tissue changes following mandibular advancement with Invisalign in skeletal Class II. Saudi Dent J. 2024 Jan;36(1):66-71. doi: 10.1016/j.sdentj.2023.09.005. Epub 2023 Sep 14. PMID: 38375387; PMCID: PMC10874789.

2. Teuscher U. A growth-related concept for skeletal Class II treatment. American journal of orthodontics. 1978 Sep 1;74(3):258-75.