

Sequential treatment of a severe Class II Division 1 malocclusion in a child:

A case report

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Abstract

Early treatment of protrusive anterior upper teeth and establishment of proper overbite and overjet can create favourable conditions for mandibular growth and may help the patient achieve an improved facial profile without tooth extraction. This case report describes the sequential orthodontic management of a patient with a severe convex profile and retrognathic mandible from six to 14 years of age. A vestibular shield was used in the deciduous dentition phase to address the habits of mouth breathing and lower lip biting. A customised fixed lingual appliance was employed to close incisor gaps and the "2x4" technique was applied to establish proper overjet and overbite. During the permanent dentition phase, non-extraction fixed orthodontic treatment with mini screws was performed. Ultimately, both occlusion and facial profile were significantly improved. Twelve-month post-treatment records showed stable results and good facial harmony.

Keywords: Class II malocclusion; Mouth breathing; Retrognathic mandible, Overjet, Overbite.

DOI: <https://doi.org/10.47391/JPMA.30613>

Introduction

Class II division 1 malocclusion is a highly prevalent condition characterised by a convex profile, retrognathic mandible, and protrusive maxillary alveolar bone, which can significantly impair aesthetic appearance. A recent study showed that the oral health-related quality of life substantially influences children's emotional and social development.¹ Consequently, many parents seek early treatment for their children with Class II malocclusion before puberty.

Although numerous studies suggest that early treatment of Class II malocclusion shows limited skeletal difference compared to treatment in the permanent dentition,²⁻⁴ severe overjet increases the risk of dental trauma, often

necessitating restorative treatment of anterior teeth and additional interventions.⁵ Improper oral habits can adversely affect both dental alignment and normal skeletal growth patterns.⁶ Early treatment of Class II malocclusion will allow early detection and timely treatment of dysfunctions and avoid worsening of already established malocclusions.⁶ This case report illustrates the successful treatment of a severe Class II malocclusion in a patient treated between six and 14 years of age.

Case Report

A six-year-old boy visited the Orthodontic Department of the Affiliated Stomatological Hospital of Chongqing Medical University, China, on May 14, 2015, with the chief complaint of protruding upper anterior teeth with gaps. Clinical examination revealed a deciduous dentition with a bilateral Class II molar relationship, significantly increased overjet, deep overbite, a narrow V-shaped maxillary arch with physiological dentition space, and a high palatal vault. He exhibited a convex facial profile due to maxillary protrusion and mandibular retrognathia. Perioral muscle tension was evident during smiling and lip closure. At rest, he demonstrated habits of mouth breathing and passive lower lip biting secondary to the pronounced overjet. Based on these findings, the diagnosis of skeletal Class II malocclusion, with associated mouth breathing and lower lip biting habits, was established.

Prior to orthodontic intervention, the patient was referred to an otorhinolaryngologist, who confirmed a patent airway. A vestibular shield was, therefore, initially prescribed for night-time use (over 12 hours) to address the oral habits. Unfortunately, due to poor compliance, this treatment was discontinued after only one month and did not result in any improvement in habit patterns.

The patient and the guardian did not return to the orthodontic department until three years later when the patient could no longer tolerate his protruding anterior teeth, large incisor gap and worsened convex profile. Considering the earlier poor compliance by the patient, a fixed orthodontic treatment was used to close the incisor gap and intrude the incisors. First, a customised transpalatal arch (TPA) welded with three lateral branches was used to retract the incisors posteriorly, thereby closing

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Submission completed: 02-04-2025 **1st Revision received:** 12-09-2025

Acceptance: 23-01-2026

Last Revision received: 22-01-2026

the space and reducing the overjet. After three months, the incisor space and overjet had significantly reduced. The patient could close his mouth without incompetent lip and his facial profile showed notable improvement. As a result, the habits of mouth breathing and lower lip biting were eliminated spontaneously.

However, the deep overbite remained uncorrected. Subsequently, MBT brackets (0.022-inch, Shinye; Hang Zhou, China) were bonded on the upper and lower incisors and second primary molars. Following five months of active treatment and five months of retention, all appliances were removed. Proper overbite was established, and the dental arch forms became more harmonious. Concurrently, mandibular advancement was observed, leading to further improvement in the facial profile.

At the age of 11, the patient underwent a third phase of non-extraction treatment with mini screws to address a Class II malocclusion with a 10 mm overjet. The mechanics involved maxillary anterior intrusion/retraction and molar distalisation, supplemented by Class II elastics, which worked synergistically with favourable catch-up mandibular growth. This approach normalised the overjet and molar relationship, as cephalometric records confirmed (e.g., SNB increased from 75.8° to 78.5°). The labial appliances were removed after 33 months of treatment. Vacuum-formed retainers were provided for both the arches for retention. After one year, the alignment, occlusion, and profile remained stable. The patient's tooth alignment, occlusion (Figure 1), and facial profile (Figure 2)



Figure-1: Changes in alignment and occlusion from 6 to 15 years of age. Change the world-old to age.

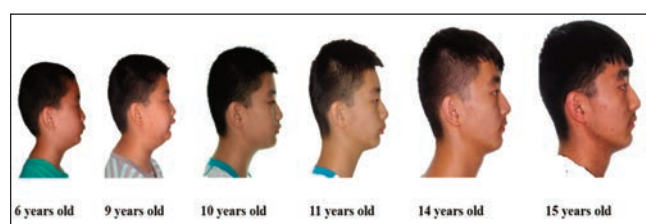


Figure-2: Changes in profile from 6 to 15 years of age.

showed progressive improvement throughout the treatment period.

Discussion

Timely and appropriate orthodontic intervention during the critical period of growth and development may achieve satisfactory outcomes in the management of malocclusion. Where occlusal issues are likely to cause abnormalities of craniofacial structures, soft tissues, or facial pattern, early orthodontic intervention is strongly indicated.

Multiple factors, including allergic rhinitis and adenoid hypertrophy,⁷ can cause upper airway obstruction, leading to a shift from nasal to mouth breathing. Mouth breathing has been associated with various dental and craniofacial abnormalities.⁸ In this case, the patient exhibited several features suggestive of mouth breathing, including a narrow V-shaped maxillary arch, high palatal vault, and Class II dental and skeletal relationships. Therefore, it was essential to identify and address the causes of upper airway obstruction to eliminate this habit. However, an otorhinolaryngological examination confirmed that the patient's airway was patent and unobstructed. A vestibular shield was initially employed with the aim of eliminating mouth breathing and lower lip biting; however, these habits persisted due to poor compliance.

This case contrasts with the conventional use of functional appliances, which are well-documented to stimulate mandibular growth.⁹ However, given the specific aetiology of a narrow maxillary arch physically restricting the mandible, the transverse constriction was first addressed by using the "2x4" technique. This approach created a favourable foundation for growth, ultimately achieving significant sagittal and facial improvement without functional appliances. This outcome emphasises that for cases with maxillary constraints, prioritising the resolution of transverse issues can serve as an effective alternative or preparatory strategy.

In this case, mini screws were used to provide stable anchorage without relying on patient compliance.¹⁰ By adjusting the hook position distally, the traction direction could be modified to simultaneously achieve distal movement of the maxillary dentition, intrusion of maxillary anterior teeth, and root control. A reverse-curve arch wire was used to facilitate slight intrusion of the mandibular anterior teeth. Combined together, these measures enabled effective sagittal and vertical control of the maxillary dentition, facilitating mandibular growth and improving mandibular retrusion and facial convexity.

The successful outcome in this case may be attributed to three key factors: accurate aetiological analysis, early

intervention and control of malocclusion, and precise selection of treatment timing and methods.

Conclusion

This case demonstrates the successful management of a patient with a severe convex profile and mandibular retrognathia through sequential orthodontic treatment from 6 to 14 years of age. Early correction of protruded upper anterior teeth and establishment of appropriate overbite and overjet can create favourable conditions for mandibular growth. Ultimately, the patient achieved a balanced facial profile and stable occlusion.

Consent: Written consent has been taken from the patient's parents for publishing the case.

Disclaimer: None.

Conflict of interest: None.

Funding disclosure: None.

References

1. Kim HY, Kim J, Hong SM. Do the oral health-related quality of life and the magnitude of its association with malocclusion differ by developmental stages of schoolchildren? *Am J Orthod Dentofacial Orthop.* 2023;163:777-85. doi:10.1016/j.ajodo.2022.06.026.
2. Zymperdikas VF, Koretsi V, Papageorgiou SN, Papadopoulos MA. Treatment effects of fixed functional appliances in patients with Class II malocclusion: a systematic review and meta-analysis. *Eur J Orthod.* 2016;38:113-26. doi:10.1093/ejo/cjv034.
3. Kallunki J, Bondemark L, Paulsson L. Comparisons of costs and treatment effects: an RCT on headgear activator treatment of excessive overjet in the mixed and late mixed dentition. *Eur J Orthod.* 2022;44:86-94. doi:10.1093/ejo/cjab026.
4. Kallunki J, Bondemark L, Paulsson L. Early headgear activator treatment of Class II malocclusion with excessive overjet: a randomized controlled trial. *Eur J Orthod.* 2021;43:639-47. doi:10.1093/ejo/cjaa073.
5. Batista KB, Thiruvengkatachari B, Harrison JE, O'Brien KD. Orthodontic treatment for prominent upper front teeth (Class II malocclusion) in children and adolescents. *Cochrane Database Syst Rev.* 2018;3:CD003452. doi:10.1002/14651858.CD003452.pub4.
6. Katib HS, Aljashash AA, Albishri AF, Alfaifi AH, Alduhyaman SF, Alotaibi MM, et al. Influence of oral habits on paediatric malocclusion: aetiology and preventive approaches. *Cureus.* 2024;16:e72995. doi:10.7759/cureus.72995.
7. Atar Bese S, Ozdemir O, Tuncerler G, Erge D, Uysal P. Do not ignore mouth breathing syndrome: respiratory functions are affected in early childhood. *Rhinology.* 2024;62:659-68. doi:10.4193/Rhin24.133.
8. Zhang J, Fu Y, Wang L, Wu G. Adenoid facies: a long-term vicious cycle of mouth breathing, adenoid hypertrophy, and atypical craniofacial development. *Front Public Health.* 2024;12:1494517. doi:10.3389/fpubh.2024.1494517.
9. Santamaría-Villegas A, Manrique-Hernandez R, Alvarez-Varela E, Restrepo-Serna C. Effect of removable functional appliances on mandibular length in patients with Class II malocclusion with retrognathism: systematic review and meta-analysis. *BMC Oral Health.* 2021;21:52. doi:10.1186/s12903-021-01399-8.
10. Jasoria G, Shamim W, Rathore S, Kalra A, Manchanda M, Jaggi N. Mini-screw implants as temporary anchorage devices in orthodontics: a comprehensive review. *J Contemp Dent Pract.* 2013;14:993-9. doi:10.5005/jp-journals-10024-1439.

Author Contribution:

JC, YK, YD, JS & GF: Concept, design, data acquisition, analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.