



## CASE REPORT

# Correction of Skeletal Sagittal Dysplasia using Twin Block Traction Technique

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## ABSTRACT

The primary concern of the patient as well as their parent seeking orthodontic treatment is the sagittal relationship of the dentition and jaws. Twin block is the most common functional appliance used successfully in correction of growing patient with skeletal class II malocclusion. However, the method of using extraoral traction in combination with twin block appliance (twin block traction technique) is to reinforce the functional component for correction of a class II sagittal relationship. A 12-year-old male patient reported to the Department of Orthodontics with a chief complaint of forwardly placed upper front teeth. With the help of clinical examination, cephalometrics, and diagnostic records, the diagnosis of the patient was confirmed as skeletal class II maxillomandibular relationship with prognathic maxilla and retrognathic mandible with a vertical growth pattern. The patient was treated with twin block appliance along with headgear. The appliance design and postfunctional results are demonstrated in the following case report. Although twin block with high-pull headgear is known to produce favorable results in mixed dentition, the same was observed in permanent dentition during growth phase. Combination of twin block appliance with high pull headgear gave the desired results.

**Keywords:** Extraoral traction, High-pull headgear, Skeletal class II, Twin block,

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## INTRODUCTION

The primary concern of the patient as well as their parent seeking orthodontic treatment is the sagittal relationship of the dentition and jaws. The most commonly observed sagittal problems are skeletal class II maxillomandibular relationship,<sup>1</sup> affecting about one-third of the examined patients seeking orthodontic treatment.<sup>2</sup> Skeletal

class II malocclusions occur due to various factors, such as maxillary protrusion, mandibular retrusion, or a combination of the aforementioned, together with abnormal dental relationships and profile discrepancy.<sup>3</sup> McNamara<sup>4</sup> reported mandibular retrusion to be the most common characteristic in a skeletal class II malocclusion.

Treatment modalities for a skeletal class II patient include various removable and fixed functional appliances to stimulate the mandibular growth by forward positioning of the mandible.<sup>5-8</sup> Growth remodulation and/or redirection is possible only in growing patients. Adult patients suffering from skeletal class II problems are treated with fixed appliance alone or in combination with orthognathic surgery. However, the severity and the nature of dysplasia are the crucial factors in deciding the treatment modality.<sup>9</sup>

In most cases, twin block appliance without the need of an additional orthopedic or tractional force can help in achieving functional occlusion. Twin block appliance along with orthopedic traction is to be considered in cases wherein the response to functional correction is expected to be poor. However, this approach of using functional therapy with extraoral traction should be used in treating cases with severe malocclusion. The indication for functional therapy with orthopedic traction is confined to cases requiring intrusion and distalization of maxilla or maxillary dentition, in cases with vertical growth pattern requiring intrusion of posterior segment of maxilla, and in adult patients for correction of severe malocclusion.<sup>10,11</sup>

## CASE REPORT

A 12-year-old male patient reported to Department of Orthodontics and Dentofacial Orthopedics with a chief complaint of forwardly placed upper front teeth. On extraoral examination, it was found that the patient had a convex profile, incompetent lips with an interlabial gap of 4 mm, short upper lip length (14 mm), acute nasolabial angle, receded chin and deep mentolabial sulcus, and vertical growth pattern. On intraoral examination, the case was classified as Angle's class II division I malocclusion with class II molar and canine relationship bilaterally with an increased overjet of 10 mm and overbite of 5.5 mm. The pretreatment extraoral and intraoral photographs (Figs 1 and 2) were recorded.

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Fig. 1: Pretreatment extraoral photographs

The case was diagnosed as skeletal class II malocclusion with a combination of maxillary excess and mandibular deficiency. Cephalometric analysis showed skeletal class II sagittal relationship and vertical growth pattern. Evaluation of patient's cervical radiograph indicated considerable amount of growth remaining. The pretreatment lateral cephalogram is shown in Figure 3.

### TREATMENT OBJECTIVES

- Correction of skeletal sagittal dysplasia (class II maxillomandibular relationship)
- Reduction in the convexity of profile
- Achievement of class I molar and canine relation
- Achievement of normal overjet and overbite.

### TREATMENT PLAN

In order to correct the skeletal class II maxillomandibular dysplasia, restrict maxillary growth, and redirect mandibular growth, growth modification was planned using functional appliance. Twin block appliance with high pull headgear in the first stage followed by fixed orthodontics appliance for final finishing and detailing of occlusion.



Fig. 2: Pretreatment intraoral photographs



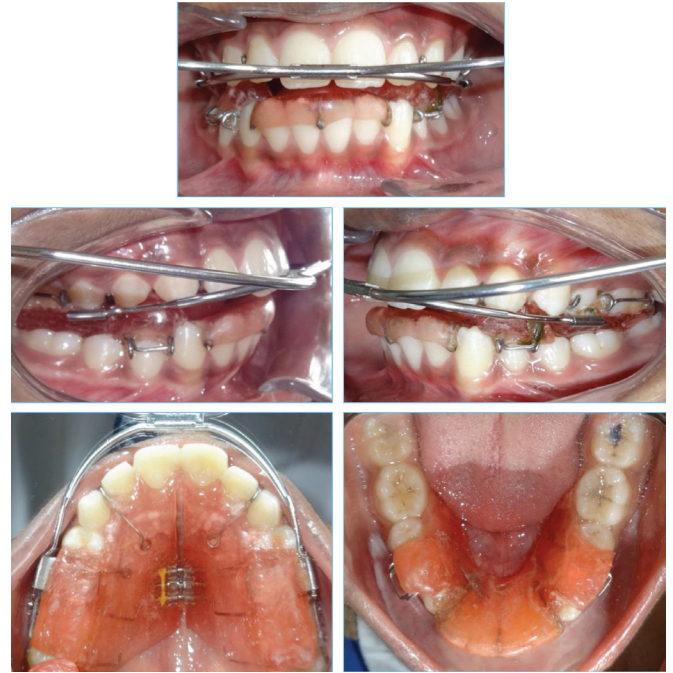
Fig. 3: Pretreatment lateral cephalogram

Twin block appliance with headgear tubes and capping of lower incisors to prevent flaring along with high pull headgear was worn for a period of 14 months (Figs 4 and 5). Remarkable correction in sagittal skeletal dysplasia along with achievement of class I molar and canine relation bilaterally with significant reduction in overjet and overbite was observed. Postfunctional extraoral and intraoral photographs are shown in Figures 6 and 7. The improvement in profile is shown in Figure 8. Skeletal





**Fig. 4:** Mid treatment extraoral photographs



**Fig. 5:** Mid treatment intraoral photographs



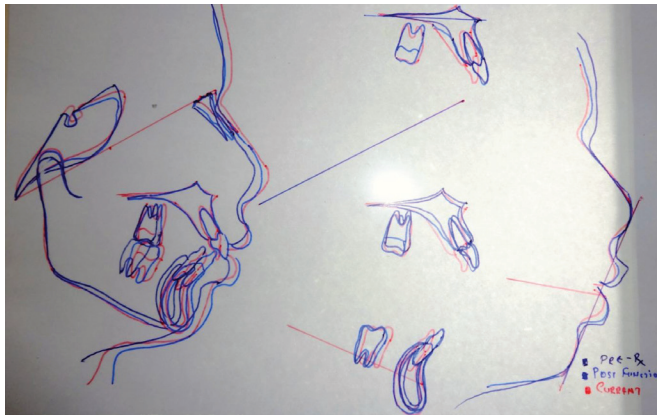
**Fig. 6:** Postfunctional extraoral photographs



**Fig. 7:** Postfunctional intraoral photographs



**Fig. 8:** Extraoral photographs (profile view)



**Fig. 9:** Superimposition of serial lateral cephalogram using Ricketts superimposition method

improvement is as shown with superimposition of serial lateral cephalograms (Fig. 9).

## DISCUSSION

Various combinations of skeletal and dental component may contribute to skeletal class II malocclusion. Therefore, identifying the etiology and understanding the expression of class II malocclusion is helpful in correcting the discrepancy and selecting the modalities of treatment, whether functional, orthodontic, and surgical or a combination of the aforementioned.

Twin block is the most commonly used removable functional appliance, based on the concept of functional occlusion, occlusion inclined plane, and proprioceptive stimulus.<sup>10,11</sup> It enables the patient to perform masticatory function, speech, lateral excursion, and other jaw functions very comfortably; patients wear the appliance full time with little discomfort. In comparison with other functional appliances, its fabrications as well as repair are not technique sensitive and can be used in mixed dentition, deciduous dentition, and sometimes in permanent dentition.<sup>12</sup>

Several studies have been performed and have documented the skeletal and dentoalveolar effects of twin block in tandem with extraoral traction for correction of class II malocclusion.<sup>13,14</sup>

In this case, when comparison of pretreatment and postfunctional cephalometric parameters was done, Angle between Sella, Nasion and Point A (SNA) remained the same, and Angle between Sella, Nasion and Point B (SNB) changed by 5°, reducing the Angle between Point A, Nasion and Point B (ANB) angle from 8 to 3°. Table 1 represents the cephalometric parameters before and after the twin block traction technique.

## CONCLUSION

Use of twin block traction technique resulted in functional correction with restriction of maxillary growth and sagittal correction of the mandibular base.

**Table 1:** Cephalometric analysis

Parameters	Pretreatment	Postfunctional
Facial angle (FH-N-Pog)	80°	85°
Angle of convexity (N-A-Pog)	14°	8°
SNA	79°	79°
SNB	71°	76°
ANB	8°	3°
Upper Incisor—NA (Degree)	27.5°	25°
Upper Incisor—NA (mm)	7.5 mm	6 mm
Lower Incisor—NB (angle)	33°	39°
Lower Incisor—NB (mm)	8 mm	8 mm
BO-AO (Wits appraisal)	+4 mm	+1 mm
FMA	27.5°	24°
FMIA	42.5°	46°
IMPA	110°	110°
Anterior cranial base length (Se-N)	63 mm	63 mm
Extent of maxillary base (PNS-Pt. A')	43 mm	43 mm
Extent mandibular base (Go-Pog)	63 mm	65.5 mm
N Perp—A	−3 mm	0 mm
N Perp to Pogonion	−17 mm	−6 mm
Facial Angle	80°	85°
Convexity at Pt. A	+6.5 mm	+3.5mm

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