



## Correction of Skeletal Class II Pattern using Twin Block Appliance Therapy: A Case Report

Authors

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### Abstract

*Aim of this study [it's not a study] was to see the effect of twin block appliance. Twin block appliance from its inception and evolution itself has been widely accepted as a more competent Class II corrector compared to earlier bulky monoblock appliances. Functional appliances can be used successfully in growing patients with certain skeletal Class II patients. It is dependent on patient's compliance. It also simplified the fixed appliance phase. In this case report a 11-year-old girl was treated with twin block appliance. The design of appliance and treatment results were demonstrated in following case report. With proper case selection and good patient cooperation, good appliance construction we can obtain a significant result with twin block appliance. The correction was due to dentoalveolar change, but some was due to favourable skeletal change. Early treatment with the twin-block appliance is effective in reducing overjet and severity of malocclusion.*

### Introduction

(O'brien et al., 2003a). Functional appliances can be removable or fixed. The mode of action differs depending on the design; however, their effect is produced from the forces generated by the stretching of the muscles (Mills, 1991). There are a number of clinical indications for the use of functional appliances to correct Class II malocclusion (Lund and Sandler, 1998). The twin block appliance was developed by Clark in 1980s (Clark, 1988). It is the commonly used functional appliance partly due to its acceptability by patients

(Chadwick et al., 1998).<sup>[11]</sup> the muscles and soft tissues are stretched with the generated pressure transmitted to the skeletal and dental structures potentially resulting in skeletal growth modification and tooth movement<sup>[11]</sup>

Twin-blocks are upper and lower acrylic bite blocks with occlusal inclined planes that interlock at a 70 degree angle and guide the mandible forward and downward.<sup>[11]</sup> it has been suggested that compared to other functional appliances like activator and bionator, success rate with twin-block is favourable because it is generally better tolerated by patients<sup>[11]</sup>

as it is smaller than other functional appliances, has no visible acrylic portion anteriorly, and its interference with speech is minimal [11]. It produces less incisor tilting in cases such as Class II division 1.<sup>[2,3]</sup> the following is a case report of 11-year-old girl treated with twin block appliance.

### Case Report

A 11-year-old girl came to the department having a chief complaint of upper front teeth placed forwardly. patient has skeletal Class II pattern angle's Class II division 1 malocclusion with normal to horizontal growth pattern on extra-oral examination, the patient has a convex profile, competent lips with an interlabial gap of 0 mm, obtuse nasolabial angle, retruded chin position and deep mentolabial sulcus. Intra-oral examination, it showed Class II molar relation and canine relation bilaterally, overjet of 9 mm, and upper and lower midline not coincide with the facial midline/procline upper and lower incisor [figure 1]. Patient's orthopantomogram showing erupting teeth: 15,17,18,25,27,28,35,37,38,47,48. no bone pathology is seen [figure 2]. The case was diagnosed as Class II skeletal malocclusion with Mandibular deficiency and maxillary dental proclination. Cephalometric analysis confirmed diagnosis of division 1 on skeletal Class II base. Patient has horizontal growth pattern and Mandibular retrusion. Evaluation of patient's cervical radiograph indicated that she was at the peak of pubertal growth spurt with a considerable amount of growth was remaining. In addition to this, patient showing positive visual treatment objective.

### Pre Treatment Photographs



### Post Treatment Photographs



### Treatment objective

- ❖ Correction of skeletal Class II pattern
- ❖ Correction of inclination of upper and lower incisor
- ❖ Correction of overjet and deepoverbite
- ❖ Correction angles Class II molar relationship

### Correction of soft tissue profile 1.3 Treatment plan

As the patient had skeletal and dental Class II relationship in growing phase (cervical vertebrae maturation indicators 3), growth modification was planned using functional appliance twin block appliance followed by fixed orthodontic appliance for final detailing of occlusion.

### Treatment progress

The aims of the functional treatment phase were achieved successfully due to good patient compliance. A 11-year-old patient took bite registration according to twin block appliance. Twin block was fabricated for a patient. As to prevent further proclination of lower incisors, capping was done total 11 months period of wear. The significant improvement noted in profile and lip competency. Significant correction in molar and the canine relation was obtained along with significant reduction in overjet and overbite [figure 4].

### Discussion

Class II malocclusion might have any number of a combination of skeletal and dental component. Hence, identifying and understanding etiology and expression of Class II malocclusion and identifying differential diagnosis helpful for its correction and to select treatment planning whether functional, orthodontic or surgical.<sup>[4]</sup>

The selection of functional appliances is dependent upon several factors which can be categorised into patient factors e.g., age and compliance and clinical

factors e.g., preference/ familiarity and laboratory facilities (20)

Clark’s twin block is a functional appliance, which effectively modify occlusal inclined plane which induce favorably directed occlusal force by causing a mandibular displacement.<sup>[5,6]</sup> it allows masticatory function. Patient can wear appliance full time with little discomfort. Other advantages include esthetic, easy to repair, and robust. It is suitable for mixed dentition as well as deciduous dentition.<sup>[7]</sup>

There were several studies where they have documented the ability of twin block to produce significant skeletal as well as dentoalveolar changes which in combination correct Class II malocclusion.<sup>[8-10]</sup>

Baccetti *et al.*<sup>(11)</sup> detected that skeletal changes were predominant over the dental changes, regardless of timing of treatment and that increases of both mandibular length and height were larger in the older treatment group who were treated during pubertal growth spurt. They also found that the main orthopaedic effect occurred in the mandible, with no changes in sagittal position of maxilla and no changes in vertical facial relationships.

Twin block functional appliance has several well established advantages including the fact that it is well tolerated by patients (Harradine and Gale, 2000), robust, easy to repair and it is suitable to use in the permanent and mixed dentition. There are potential disadvantages such as the proclination of the lower incisors and development of posterior open bites. In this case, the treatment objectives were achieved largely due to the good compliance by the patient. The patient’s chief complaint was the increased overjet. Thus by reducing the overjet with the functional appliance, the patient’s confidence has improved and also the risk of sustaining trauma to the upper incisor was minimised (O’Brien *et al.*, 2003c). Due to the fact that the patient was instructed to activate the midline screw only twice a week (0.25 mm of expansion per turn), this may contribute to the limitation of the severity of the posterior open bite at the end of the functional appliance phase. 12

Here, comparison of pre-treatment and post-treatment lateral cephalogram [figure 5] showed Sna remained unchanged, and Snb increased by 6 mm. Anb angle reduced up to 2°. Inclination of maxillary remains same and mandibular incisors were proclined by 2°. Length of the mandible is increased by 5 mm [table 1].

The superimposition of the lateral cephalometric radiographs Taken during pre-treatment and pre-debonded demonstrated That the patient grew in a favourable direction towards a class I skeletal pattern. The radiographs were registered on stable structures in the anterior cranial base (Sella line). The maxilla demonstrated vertical growth. The upper incisors were extruded and the molars moved mesially. The mandible demonstrated down and forward growth with a slight anterior growth rotation. The lower incisors were proclined despite the use of acrylic capping which was reported to reduce the amount of lower incisors proclination (Mills and McCulloch, 1998). The lower molars moved mesially. It has been proved in the literature that functional appliances do not produce long term skeletal changes and most of their effects are dentoalveolar (Lee *et al.*, 2007). In a prospective controlled trial (Lund and Sandler, 1998) with twin blocks and controls to investigate the skeletal and dental effects showed that the ANB angle reduced by 2° which was almost entirely due to mandibular length increase which was 2.4 mm compared to the controls as measured from Ar-Pog. There was no evidence of a restriction in maxillary growth. However, it can be seen in this case that functional appliance can facilitate the fixed appliance phase dramatically to achieve good result.<sup>12</sup>

**Table 1:** comparison of pre- and post-treatment parameters

Parameter	Pre treatment	Post treatment
Sna	78	78
Snb	74	80
Anb	4	2
Sn-gon	22	23
Mx length	77	77
Md length	90	93
Nasolabial angle	110	112
Impa	114	114

### Conclusion

- ❖ Effect of twin block depends upon patient's compliance and case selection. Use of this appliance during growing phase with good patient co-operation produce the skeletal effect, and some amount of dentoalveolar effect.
- ❖ Proclination of lower incisors, retroclination of upper incisors, distal movement of upper molars and/or mesial movement of lower molars, increase in mandibular length, and/or forward movement of the mandible were consistently reported.
- ❖ Clinically significant restraint of maxillary growth was not found. Although the mandibular body length is increased, the facial impact of it is reduced by the simultaneous increment of the face height.
- ❖ Changes of lower face height and occlusal plane inclination varied, suggesting that vertical dimension can be manipulated in patients who would benefit from lower molar extrusion

### Clinical significance

During permanent dentition phase and growing age and good patient's compliance required for result. Twin block is as much effective as in mixed dentition phase and the peak of pubertal growth spurt good result achieved by twin block appliance

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