

# Treatment of Class II Malocclusion with Combined Twin Block and Fixed Appliance Therapy with Correction of Bolton's Discrepancy - 3 Year Follow Up

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**Abstract:** *Treatment of Class II malocclusion with myofunctional appliances has been proven beneficial in growing patients. Twin block appliance, introduced by Clark in 1978 is most widely used myofunctional appliance. In this case report, 11 year old female patient with Class II malocclusion treated with two phase therapy. Phase I therapy involved treatment with twin block appliance to correct mandibular retrusion. Phase II involved fixed mechanotherapy to correct minor displacement and settle occlusion. Diagnosis, treatment planning, results and three year follow up are demonstrated in this case report.*

## 1. Introduction

Class II malocclusion is most commonly encountered problem in Orthodontic practice. It is characterized by dental antero-posterior discrepancy often associated with skeletal discrepancy (1, 2). According to MacNamara, mandibular retrusion is most common contributing factor in the development of Class II malocclusion (3). Various treatment modalities were suggested in Orthodontic literature such as myofunctional appliances, orthopedic appliances, orthodontic camouflage as well as surgical repositioning of jaws depending on patient's age and etiology of class II malocclusion. Functional appliance therapy has become an increasingly popular method of correcting Class II malocclusion during growth period. Their effect is produced by the forces generated by the stretching of the muscles. (4) Also headgear effect on maxilla helps in class II correction. (5)

Various functional appliances are being used for correction of Class II malocclusion amongst which Twin block appliance enjoys widespread popularity. Introduced by William Clark in 1977, consists of upper and lower occlusal inclined planes which act as guiding mechanism causing mandible to move downward and forward. Popularity of twin block appliance is attributed to its versatility of designs, reduced bulk and more freedom for mandibular movements thus providing more patient comfort. (6, 7)

The following case report demonstrates treatment of female patient with Class II div 1 malocclusion treated with two phase therapy. Phase I includes myofunctional appliance therapy followed by fixed appliance therapy with correction of Bolton's discrepancy.

## 2. Case Report

A 11 year old girl reported to the department of Orthodontics with the chief complaint of forwardly placed upper front teeth and presented with class II division 1 incisor relationship with class II skeletal bases, decreased lower anterior facial height. Patient did not present any

relevant medical and dental history. Clinical examination showed dolicocephalic, dolicofacial with acceptable facial symmetry. Patient presented with convex profile, competent lips, deep mentolabial sulcus, hypotonic lower lip and prominent chin button. Lower facial height was normal. VTO (visual treatment objective) showed need for mandibular advancement.

Dental examination revealed end on molar relationship on both sides, over jet of 10 mm, overbite of 4 mm with grossly symmetric upper and lower arches, mild spacing with upper anteriors.

Panoramic examination showed normal axial inclination of all the teeth, normal TMJ with congenitally missing lower second and third molars.

Hand wrist examination showed circumpubertal growth period indicating favourable time for myofunctional appliance. (8)

Lateral cephalometric analysis revealed skeletal class II discrepancy due to retro positioned mandible and normal maxilla with respect to cranial base.



Figure 1: Pre-treatment facial photographs



Figure 2: Lateral profile with positive VTO (visual treatment objective)

- 3) To achieve Class I molar and canine relationship.
- 4) To reduce over jet and overbite.
- 5) To align and level both the arches.
- 6) To correct Bolton's discrepancy

**Treatment plan**-Treatment was planned in two stages. Phase I –myofunctional appliance therapy was planned to take advantage of remaining growth followed by phase II for alignment and levelling.

**Treatment progress**-Bite registration was done with forward positioning of mandible and standard twin block was fabricated. Midline expansion screw was given and patient was instructed to activate the screw. Lower lip pad was given for correction of hypotonic lower lip. Phase I completed in 10 months followed by retention with anterior inclined plane for occlusal settling.



Figure 3: Pre treatment intraoral photographs



Figure 5: Twin Block appliance

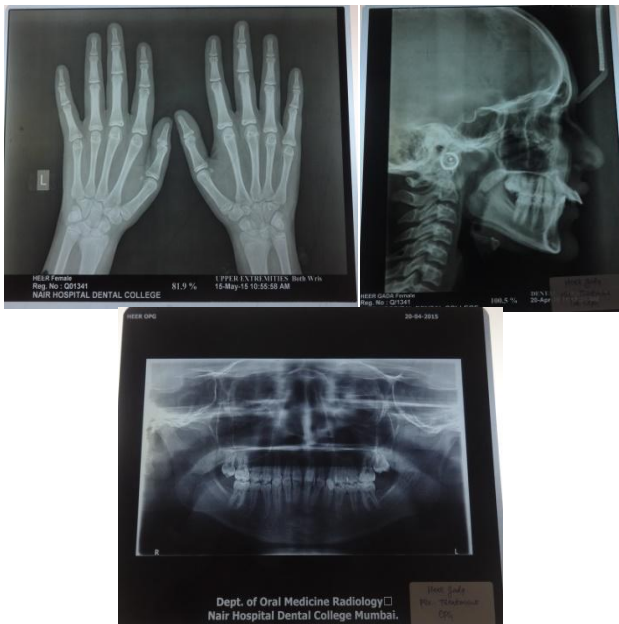


Figure 4: Pre treatment radiographic records.



**Objectives of treatment**

- 1) To improve Class II skeletal bases.
- 2) To reduce facial convexity and achieve optimum soft tissue balance.



Figure 6: Post twin block appliance records

**Treatment result**

Treatment objectives were achieved. Patients profile was improved. Incisor, canine and molar class I relationship was achieved. Mentolabial sulcus was improved. Maxillary arch spacing was closed. Ideal Over jet and over bite achieved. Panoramic radiograph showed adequate root parallelism in both upper and lower arches.

	Pre treatment	Post twin block phase	Post treatment
SNA	82	81	81
SNB	75	80	79
ANB	6	2	3
WITS	4mm	0mm	0mm
Beta angle	21	33	33
Facial angle	78.5	84	84
Interincisal angle	108	115	120
Lower lip to RickettsE plane	-3mm	-2mm	-2mm

Overall treatment time was 24 months i.e. 12 months of myofunctional appliance wear and 12 months of fixed appliance.

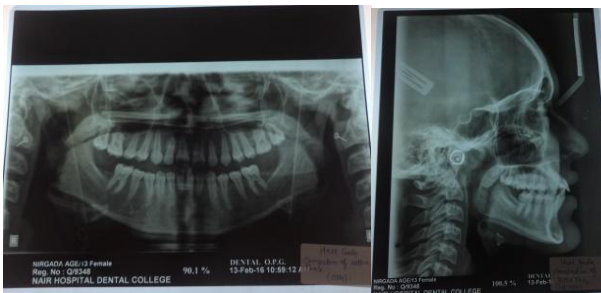


Figure 7: Post twin block appliance radiographs.

Phase II included alignment and leveling with 0.018 MBT appliance. Occlusal settling and midline correction was carried out with elastics. However, Bolton's analysis presented anterior maxilla discrepancy as presented by smaller size of lateral incisors (9). In order to close upper anterior spacing composite build up was done on lateral incisors.



Figure 9: Post treatment records



Figure 8: Post alignment and leveling

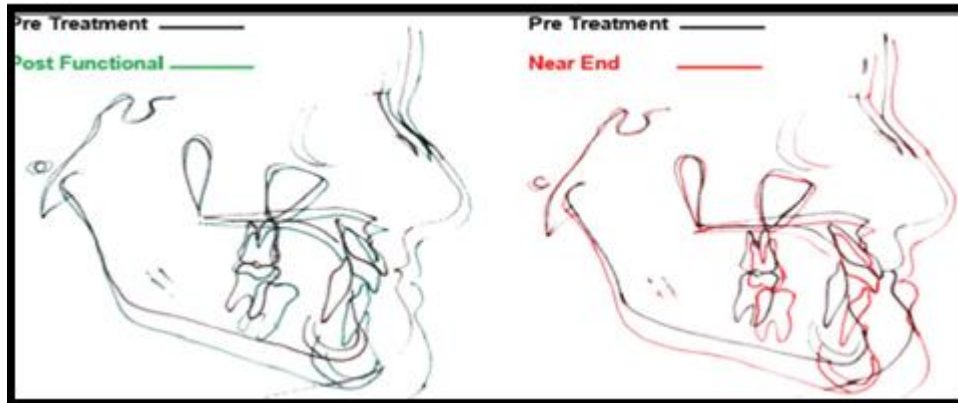


Figure 10: Superimposition images showing pre, mid and post treatment results.



Figure 11: 3 year follow up

### 3. Discussion

The principle objective of twin block therapy is to induce favourable growth of mandible by enhancing condylar growth. Studies also suggest that treatment carried out during growth period induce more skeletal growth. (10, 11). Also, girls mature earlier compared to boys. In our case, patient reported in circumpubertal growth period, hence it was necessary to carry out treatment immediately in order to take maximum advantage of remaining growth (8).

The positive esthetic outcome at the end of phase II is attributed to both skeletal as well as dental changes. Post treatment, patient experienced an increase in SN Bangle of 4°. This was most likely a result of increased mandibular growth. SNA angle reduced to 1° which can be attributed to the “headgear effect” produced by the twin-block appliance (12). Overall changes in ANB showed significant improvement owing to changes in both maxillary and mandibular components. Mandibular plane angle showed increase by 3° which can be attributed to downward and forward growth of mandible.

Overjet was reduced by 7mm owing to both skeletal and dental changes. Over bite was reduced due to eruption of posterior teeth.

One major difficulty in this case was Bolton’s discrepancy due to maxillary tooth material was reduced. Hence, it was not possible to close the space by Orthodontic means. Therefore, composite build-up was planned to build and reshape lateral incisors and correct Bolton’s discrepancy.

Three year follow up showed significant improvement in facial profile. Diagnostic records showed more of a dental changes as compared to skeletal changes. Skeletal changes showed more relapse. However, soft tissue showed minimal changes post treatment. This is as per a orthodontic study which suggests dentoalveolar changes which are produced by functional appliances are retained quite well. (13, 14, 15)

### 4. Conclusion

Twin block appliance effectively corrects growing Class II cases with dentoalveolar and skeletal changes. Long term

analysis indicates dentoalveolar changes with good amount of soft tissue changes. In this case patient was treated with twin block followed by fixed appliance. Five year follow up showed significant changes are retained with good esthetic outcome.

## 5. Declaration of patient's consent

The authors certify that they have obtained appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published.

**Conflict of interest-** nil

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