

## A Functional Treatment for the Correction of Class II Division 1 Malocclusion: Twin Block Appliance

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### Case Report

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**Abstract:** The twin-block appliance, described by Dr. Clark in the year 1977, is frequently used functional appliance. Contemporary studies suggest that, in growing patients, skeletal Class II malocclusion can be treated with this appliance. During the active phase, it guides molar eruption, and helps in reduction of posterior open bite by eruption of buccal teeth into occlusion. After which, an anterior inclined bite plane is used to maintain corrected occlusion. This is a case report of growing skeletal Class II patient who was successfully treated by twin block appliance.

**Keywords:** twin-block, malocclusion, dental variations.

### INTRODUCTION

A patient with Class II malocclusion presents with numerous skeletal and dental variations. The commonest among skeletal variations is mandibular retrusion. Numerous treatment possibilities are available for treating Class II malocclusion. Among the various treatment possibilities, functional appliances can be used in skeletal mandibular retrusion cases [1-3]. Functional appliances are used to correct the aberrant muscle functions which are responsible for the abnormal growth and development of the underlying hard tissues. Functional appliances redirect the neuromuscular activity of the oral cavity to normal limits there by correct the skeletal malocclusion. In case of mandibular retrognathism, positioning the mandible forward enhances its growth [4].

Dr. Clark originally developed Twin Block appliance. It is a commonly used functional appliance for the management of Class II malocclusion with retrognathic mandible [5]. Its acceptance over other functional appliances is due to high patient compliance and ability to yield swift treatment changes [6]. The twin block appliance has a upper and lower acrylic plates with clasps on upper and lower premolars and molars to retain the plate and bite blocks that interlock at an angle (70degree) on closure, as a result the mandible is postured forward [7, 8]. The succeeding case report documents a 10-year-old boy with 11 mm overjet treated by growth modification using Twin Block appliance followed by retention appliance, and total treatment duration of 20 months.

### CASE REPORT

A 10 year old boy reported to the Department of Orthodontics and Dentofacial Orthopedics, Mahatma Gandhi Dental College and Hospital, complaining of forwardly placed upper front teeth. The patient was in the early permanent dentition. On extra oral examination the patient had a convex facial profile, Posterior facial divergence, acute nasiolabial angle, deep mentolabial sulcus, receded chin position with horizontal growth pattern of mandible (Figure-1 a-c). Intra-orally, patient presented with a Class II Division 1 malocclusion. He had an overjet of 11 mm and overbite of 5 mm (Figure-2 a-c).



**Fig-1: (A-C) Extra Oral Photographs**



**Fig-2: (A-C) Intraoral Photographs**

**Teeth present**

16 15 14 13 12 11 21 22 23 24 25 26  
46 45 44 43 42 41 31 32 33 34 35 36

**Diagnosis**

Angle's Class II division 1 malocclusion on class II skeletal bases with retrognathic mandible, horizontal growth pattern, proclined upper anteriors, skeletal deep bite and buccally placed 13.

**Treatment Objectives**

- To obtain good facial balance.
- To achieve Class I skeletal pattern by growth modification with the functional appliance
- To achieve a normal inclination of upper & lower anteriors.
- To achieve class I molar, incisor and canine relationship.
- To correct spacing and rotations in lower anteriors.
- To correct curve of spee

**Treatment Plan**

**The Phase I: Orthopedic Stage**

The patient was advised to wear an acrylic twin block full time. Skeletal correction was achieved in 2 steps as overjet was more than 10 mm. Initially mandibular advancement of 6 mm, vertical opening between the premolars of 4mm and incisal opening of 2mm was given. Inclined plane was at 70 degree angulation and extended from mesial of lower first permanent molar to distal of upper first premolar [Figure 3]. In second step of mandibular advancement an edge to edge incisor relation was achieved. The phase I orthopedic stage treatment with Twin Block appliance was continued for 12 months. The appliance was worn full time for 6 months, followed by the trimming of inter occlusal bite blocks to facilitate the eruption of mandibular molars. The twin block appliance was worn for 12 months and was discontinued. The treatment objectives for orthopaedic stage were achieved.

**The Phase II Retention Stage**

To maintain skeletal correction and to facilitate eruption of mandibular molars anterior inclined bite plane was given for period of 3 months (Figure-4).



**Fig-3: Twin Block Appliance in Mouth**



**Fig-4: Anterior Inclined Bite Plane Appliance**

**Treatment Assessment**

All the treatment objectives were achieved by the end of 20 months. The overjet and overbite reduced from 11mm to 1mm. The Class II malocclusion was changed to Class I relation (Figure-5 a-c and Figure-6

a-c). The lateral cephalometric superimposition comparison was done between pre treatment and post treatment twin block appliance treatment (Figure-7 a-b, Table-1).



**Post Treatment Photographs Fig-5: (A-C) Extra Oral Photographs**



**Post Treatment Photographs Fig-6: (A-C) Intraoral Photographs**



Post Treatment Fig-7: (a-b) LATERAL CEPHALOGRAPH

Table-1: Comparison of pre-treatment and post-treatment parameters

Parameter (degree)	Pre-treatment	Post-treatment
SNA	80	80
SNB	76	78
ANB	4	2
Facial angle	86	91
Interincisal angle	108	125

After orthopaedic stage, fixed orthodontic treatment with MBT .022” appliance was carried out for

a period of 5 months to correct dental problems (Figure-8).



Fig-8: Fixed orthodontic treatment with MBT .022” appliance

**DISCUSSION**

Ideal time to start functional treatment of Class II malocclusion is during or slightly after the pubertal growth spurt. Corresponding to the occlusal development, treatment should be started at late mixed or early permanent dentition stage.<sup>7</sup> The patient in this case, was in early permanent dentition and, thus, was at an ideal age to start with the treatment [9, 10].

The treatment objectives set for this case, were achieved due to the good compliance by the patient. The patient’s chief complaint was forwardly placed upper front teeth. In this patient, overjet was reduced due to favorable growth of mandible with the forward movement of lower incisors as well as due to retroclination of the upper incisors by twin block. Thus

by reducing the overjet, the patient’s confidence enhanced and also the risk of sustaining trauma to the upper incisor was reduced. The positive result at the end of treatment is due to the skeletal and dentoalveolar changes produced by the appliance. Due to increased mandibular growth the patient experienced an increase in the SNB angle by two degrees, from 76 degrees to 78 degrees.

Twin-block for Class II correction is constructed from bite registration. The bite is registered with the mandible in in a forward and downward posture. The rationale behind this procedure is that favorable mandibular growth occurs after mandible is displaced in forward and downward position. The changes mainly occur at the mandibular condyle, which

responds by growth in a posterior-superior direction, with an increased bone deposition at the posterior aspects of the head of the condyle and ramus [11]. The advantages of twin block are simple design, comfortable to wear, aesthetic and efficient. It is less obstructive on speech and other oral functions, compared to one piece functional appliance.

Major favorable effects achieved by twin block therapy in the pubertal growth spurt are-

- Greater skeletal impact in correction of the molar relation.
- Larger growth increments in total mandibular length and in ramus height.
- Increased posterior direction of condylar growth, a biological mechanism which leads to supplementary mandibular lengthening and reduced amount of forward condylar displacement in favor of effective mandibular growth and reshaping [8].

### CONCLUSION

Twin Block appliance can be an appliance of choice, for correction of Class II malocclusion in growing individuals, as it brings about major changes by skeletal effect on the mandible. Along with the skeletal changes, it also induces dentoalveolar changes by altering dental inclination. They simplify fixed appliance treatment by achieving Class I molar relationship and esthetic facial profile. Although, case selection and favorable growth are key factors that determine the success of functional appliance therapy.

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