

Treatment of Class II Malocclusion using Twin Block Appliance

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ABSTRACT

The twin-block appliance which is the most commonly used functional appliance was first described by Clark in the year 1977. Recent studies suggest that skeletal Class II malocclusion in growing patients can be managed with this appliance. During the active phase, twin block appliances control the molar eruption, and helps in progressive reduction of posterior open bite following which, an anterior inclined plane is used to support the corrected occlusion while the buccal teeth erupt into full occlusion. This is a case report of skeletal Class II malocclusion successfully treated by twin block appliance followed by a retention appliance.

KEYWORDS: Class II malocclusion, Functional appliances, Mandibular retrognathism, Twin Block appliance, Upper inclined plane appliance.

INTRODUCTION

Class II malocclusion present with a wide variety of skeletal and dental configurations. The most consistent diagnostic finding in Class II malocclusion is mandibular skeletal retrusion. Various treatment options are available for managing Class II malocclusion. The use of functional appliances are one amongst them.^{1,2,3} Functional appliances are used to correct the abnormal functions responsible for the abnormal growth and development of the underlying hard tissues. Redirecting the neuromuscular activity of the oral cavity to normal limits is the major goal of applying this method of the treatment. In case of mandibular retrognathism, positioning the mandible forward is believed to enhance its growth.⁴

Twin Block appliance, which was originally developed by Clark, is a widely used functional appliance for the management of Class II malocclusion.⁵ Its popularity over other functional appliances is due to high patient adaptability and ability to produce rapid treatment changes.⁶ The twin block appliance consists of upper and lower acrylic plates with bite blocks, which interlock at a 70-degree angle on closure, while the mandible is postured forward with clasps on upper and lower premolars and molars.^{7,8} The following case report documented a 12-year-old girl with 8 mm over jet treated by growth modification using Twin Block appliance followed by retention appliance for a duration of 20 months.

CASE REPORT

A 12 year old girl reported to the Department of Pediatric and Preventive dentistry, KMCT Dental College, 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, 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 with retruded mandible. She had an overjet and overbite of 8mm [Figure 2 a-c].



Figure 1: (A-C) Extra Oral Photographs

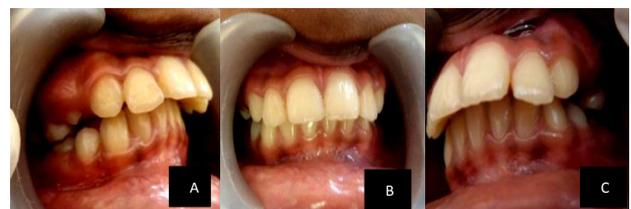


Figure 2: (A-C) Intraoral Photographs

Teeth present
16 55 14 13 12 11 21 22 23 65 26
46 85 44 43 42 41 31 32 33 34 35 36

Diagnosis: The lateral cephalometric findings depicted as “A case of skeletal class II malocclusion with orthognathic maxilla and retrognathic mandible with Angle Class II molar relation and horizontal growth pattern” [Table 1 a].

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Treatment Objectives:

- To achieve normal overjet and overbite
- To achieve skeletal Class I by growth modification with the functional appliance
- To achieve Class I molar relation

Treatment Plan:**The Phase I: Orthopedic Stage**

The patient had to wear an acrylic twin block full time. The mandibular advancement of 8 mm and the vertical opening between the premolars of 5mm was given to achieve an edge to edge incisor relation. Inclined plane was at 70 degree angulation and extended from mesial of lower first permanent molar to distal of upper first premolar [Figure 3]. 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 plane to facilitate the eruption of mandibular molars. The twin block appliance was worn for 12 months and was discontinued. The treatment objectives of normal overjet and overbite, and skeletal Class I by growth modification were achieved in stage I orthopaedic stage.



Figure 3: Twin Block Appliance In Mouth

The Phase II Retention Stage

Upper inclined plane appliance was delivered to the patient and she was instructed to wear it night time only for 8 months [Figure 4].



Figure 4: Upper Inclined Plane Appliance

Treatment Assessment: All the treatment objectives were achieved by the end of 20 months. The overjet and overbite reduced from 8mm to 1mm. The Class II molar

relation 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 twin block appliance treatment [Figure 7 a-b, Table 1].

Post Treatment Photographs
Figure 5: (A-C) Extra Oral PhotographsPost Treatment Photographs
Figure 6: (A-C) Intraoral PhotographsPre Treatment Post Treatment
Figure 7: (a-b) CEPHALOGRAPH

Parameter (degree)	Pre-treatment	Post-treatment
SNA	82.5	82.5
SNB	78	82
ANB	4.5	0.5
Facial angle	78.5	84
Interincisal angle	108	120

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

DISCUSSION

Functional treatment of Class II malocclusion is best initiated during or slightly after the pubertal growth spurt. Considering the occlusal development, this period correlates in most patients with the late mixed or early

permanent dentition.⁷ Here, in this case, the patient was in the late mixed dentition and, thus, at an ideal age to start with the treatment.^{9,10}

In this case, the treatment objectives were achieved largely due to the good compliance by the patient. The patient's chief complaint was proclined upper anteriors. The overjet reduction, in this case, was achieved by the favorable growth of mandible with the forward movement of lower incisors and dentoalveolar effect to retrocline the upper incisors by twin block. 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 minimal. The positive outcome at the end of treatment is due to the skeletal and dentoalveolar changes produced by the appliance. Post treatment the patient experienced an increase in the SNB angle by four degrees, from 78 degrees to 82 degrees; this was most likely a result of increased mandibular growth.

Ideally all functional appliances for Class II correction including twin-block are constructed from bite registrations. This is taken while the mandible is postured in a forward and downward position. The rationale for this clinical procedure is that favorable mandibular growth changes occur after mandibular displacement. The changes mainly involve the mandibular condyle, which shows additional growth in a superoposterior direction, with an increased bone apposition at the posterior aspects of the head of the condyle and ramus.¹¹ The advantages of twin block include simple and aesthetic appliance design, reduced chairside time and comfortable wear of the appliance.

Major favorable effects induced by twin block therapy after the pubertal growth spurt compared to earlier phases are

- Greater skeletal contribution to the correction of the molar relation
- Larger and clinically significant increments in total mandibular length and in ramus height
- More posterior direction of condylar growth, a biological mechanism which enhances supplementary mandibular lengthening and reduces the amount of forward condylar displacement in favor of effective mandibular growth and reshaping.⁸

CONCLUSION

Twin Block appliance offer great effectiveness for the correction of Class II malocclusion in growing individual.

Twin block appliance brings about major changes which are dentoalveolar in nature with a marked emphasis on dental inclination together with a significant skeletal effect on the mandible. They simplify the following phase of fixed appliance by gaining anchorage and achieving Class I molar relationship.

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