



Case Report: Treatment of Class II Div 1 Malocclusion in Growing Patient with Removable Twin Block Appliance Therapy

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ABSTRACT

Myofunctional appliances are loose removable appliances improve the functional relationship by eliminating unfavourable developmental factors and improving the muscle environment that envelops the developing occlusion. By altering the position of the teeth and supporting tissues, a new functional behaviour pattern is established that can support a new position of equilibrium. Twin Block is a well accepted patient friendly appliance for the treatment of growing patient with class II malocclusion due to mandibular retrognathia. It works by guiding the mandible forward through its inclined plane on the bite block. It alters the neuromuscular environment and promotes favourable growth of the mandible by condylar adaptation. This is a case report of a successful treatment of growing patient with class II div I malocclusion with Twin block appliance and fixed orthodontic treatment.

KEYWORDS :Class II div I malocclusion, mandibular retrognathia, Twin block appliance, growing patient, functional appliance

I. INTRODUCTION

One-third of individuals seeking orthodontic treatment have Class II malocclusion, which is one of the most prevalent problems in orthodontics.[1,2] Patients with Class II

malocclusions have aberrant occlusal relation and profile disparity, as well as maxillary protrusion, mandibular retrusion, or both.[3] The most prevalent symptom of this malocclusion, according to McNamara, is mandibular retrusion.[4]

Removable and fixed functional appliances are used to encourage mandibular development by forward repositioning the mandible in growing individuals with Class II malocclusions due to mandibular retrusion [5,6]. Clark described the twin block appliance in 1982. Many studies indicate that it is one of the most effective appliances for the treatment of skeletal Class II malocclusions.

A 12-year-old boy was treated with a twin block device and the following is a case report.

II. DIAGNOSIS AND ETIOLOGY

A 12-year-old kid presented with a primary complaint of forwardly positioned upper front teeth. His Family, Medical & dental history are non contributory to the presented malocclusion. On Extraoral examination, he had Apparently symmetric euryprosopic face with convex profile incompetent lips, deep mentolabial sulcus, increased interlabial gap and acute nasolabial angle (Fig 1)



Fig 1



Intra oral examination revealed class II molar relation and end on canine bilaterally with 100 % traumatic overbite, 6 mm overjet and coincident upper and lower midline. Maxillary right primary second molar was retained and mild

crowding in Mandibular anterior region was present (Fig 2). In addition, patient was showing positive visual treatment objective (VTO) suggesting that he may be treated with growth modulation (Fig 3)



Fig 2



Fig 3

Pretreatment cephalometric findings confirmed skeletal Class II Division I Malocclusion with retrusive mandible, retruded chin and Hypodivergent growth pattern. The patient's cervical vertebrae were examined, and it was found that he still had a significant amount of growth

potential. The lower incisors were also retruded and retroclined, whereas the upper incisors were protruded and proclined. The interincisal angle was 113 degrees, and the distance between the lower lip and the E line was within normal limit. (Fig 4)

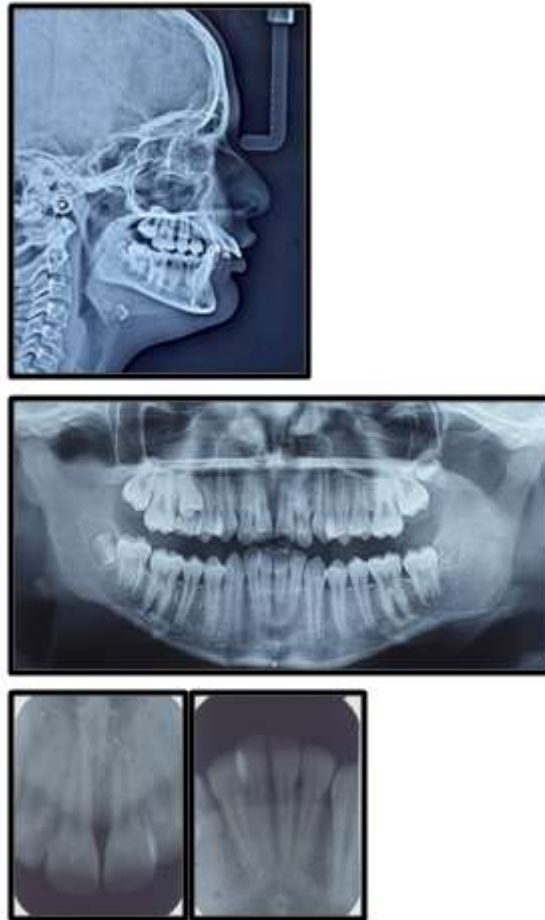


Fig 4

	Pre	Stage 1	Stage 2
SNA	81°	80°	80°
SNB	77°	79°	78°
ANB	4°	1°	2°
Wits	4mm	0 mm	0 mm
APP- BPP	7 mm	5 mm	5 mm
MM bisector	-2 mm	-3mm	-4mm



SN length	68 mm	69 mm	69 mm
Maxillary length(pns-A [⊥])	47 mm	47 mm	47 mm
Mandibular length(Go-Pg)	68 mm	69 mm	70 mm
N [⊥] to A point	-3mm	-4 mm	-4 mm
N [⊥] to B point	-10 mm	-7 mm	-8 mm
N [⊥] to Pog	-7 mm	-4 mm	-5 mm
Maxillo-mandibular difference	21 mm	22 mm	22 mm

FMA	22°	22°	23°
SN-MP	29°	29°	30°
Y Axis	55°	58°	60°
Bjork's sum	385°	387°	388°
J ratio	75%	70%	69%
Gonial angle	128 °	129°	130°
Upper anterior facial height	50%	44%	43%
Lower anterior facial height	50%	56%	57%



Dentoalveolar findings :

Mx 1 to A-Pg	12 mm	7 mm	7 mm
Mx 1 to NA	10 mm	7 mm	7 mm
Mx 1 to NA	46°	35°	32°
Mx 1 to Palatal Plane	51°	60°	62°
Md 1 to A-Pg	-1 mm	4 mm	2 mm
Md 1 to NB	2 mm	6 mm	5 mm
Md 1 to NB	19°	28°	29°
IMPA	92°	99°	100°
Inter-incisor Angle	113°	112°	117°

Soft tissue findings :

E – line (mm)	Upper lip	-1 mm	-4 mm	-4 mm
	Lower lip	-2 mm	-1 mm	-1 mm
S – line (mm)	Upper lip	2 mm	0 mm	0 mm
	Lower lip	0 mm	1 mm	1 mm
Nasolabial angle		82°	88°	93°
Interlabial gap		5 mm	4 mm	2 mm
Lip strain		3	2 mm	1 mm

All permanent teeth, including growing third molars, were found on the Orthopantomograph. There were no evident

indications of carious lesions or periapical disease, and the root shape seemed normal.



III. TREATMENT OBJECTIVES

The main objectives of Twin Block therapy included,

- To Improve the Convexity of facial profile and retruded chin i.e To improve Skeletal Class II base relationship
- To Improve Lip incompetence and lip trap
- To Achieve optimum overjet and overbite
- To Achieve Class I molar & Canine Relationship Bilaterally

The objectives of Fixed Appliance therapy included,

- Levelling and Alignment of Arches
- Finishing, Detailing & Long term retention

IV. TREATMENT PLAN

First phase involved treatment with Myofunctional appliance Therapy for correction of class II relationship followed by Fixed orthodontic mechanotherapy with preadjusted edgewise (MBT-022 X 028” slot) appliance and long term retention on upper and lower arch

V. TREATMENT PROGRESS

Due to strong patient compliance, the functional therapy phase's goals were met. Over the course of 7 months, this phase of therapy was completed. (Fig 5)



Fig 5



Fig 6

Upper incisors were 11 degrees retroclined, whereas lower incisors were 7 degrees proclined. The overjet was reduced as a resultant of this (Fig 6). The patient was told to activate the midline screw twice a week and was checked every four weeks. The fixed appliances were used in the second phase of therapy to close any residual space

and it was completed in 12-months (Fig.7). The total treatment period was 22 months, which included 7 months of functional appliance usage, 3 months of transition between functional and fixed appliance therapy, and 12 months of fixed appliance treatment

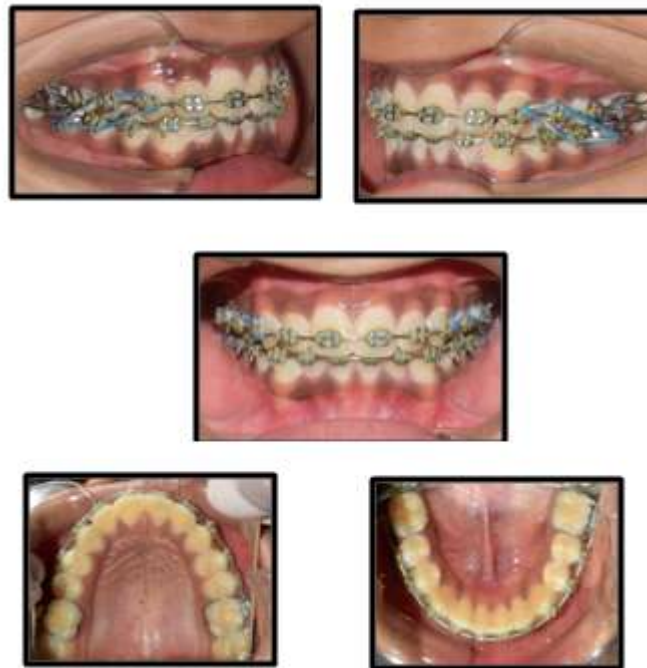


Fig 7

The therapeutic goals were accomplished. After therapy, the patient's profile has improved (Fig.8). Proclination of the lower incisors alleviated crowding in the lower arch. During the fixed appliance phase of therapy, space in the upper arch were closed. At the completion of therapy, the incisor, canine, and molar relationships were all

class I. Overbite and overjet were brought down to normal levels. The growth changes are presented in the overall superimposition of the lateral cephalometric radiographs in Fig. 9, and the maxillary and mandibular superimpositions in Fig. 10.



Fig 8

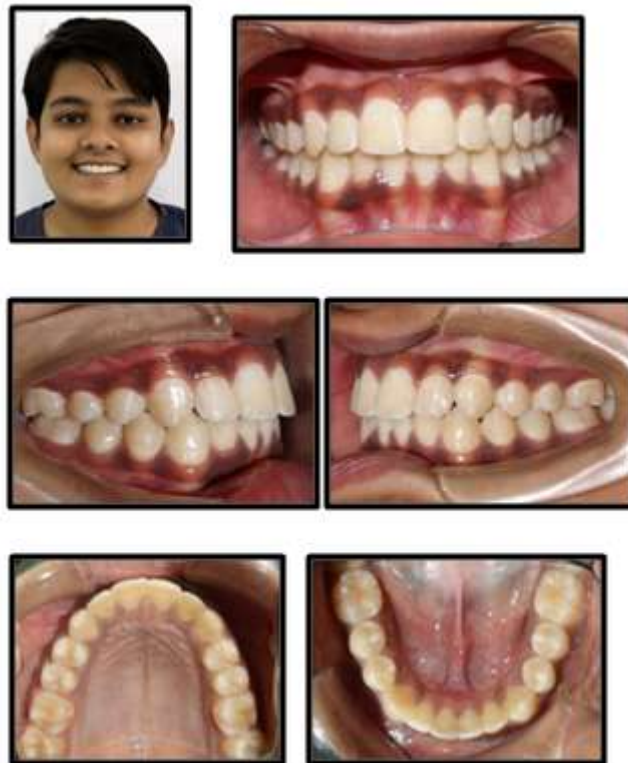


Fig 9

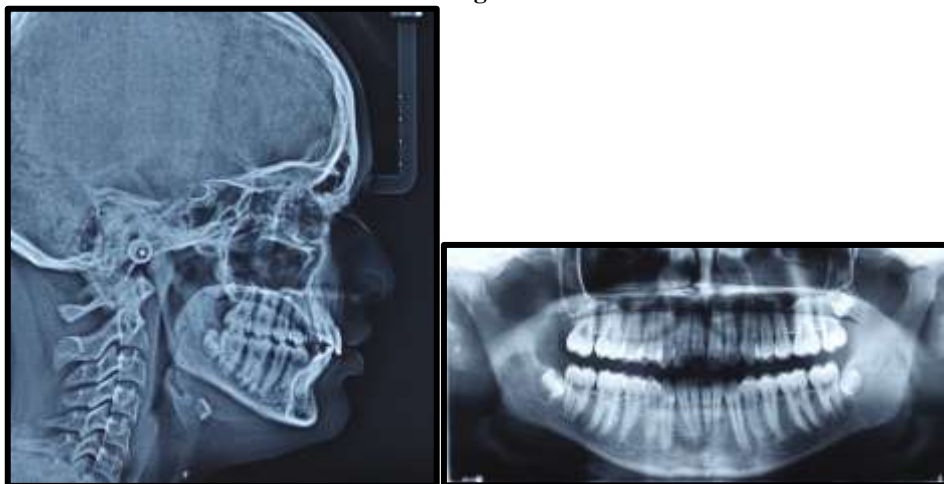
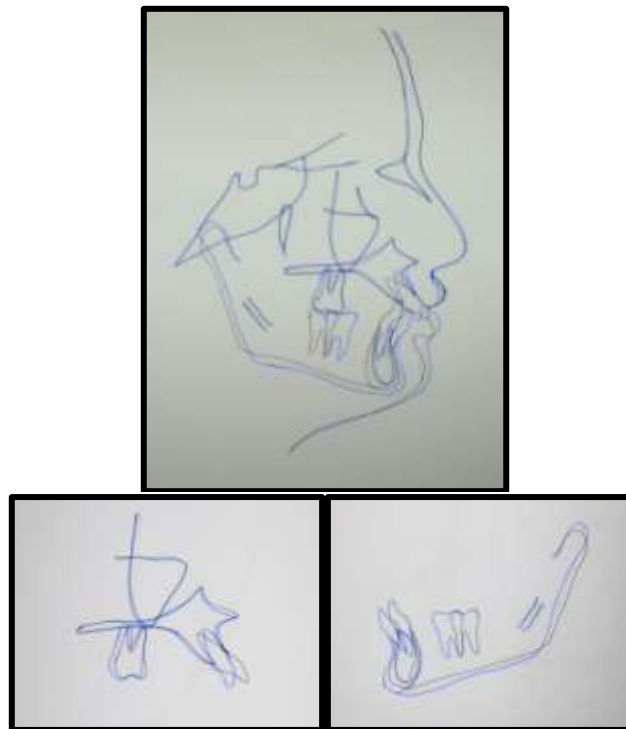


Fig 10



The comparison of pre treatment, post twin block and post treatment extraoral photographs are shown in the fig.11

Fig 11

VI. DISCUSSION

Class II malocclusion can be caused by a variety of skeletal and dental factors. As a result, determining the cause and manifestation of Class II malocclusion, as well as identifying differential diagnoses, will aid in its correction and treatment planning, whether functional, orthodontic, or surgical. [4]

Evidence shows that offering early orthodontic therapy in two phases for children with prominent upper front teeth is more beneficial than providing one phase of orthodontic treatment in adolescence in lowering the occurrence of upper front tooth trauma (incisal trauma). [7]

Clark's twin block is a functional appliance that allows mandibular displacement and efficiently modifies the occlusal inclined plane to induce a favourably directed occlusal force. To aid the fundamental processes of mastication and swallowing, rapid soft-tissue adaptation occurs in response to a better occlusal alignment [5]. With little discomfort, the patient can wear the device all day. Aesthetic and reparability are two further additional benefits. It may be used on both deciduous and mixed dentition.

Several studies have demonstrated the efficacy of twin block to induce considerable skeletal and dentoalveolar alterations that, when combined, resolve Class II malocclusion [8].

In this case, a comparison of pre- and post-treatment lateral cephalograms revealed that SNA remained almost constant but SNB rose by 2° . The ANB angle was decreased by up to 2° . The inclination was decreased for maxillary incisor whereas increased for mandibular incisor. The length of the mandible was enhanced by 2 mm. B point and Pogonion also moved forward by 2mm. Nasolabial angle was increased and lip strain was reduced. The above mentioned Table shows the values of chosen parameters before and after functional as well as fixed appliance therapy.

VII. CONCLUSION

The effectiveness of twin block is dependent on the patient's compliance and case selection. The use of this appliance during the growth phase with adequate patient cooperation produces skeletal effect, as well as some dentoalveolar effects.

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