

Growth Modification Of Skeletal Class Ii Malocclusion With Functional Appliance - A Case Report.

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Abstract

Mandibular Retrusion Is The Most Prevailing Characteristic Feature Of Class Ii Malocclusion. Functional Appliances If Used In Growing Patients Can Cause Skeletal Changes For The Correction Of Class Ii Malocclusion. This Case Report Demonstrates The Use Of Functional Appliance (Twin Block) In A Growing Patient With Skeletal And Dental Class Ii Malocclusion, Large Overjet And Deep Overbite. Treatment With 'Twin Block' Appliance Caused Not Only Skeletal And Dental Changes, Dramatic Improvement In Facial Appearance Has Been Achieved.

Keywords- Skeletal Class Ii, Twin Block. Functional Appliance.

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I. INTRODUCTION

One of the most prevalent skeletal discrepancies is Class II malocclusion. Different skeletal pattern can contribute in the development of a Class II malocclusion : mandibular retrusion, sagittal maxillary hyperplasia, or a posterior position of the glenoid fossa. Mandibular retrusion is the most common factor in skeletal Class II malocclusion; it occurs in about 30% of the population. Functional appliances are most frequently used for correction of skeletal Class II malocclusion in growing individuals stimulating sagittal growth of mandible. Functional appliances use the forces generated by muscles to achieve dental and skeletal changes and are designed to alter the position of the mandible both sagittally and vertically to induce supplementary lengthening by stimulating increased growth at the condylar cartilage. Functional appliances comprehend different types of removable and fixed devices. Activator, Bionator, Twin Block and Frankel are some of the well known removable functional appliances while Herbst, MARA, Forsus and Powerscope are fixed functional appliances.

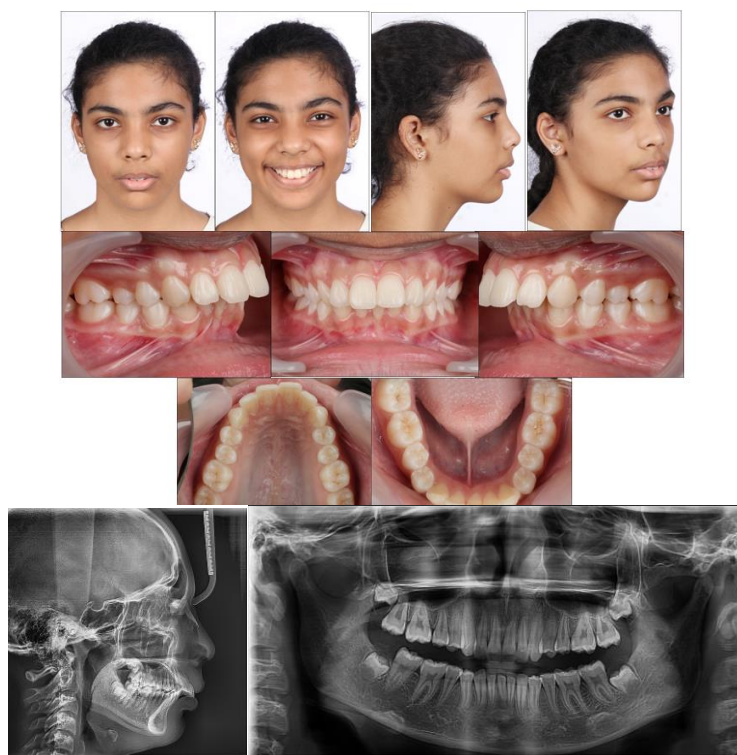
The use of functional appliances to correct Class II malocclusion depends on the existing antero-posterior discrepancy, cooperation and growth status of the patient. Growing patients are generally treated with removable functional appliances.

Twin Block is the most popular removable functional appliance due to its design configuration. It was developed by Clark in 1988 and is most commonly used functional appliance due to its acceptability by patients. In this case report, a 13 year old female patient with CVMI stage IV and Angle's Class II and skeletal Class II malocclusion due to retruded mandible was treated in two stages, functional appliance followed by fixed appliance therapy.

II. CASE REPORT-1

A 13 year old female patient reported to the Department of Orthodontics and Dentofacial Orthopaedics with the chief complaint of forwardly placed upper front teeth. Extraoral examination revealed that the patient had symmetrical face with convex profile, competent lips , deep mentolabial sulcus with receded chin . Intraoral features showed a Class II molar relation on left side and End On molar relation on right side, Class II canine relation bilaterally , overjet of 9 mm , overbite of 5 mm , single incisor missing along with tongue tie (Fig-1.1).

Figure 1.1 ; Pretreatment Photographs, Lateral cephalogram and OPG.



Orthopantomogram of the patient revealed a permanent dentition stage with single incisor missing along with the presence of third molar buds in all the quadrants. (Fig -1.1). Cephalometric analysis confirmed the case as Class II division 1 with mandibular deficiency along with ANB of 8° and Wits of 7mm (Fig-1.1) . Skeletal values showed a normally positioned maxilla (SNA- 83°) with retruded mandible (SNB- 75°) in relation to cranium with a horizontal growth pattern . Dentoalveolar findings showed proclined and bodily forwardly placed upper and lower anteriors. Cephalogram indicated CVMI-IV (Fig-1.1). The patient also had positive visual treatment objective (VTO) which also favoured the use of mandibular advancement using the twin block appliance.

Treatment Objective

- a. Achieving Class I molar & canine relationship on both side.
- b. Reduction of profile convexity and achieving optimum soft tissue balance.
- c. Achievement of normal over jet and overbite.
- d. Leveling and alignment of arches.
- e. Long term retention.

Treatment Plan

As the patient had skeletal and dental Class II relationship and was in growing phase, a two phase treatment was planned.

Phase I- Growth modification using functional appliance (Twin Block).

Phase II- Fixed orthodontic mechanotherapy for final detailing of occlusion.

Treatment Progress.

Bite registration was done with a forwardly placed mandible and twin block was fabricated for the patient (Fig- 1.2). Single step advancement was done with sagittal advancement of 6 mm and vertical opening of 4 mm.

Patient was asked to wear the appliance 8 hours a day initially and then gradually increase the duration to 24 hours a day. After a period of 6 months, significant improvement was noted in the profile of the patient with correction in molar and canine relation as well as the overjet and overbite (Fig-1.3). This active phase of growth was followed by a retentive phase where the patient was given a removable guiding plate to retain the correction obtained along with 0.22 MBT fixed appliance mechanotherapy. Mandibular lingual frenectomy was done for the management of tongue tie. The duration of the treatment was 1.5 years .

Fig-1.2; Intraoral photographs with twin block appliance



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Treatment Results

Cephalometric measurements at the pretreatment, post-functional and post-treatment periods are given in Table 2.1. The results indicated improvement in both skeletal and dental parameters. At the end of treatment, overjet was reduced from 9mm to 3mm and overbite reduced from 5 mm to 2 mm. The incisor, canine and molar relationships were class I at the end of treatment. Cephalometric measurements revealed mandibular incisors were proclined from IMPA of 96° to 102° and ANB angle decreased from 8° to 3° . (Fig- 2.3). Cephalometric superimposition indicated downward and forward movement of the mandibular dentoalveolar arch and growth at the condylar region. Convexity decreased and the prominence of labiomental fold diminished. Post treatment lateral cephalogram and OPG are shown in Fig-1.3. Overall superimposition, maxillary and mandibular superimpositions are illustrated in Fig. 1.4.

Fig- 1.3; Post treatment photographs, lateral cephalogram and OPG

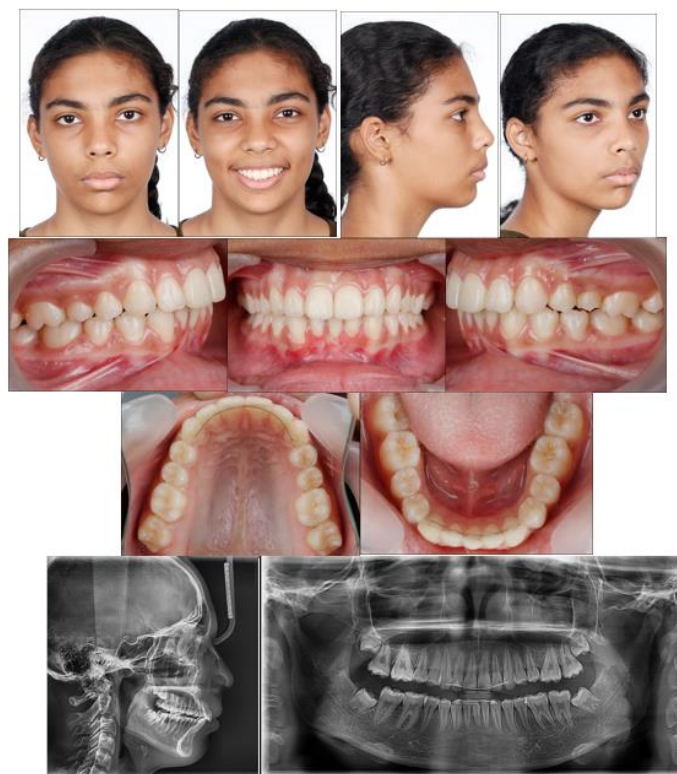


Fig- 1.4; Overall Superimposition

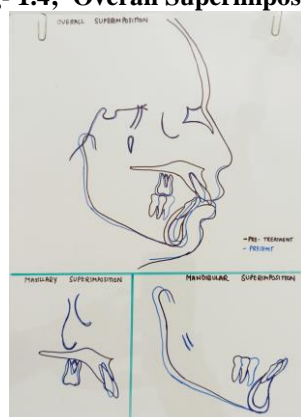


Table 1.1 ; Cephalometric comparisons of pre-treatment, post-functional and post-treatment period.

Parameters	Mean value	Pre treatment	Post Functional	Post Treatment
ANB	4°	9°	3°	3°
Upper 1 to NA (mm)	4mm	8mm	7mm	5mm
Upper 1 to NA (angle)	22°	30°	28°	26°
$\underline{1}$ to SN	102° ± 2°	116°	110°	103°
Lower 1 to NB (mm)	4mm	6mm	7mm	7mm
Lower 1 to NB (angle)	25°	30°	34°	33°
IMPA	90°	96°	98°	102°
Interincisal angle	130°	105°	108°	120°
Effective mandibular length	126.8 +/- 4.7	101mm	104mm	104mm
Nasolabial Angle	99-110°	107°	109°	111°

III. DISCUSSION

Clark's Twin block is a functional appliance that modifies the occlusal inclined plane to induce favorably directed occlusal forces by causing a functional mandibular displacement. It is esthetic, allows masticatory function and has the advantage of full-time wear and is easily tolerated by the patients. Several studies have documented the ability of the twin block to induce significant skeletal as well as dentoalveolar changes, which, in combination bring about correction of the Class II relationship. The treatment approach to Class II correction involved two phases of therapy—a functional appliance phase followed by fixed appliance phase.

The treatment with the twin block starting during or slightly after the onset of the peak in mandibular growth appears to be more effective as it induces more favorable mandibular skeletal modifications. Starting at the late mixed dentition ensures maximum patient cooperation at an age when the patient is becoming increasingly conscious of his/her appearance and actively participates in the process. This ensures consistent results with the functional appliance.

However, there are potential disadvantages such as proclination of lower incisors and development of posterior open bite. In this case, the treatment objectives were achieved largely due to the good patient compliance. The patient's chief complaint was increased overjet. Thus by reducing the overjet with the functional appliance, the patient's confidence has improved. Posterior open bite was managed by full time wear guiding plate along with the coordination of stainless steel archwires during the fixed appliance phase.

IV. CONCLUSION

The effect of Twin Block functional appliances is mostly skeletal (70%) with small dentoalveolar component (30%). There are a number of situations where functional appliances can be successfully used to correct Class II malocclusion. It is important that functional appliances are used in a growing patient to achieve

the maximum benefit. They simplify the following phase of fixed appliance by gaining anchorage and achieving Class I molar relationship. In this case, the patient was treated with Twin Block appliance followed by fixed appliance phase. A significant mandible sagittal advancement with minimal dental changes was observed along with the improvement in facial profile.

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