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Case Report

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MANAGEMENT OF SKELETAL CLASS II MALOCCLUSION WITH TWIN BLOCK APPLIANCE: A CASE REPORT

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ABSTRACT

The term "Functional appliance" refers to a variety of appliances designed to alter the arrangement of various muscle groups that influence the function and position of the mandible to transmit forces to the dentition and basal bone. Typically these muscular forces are generated by altering the mandibular position sagittally and vertically resulting in orthodontic or orthopaedic changes. The original concept of functional jaw orthopaedics essentially encompasses growth modulation for the correction of mandibular retrognathia i.e. skeletal class II malocclusion not by active forces of appliance but by the forces generated from the muscles when the mandible is held forward. The functional force indirectly produce growth modulation and bring about changes in jaw bones. This case report presents first phase of correction of class II malocclusion due to mandibular retrognathism by use of Twin Block appliance at growing age. Later 2nd phase of treatment was done by preadjusted edgewise technique.

KEYWORDS: Functional appliance, Retrognathia, Twin Block, Visual Treatment Objective.

INTRODUCTION

The goal in developing the Twin Block approach to treatment was to produce a technique that could maximise the growth response to functional mandibular protrusion by using an appliance system that is simple, comfortable and esthetically acceptable to the patient. William Clark believed that the occlusal inclined plane is the fundamental functional mechanism of the natural dentition. Cuspal inclined planes play an important part in determining the relationship of the teeth as they erupt into occlusion.[1]

Twin blocks are constructed to a protrusive bite that effectively modifies the occlusal inclined plane by means of acrylic inclined planes on occlusal bite blocks. The purpose is to promote protrusive mandibular function for correction of skeletal class II malocclusion.

DIAGNOSIS: B Karan Rao, a 12 years old boy reported to our clinic with chief complain of forwardly placed upper teeth and unpleasant smile.

Extra-oral examination shows

- Mesocephalic head form and Mesoprosopic facial form.
- Lips are potentially competent.
- Incisor display is 5mm at rest.
- 10 mm incisal display with no gingival display at smile.
- Smile arc is non consonant.
- Decreased lower anterior facial height.
- Posteriorly divergent face.
- Lateral profile is convex.
- Nasolabial angle is 85 degree.
- No history of congenital diseases or anomaly recorded.

Intra-oral examination

- Maxilla mandibular relationship shows class II molar relationship and end on canine relationship on both side.
- Overjet of 13mm.
- Overbite of 7 mm.
- Mild spacing on upper arch.
- Curve of spee 2.5mm on left side and 2mm on right side.

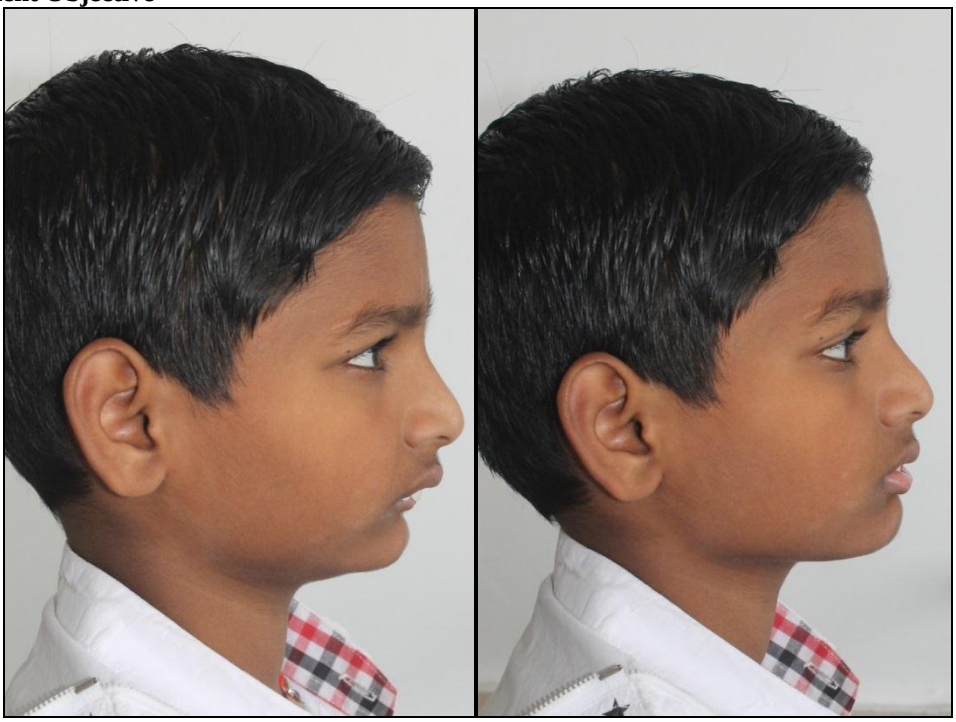
Study model analysis – Carey' s analysis shows arch perimeter and total tooth material 3mm excess on maxillary arch and discrepancy of 2 mm on mandibular arch.

Bolton' s ratio shows .5mm of mandibular tooth material excess in anterior region and 4 mm of maxillary tooth material excess in posterior region.

Ashley Howe's analysis indicates basal arch width 40.45%.

Cephalometric analysis revealed skeletal class II with ANB of 09 degree and FMA of 25 degree.

Visual Treatment Objective



This diagnostic test enable us how the patients profile would be after functional appliance therapy and for this patient VTO was positive.

MANAGEMENT

Treatment plan

1st Phase: With the use of twin block, initial advancement of 7-8mm followed by reactivation of the appliance after occlusion will be corrected to initial bite registration.

2nd Phase: Fixed mechanotherapy with preadjusted edgewise mechanics following MBT prescription.

Table 1: Pre-treatment and post-treatment parameters.

Parameters	Pre-treatment	Post-treatment
SNA	81 degree	80 Degree
SNB	72 degree	76Degree
ANB	9 degree	4Degree
FMA	17degree	20Degree
IMPA	104degree	105Degree
1 to NA	32degreee/6mm	29degree/3mm
1 to NB	22degree/4mm	25degree/5 mm
Angle of convexity	+16 degree	+10 degree
Length of mandible (co-pog) Macnamara	101mm	104mm

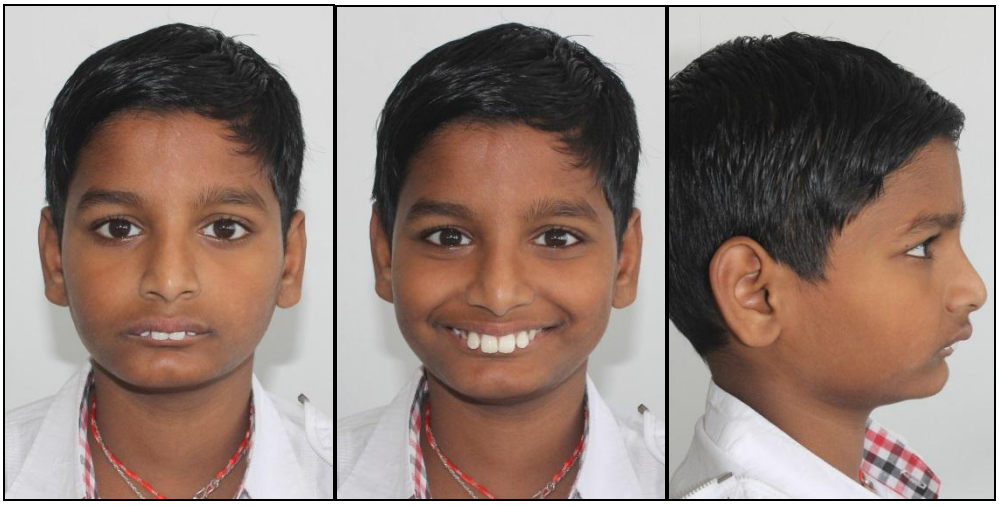


Figure 1: Pre-treatment extra-oral photographs.

Figure 2: Pre-treatment intra-oral photographs and cephalogram.

Figure 3: Intra-oral photographs with Twin Block appliance.

Figure 4: Post Twin block therapy extra-oral photographs.

Figure 5: Post Twin block therapy intra-oral photographs with cephalogram.

DISCUSSION

Treatment effects of Twin Block appliance have been investigated by a number of researchers. Both short term and long term studies are now available.[2,3] It has been found that twin Blocks are capable of sagittal forward positioning of the mandible and therefore result in improvement of sagittal skeletal relationship, which can be measured on several cephalometric parameters such as, reduction of facial convexity, increase in effective length of the mandible, and reduction of ANB angle. There is a significant favourable change in the posterior facial height. Dental changes include reduction of upper incisor angulation, reduction in distance from pterygoid vertical to distal of maxillary molar, increase in incisor mandibular plane angle, some improvement in the proclination can be attained during support phase of Twin Block therapy. Twin block produce some distalization effect on maxillary molars. Even this study shows similar skeletal and dental changes as that of previous studies.

There are controversy regarding the timing of treatment is "Did early treatment with headgear or a functional appliance produce a long-term difference when early treatment outcomes are compared to the outcome of later (adolescent) treatment?" The UNC trial was extended into a second phase of treatment for all of the children to compare early two-stage with later one-stage treatment more completely; long-term data from the Florida trial also are available. Both the former controls and the two groups who had preadolescent growth modification treatment received comprehensive fixed appliance orthodontics (phase 2) when their permanent teeth erupted, during adolescence.[4,5]

These data show that changes in skeletal relationships created during early treatment were at least partially reversed by later compensatory growth, in both the headgear and functional appliance groups. By the end of phase 2, the skeletal relationships between the former controls and the early treatment groups were similar. Peer Assessment Rating (PAR) scores, which reflect the alignment and occlusion of the teeth, also were not

different at the end of phase 2 between the children who had early treatment and those who did not. The groups were also similar for extractions and eventual surgical treatment, although functional appliance treatment tended to increase the need for extractions.

Based on these results, it seems clear that for most Class II children, early treatment is no more effective than later treatment. Since early treatment takes longer and costs more, it is less efficient.

Another finding of the early treatment studies was that among the treated and control groups, both with reasonably high self-concepts to begin with, the early treatment group reported higher self-concepts, less anxiety and better physical appearance, popularity, and happiness and satisfaction than the controls at the end of phase 1. The treated patients also believed the benefits of treatment were general well-being, confidence, health of teeth, and mouth function. This difference, however, disappeared by the end of phase 2 when both groups finished comprehensive treatment.

CONCLUSION

Although research studies have questioned efficacy of functional appliance treatment, their clinical performance has been the reason for their continued and expanding popularity in developing class II malocclusion. The case selection, appliance design, rigorous follow up and favourable growth are the key factors that determine success of functional appliance therapy. Long term maintenance necessitates a well finished occlusion, achieved during 2nd phase with fixed appliance therapy of outcome and follow-up during retention phase.

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