

# "TRIPLER APPROACH"- COMBINATION OF ORTHOPEDIC, MYOFUNCTIONAL AND FIXED MECHANOTHERAPY- A CASE REPORT

## Case Report

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### ABSTRACT:

A 13 year old female patient came to our department with chief complain of excessive gum show. On Clinical examination patient presented with convex facial profile, obtuse nasolabial angle, mesocephalic, mesoprosopic, incompetent lips and increased interlabial gap. Intraorally she had class II canine and molar relation bilaterally with crowding irt 31, 32, 33, 41, 42, 43. Patient was really concerned about her facial profile. So we decided to manage the same with triplet approach i.e the combination of orthopedic, myofunctional and fixed mechanotherapy. The total treatment time was 28 months which include 13 month phase I therapy and 15 months phase II therapy and the results were exuberant.

### Key words:

Triplet approach,  
class II malocclusion,  
myofunctional therapy.

Source of support : Nil

Conflict of interest: None

**INTRODUCTION:** According to McNamara Angles class II malocclusion in children presents with maxillary excess, mandibular deficiency or combination of both, although the most common verdict is due to mandibular skeletal retrusion [1] Mandibular retrusion is the most widespread in children which shows no tendency for self-correction with growth. Furthermore, mandibular retrusion worsens during the pubertal growth spurt and maintains the same standard after this period until adulthood. There are various methods to treat this problem.

The Andersen activator is one of the most widely used functional appliance. A high pull face bow attached to activator is indicated in those patients in whom an increase in vertical dimension should be minimized or restricted [2] In general, Class II div I malocclusion correction using high pull headgear-activator combination therapy results in inhibition of forward maxillary growth, inhibition of the mesial and vertical displacement of the maxillary teeth, condylar and glenoid fossa remodeling and improvement in facial musculature. [3]

### CASE REPORT:

A 13-yearold female patient presented with the chief complaint of excessive gum show both at rest and on smile. Clinical examination revealed convex facial profile, obtuse nasolabial angle, mesocephalic, mesoprosopic, incompetent lips, non consonant smile, increased interlabial gap, short upper lip length, and hyperactive mentalis activity. Intraorally, she had end on molar and Canine relationship bilaterally. The patient presented with rotation in relation to 14, 15, 24, 25 and crowding irt 31, 32, 41, 42, increased overjet, (12 mm) and deep bite (4 mm). The patient had a Bolton's discrepancy of 2.1 mm mandibular anterior tooth material excess and 2.6 mm total mandibular tooth material excess. On the basis of cephalometric values, the patient was diagnosed as a case of skeletal Class II malocclusion with vertical growth pattern, prognathic and vertically excess maxilla, retrognathic mandible with unpleasant soft tissue facial profile (Fig-1, Table 1). There were no signs and symptoms of any temporomandibular disorder.

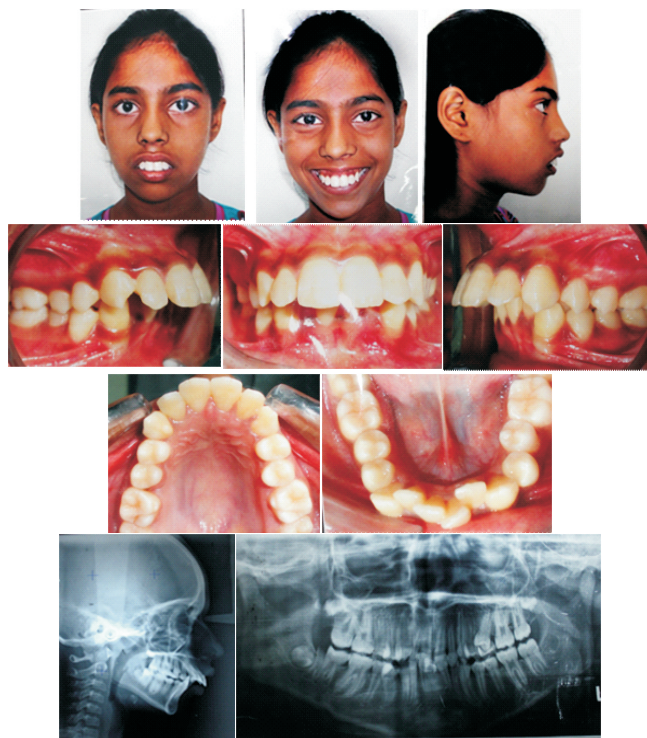


Figure 1-Extraoral and intraoral pretreatment photograph with lateral cephalogram and OPG

#### Treatment objectives

- Level and align the upper and lower teeth
- Achieving Class I canine and molar relationship bilaterally
- Achieving ideal overjet and overbite
- Control of vertical dimension
- Achieving neuromuscular balance by elimination of Aberrant musculature
- To achieve an esthetic profile

#### TREATMENT ALTERNATIVES:

The first alternate was an orthognathic surgery (Bilateral sagittal split osteotomy with advancement and vertical reduction and augmentation genioplasty) after the patient's growth was completed. This option had the shortcoming of patient waiting for a few years.

The second was the extraction of 14, 24 and a camouflage line of treatment for Class II, Division 1 malocclusion. However, this treatment option would not improve the patient's profile features or inhibit the vertical growth of maxilla.

Third alternate was the orthopedic and myofunctional therapy, i.e twin block with increased height of blocks or activator-headgear combination therapy considered.

Activator headgear combination therapy was opted as the third treatment option due to well documented skeletal results of this combination. Benefits and disadvantages of each were explained to the patient and the patient opted for the third treatment alternative.

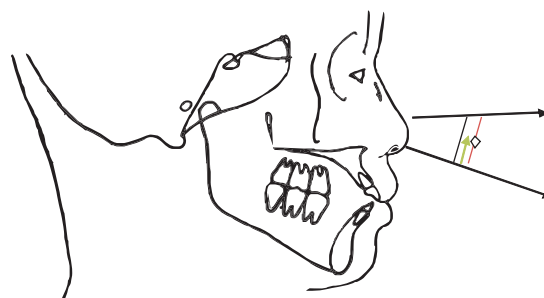


Fig 2 the centre of resistance of maxilla (diamond in red vertical line) is located on the midpoint on a line perpendicular to functional occlusal plane at distal contact of maxillary molar.

#### TREATMENT PROGRESS:

To improve the profile and control the backward rotation of the mandible, activator headgear combination was used. However the visual treatment objective of this patient was not so much satisfied but our first aim was to correct jaw bases. Construction bite for activator was taken with 5 mm of vertical opening and 5 mm of horizontal advancement. 2 mm lower incisal capping with acrylic was done to prevent the flaring of incisors. After 2 week of activator wear the headgear was attached to the activator tubes in molar region. High pull headgear was used with the force of 500 gm per side with 14-16 hr daily wear for 13 months. The outer bow and extra oral force were adjusted such that force passed through the center of resistance of maxilla approximately between the root tips of maxillary first and second premolars (Fig 2&3).



Fig -3 activator +headgear combination



Fig -4 post functional records

The patient was shifted to fixed mechanotherapy after achieving Class I molar relationship. After the end of phase one treatment we achieved class I canine and molar relation. Fixed preadjusted appliance with MBT prescription (0.022" × 0.028" slot 3M Unitek™ Gemini metal, USA) was placed with extraction of 14,24,34,44. As mentioned earlier the VTO of the patient was not positive and as anticipated the patient ended up in bimax type of profile post phase I of treatment, hence extraction was modality during fixed mechanotherapy. An initial 0.014 nickel-titanium (Nitinol super elastic 3M Unitek, USA). Arch wire was placed for aligning and leveling. Anchorage in this stage was reinforced using lace backs and bend backs in both the arches. The patient was progressively shifted to heavier arch wires 0.019" × 0.025" stainless steel wires with crimpable retraction hooks to close the spaces. Class I active tie back (MBT) was used for retraction. After the space closure (phase II), settling of occlusion was achieved using upper and lower 0.014" niti wire with short settling elastics (class II pattern). After debonding of appliances upper and lower fixed retainer was delivered. The total treatment time was 28 months which include 13 month phase I therapy and 15 months in phase II therapy (Fig 4).



Fig-5 Mid treatment photograph

### TREATMENT RESULTS:

The patient's profile had significantly improved, although there was excess gingival show on smile. There was a significant reduction in the soft tissue facial convexity with downward and forward mandibular growth, and a restraint of maxillary growth during the activator headgear therapy phase. A consonant smile was obtained at the end of treatment. Class I dental occlusion was achieved bilaterally with optimal overjet and overbite. Post treatment cephalometric

Tracing revealed significant improvement in the skeletal discrepancy (SNA pretreatment: 84° and post treatment 81°; SNB pretreatment: 76° and post treatment 78°), inclination of the maxillary and mandibular incisors (upper incisors to NA angle, pretreatment: 28° and post treatment: 23°; IMPA pretreatment: 93° and post treatment 94°). The nasolabial angle was mildly acute at the end of treatment but showed a great improvement from its pretreatment value (pretreatment: 78° and post treatment: 91°). Superimposition of pre and post treatment cephalometric tracings confirmed the inhibition of

maxillary growth, attainment of mandibular growth at condylar region, and retraction of anterior teeth as desire (fig 5&6, table 1).



Fig-6 extra oral and intraoral photograph of patient after debonding of appliance

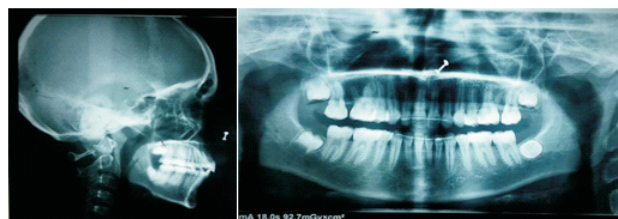


Fig-7 Post treatment lateral cephalogram and OPG

Parameter	Average	Pretreatment	postmyofunctional	Post treatment
SNA (°)	81.7	84	83	81
SNB (°)	82.4/2	76	78	78
ANB (°)	2.4/2	10	5	3
FMA (°)	25	31	27	26
UI?NA (°)	22	28	25	23
UI?NA (mm)	4	10	6	3
LI-NB (°)	25	24	25	22
LI-NB(mm)	4	11	12	5
LI to MP angle (°)	90	93	95	92
Interincisal angle	131+/-5	120	106	130
"s" line (mm)-				
upper	0	6	4	2
Lower	0	6	5	2

Table -1 pretreatment, postmyofunctional, and post treatment cephalometric data

### DISCUSSION:

The nature of a Class II malocclusion is related to many factors, such as facial structure, maxillary and mandible growth patterns, and dentoalveolar development. Individual variations of these factors have to be considered in relation to treatment procedures to correct the malocclusion. Correction of mandibular deficiency in a skeletal Class II patient with a vertical growth pattern poses a great challenge. The control of vertical dimension becomes very important with downward and backward rotation of mandible and gummy smile. The vertical development is better controlled by the activator headgear combination as it can induce anti- clockwise mandibular rotation and more control mechanics over maxilla. [4] Katsavrias and Halazonetis found that posteriorly



directed forces acting on the maxilla during activator wear were generally in the range of 100 g, whereas with activator headgear appliances the forces generated were generally in orthopedic range. The evidence suggests more orthopedic changes with the activator headgear appliance [5] as it stimulates mandibular growth, increases mandibular length, and has a restrictive effect on maxillary sagittal growth. [6, 7] In present case she had Class II skeletal base along with vertical growth pattern. As she was in growing stage, our objective was functional advancement of the mandible and inhibition of further maxillary growth. Activator headgear treatment option was presented to her. High pull headgear was used with the force of 500 gm per side for 14-16 h daily wear for 13 months. The patient wore the appliance regularly. The skeletal correction was achieved by mandibular base lengthening and restriction of increase in maxillary basal length. The profile of the patient was improved drastically as seen from the post treatment photographs and the cephalometric readings [Table 1 and Figure 2]. The forward growth of maxilla was restricted using the headgear. Our aim was to improve mandibular base length and inhibit / vertical control over maxilla so we decided to go along activator and headgear therapy despite the visual treatment objective not satisfying so first we corrected jaw bases (phase I) and after the correction of jaw bases we planned extraction of 14,24,34,44 in phase II therapy. However some amount of gingival recession occurred after orthodontics tooth movement [8, 9]. In this case report patient had gingival recession irt 31, 32 after the orthodontic therapy (fig 5). She was referred to department of periodontology for needful correction. Although we observed that chin not grow well during the treatment so we adviced to go for functional genioplasty [10, 11].

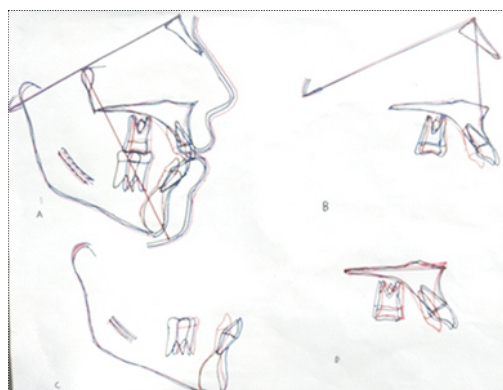


Figure8: Superimposition of cephalometric tracings pre-treatment (black), post activator headgear therapy (blue), and post treatment (red) (a)Nasion Basion at Cc point (b) Nasion Basion at nasion (c) mandible on internal structure.(d)ANS –PNS at ANS

## DECLARATION OF PATIENT CONSENT:

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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