

# Face Mask a Promising Option in Growing Children with Maxillary Deficiency and Mandibular Prognathism

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**Abstract:** *The aim of early treatment in class III malocclusion is to enhance the growth pattern and to provide purview for future growth. It reduces the hurdle like psychological effect on the child, improves dental and facial esthetics, eliminates anterior functional shift of the mandible, and decreases the chances of later orthognathic surgery. In children with active growth, orthopaedic treatment is usually carried out to obtain maximum skeletal and minimum dental changes. In this article, we present two case reports relating to early orthopaedic management of class III malocclusion with facemask therapy.*

**Keywords:** Class III malocclusion, Face mask therapy, Orthopaedic therapy

## 1. Introduction

Class III malocclusion with maxilla deficiency and mandibular prognathism or a combination of both arches to sync with harmony with each other and cranial base.

Prevalence of class III malocclusion is greater in the Asian population compared to Caucasians, it ranges between 4% and 13% in Japanese, 7.8% and 15.2% in Iranians, and 4% and 14% among Chinese<sup>1, 2</sup>. The prevalence of class III malocclusion is 3.4% in the Indian population<sup>3</sup>. On average, 60% of class III malocclusions are characterized by maxillary deficiency<sup>4</sup>.

The aim of early treatment in class III malocclusion is to enhance the growth pattern and to provide purview for future growth. It reduces the hurdle like psychological effect on the child, improves dental and facial esthetics, eliminates anterior functional shift of the mandible, and decreases the chances of later orthognathic surgery. In children with active growth, orthopedic treatment is usually carried out to obtain maximum skeletal and minimum dental changes.

In this article, we present two case reports relating to early orthopedic management of class III malocclusion with facemask therapy.

## 2. Case Descriptions

### Case I

An 13 - year - old boy reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of backwardly placed upper front teeth. Straight facial profile. Patient was in the mixed dentition with all erupted permanent first molars in maxilla and mandible. With molar relation was end on left side and scissor bite on right side.

Dental crossbite with anterior crossbite with 11, 21, 22 and reverse over jet of 2mm, rotated 15 and scissor bite of 16 and 46.

On Steiner cephalometric analysis the ANB value was - 2° indicative of a Class III skeletal pattern. An SNB angle of 78° indicated that the mandible was normal and SNA angle of 76° indicated that maxilla was retrognathic. Maxillary incisors were proclined with U1 - NA - 5mm/31°. The interincisal angle was 124°. Cervical vertebrae indicated acceleration period of growth. Positive results were seen on VTO.

### Treatment objectives:

- To enhance the growth of retrognathic maxilla
- To precise the anterior segmental cross bite irt 12, 11, 21, 22.
- To rectify the scissor bite of 16/46
- To derotate the 25

### Treatment plan:

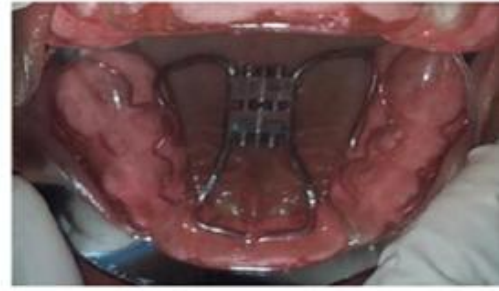
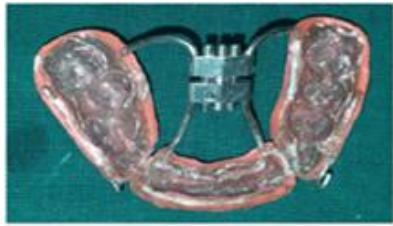
Early phase (phase I) of orthopedic treatment was planned to induce harmonious skeletal growth and improve facial esthetics. Rapid maxillary expansion with occlusal splint with Petit face mask therapy was given to correct retrognathic maxilla. For scissor bite with respect to 16/46 and for the rotated 25 fixed mechanotherapy is done.

### Treatment progress:

In phase I rapid maxillary expansion appliance is given to increase the size of maxilla along with occlusal splint for the attachment and forward movement of maxilla along with a petit face mask as an extraoral anchorage is given. For retentive phase Hawley's retainer.

PRE OP



APPLIANCE DELIVERY**Case II**

An 8 - year - old boy reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of forwardly placement of lower front teeth. Patient came with good general health. His facial profile is straight. After extra - oral and intra - oral examination and cephalometric analysis, it was diagnosed that the patient had skeletal and dental class III malocclusion. The patient was in the mixed dentition with all erupted permanent first molars in maxilla and mandible. The molar relation was class III with edge - to - edge bite. There was a dental crossbite with 12 and 83. OPG relieved congenitally missing 35. Patient had a history of tongue thrusting habit.

On Steinercephalometric analysis the ANB value was  $-1^\circ$  indicative of a Class III skeletal pattern. An SNB angle of  $85^\circ$  indicated that the mandible was prognathic. Maxillary incisors were proclined with U1 - NA - 9 mm/ $33^\circ$  and mandibular incisors were upright over the basal bone with L1 - NB - 6 mm/ $31^\circ$ . The interincisal angle was  $118^\circ$ . Cervical vertebrae indicated acceleration period of growth. Positive results were seen on VTO.

**Treatment objectives:**

- To enhance the growth of retrognathic maxilla
- To restrict the further growth of prognathic mandible.
- To rectify the crossbite of 12/83
- To eliminate the Tongue thrusting habit
- To prosthetic rehabilitate the missing 35

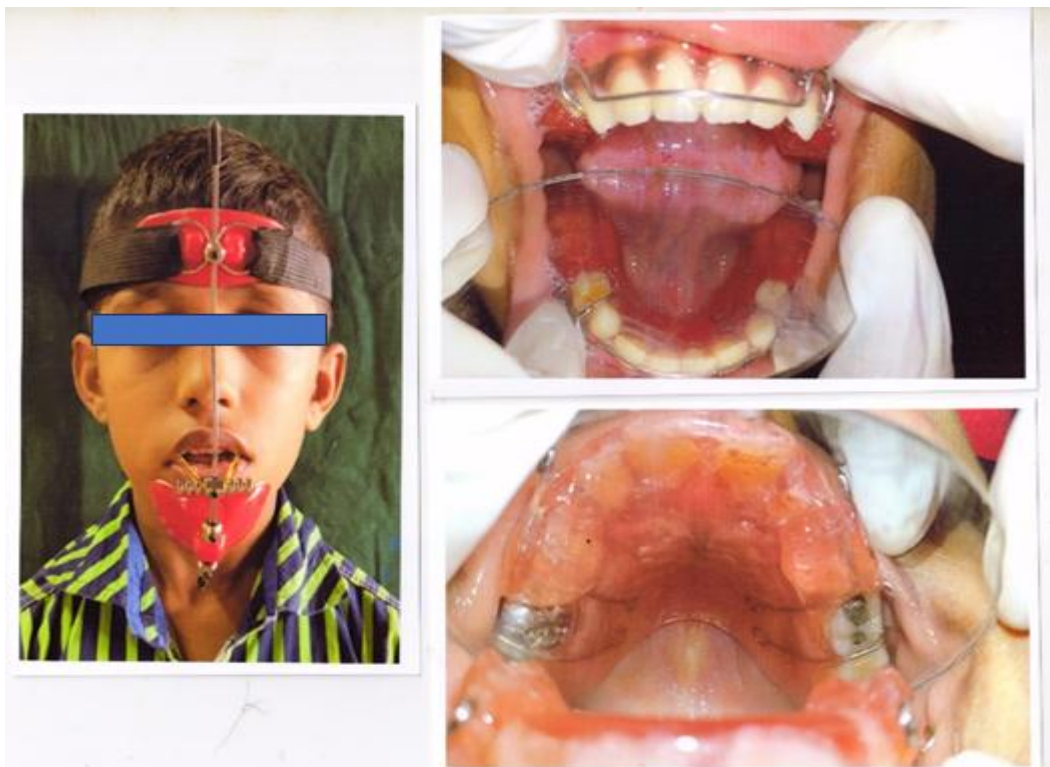
**Treatment plan:**

Early phase (phase I) of orthopedic treatment was planned to induce harmonious skeletal growth and improve facial esthetics. It was started with reverse twin block followed by facemask therapy for maxillary advancement, correct skeletal Class III malocclusion. For the tongue thrusting habit fixed tongue crib and finally for congenitally missing 35 lingual arch followed by prosthetic rehabilitation was done.

**Treatment progress:**

Initially bite registration was done by placing the mandible in the most retruded position with 2mm interincisal clearance. In phase I face mask with reverse twin block is given for correct the class III malocclusion with an extraoral anchorage. Then in support phase anterior bite plane was given to correct the deep bite and finally in retentive phase hawley's retainer with tongue crib to remove the tongue thrusting habit.





### 3. Discussion

The success of orthodontic treatment with a developing Class III malocclusion can be greatly dependent on the growth of individual and timing of orthodontic or orthopedic manipulation of growth.<sup>5</sup>

Several appliances are used for early treatment of skeletal Class III, including Bionator,<sup>6</sup> Frankel (FR-III)<sup>7</sup>, chin cup<sup>8</sup>, double-plate appliance<sup>9</sup>, Eschler appliance “progenic appliance,” and protraction face mask. Takada *et al.* reported that the forward maxillary displacement with protraction was more favorable before or during the acceleration of a

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child's pubertal growth spurt<sup>10</sup>. In recent years, face mask therapy with and without palatal expansion has become a common technique used to correct a developing hypoplastic maxillary Class III malocclusion<sup>11</sup>. Maxillary expansion has been advocated as a routine part of Class III treatment caused by maxillary deficiency<sup>[12, 13, 14]</sup>, however, a critical evaluation of expansion in conjunction with maxillary protraction has been limited.

Some authors reported that Class III treatment with maxillary expansion and protraction was effective in the maxilla only when it was performed before the peak (cervical Stage 1 or cervical Stage 2)<sup>15</sup>.

Orthopedic protraction of the maxilla has some limitations, including problems with patient compliance, limited protraction of the maxilla (2–3 mm in 9–12 months), unwanted dentoalveolar effects, and the possibility of relapse as a result of late mandibular growth<sup>[14, 16, 17]</sup>. A combination of maxillary protraction and RME has been used to treat young Class III patients with the maxillary deficiency<sup>13</sup>.

The goal of combining RME with maxillary protraction was to disarticulate the maxilla from the surrounding bones connected by circummaxillary sutures and to facilitate the forward movement of the maxilla<sup>18</sup>. Maxillary protraction along the occlusal plane is accompanied by counter clockwise rotation of the palatal plane and downward and backward rotation of the mandible plane, which results in tentative improvement of the skeletal relationship. A significant increase in ANB angle after facemask and RME treatment was due to the forward movement of the maxilla and the backward movement of the mandible<sup>[19 - 22]</sup>.

The downward and forward movement of the maxilla and the downward and backward rotation of the mandible improved the maxillomandibular skeletal relationship and the convexity of the profile.

Various clinical studies focusing on maxillary protraction described forward and downward movement of the maxilla and a clockwise rotation of the mandible.

Mandibular rotation may be due to vertical maxillary movement or a retractive force on the chin. The mandibular rotation resulted in an increase in lower anterior facial height. Age 11 years of Intervention (Face Mask Therapy). An important factor determining the success of treatment for Class III patients is treatment timing.

It has been recommended that facemask therapy should be initiated at 6–8 years of age after eruption of maxillary permanent first molar and incisors, that is, early mixed dentition<sup>[23 - 27]</sup>. However, maxillary protraction with bone anchors and Class III elastics has been reported to be successful in the late mixed or permanent dentition phases.

#### 4. Conclusion

An important factor for treatment of Class III malocclusion in growing patient is the origin of malocclusion. The skeletal or dental origin of the malocclusion and in skeletal Class III

malocclusions mandibular Prognathism or maxillary deficiency are important for choosing early intervention and selection of the appliance for treatment. The appliances described in this paper can be useful when the clinicians use them in correct manner.

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