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CASE REPORT

MANAGEMENT OF CLASS III MALOCCLUSION: TREATMENT DILEMMA- A CASE REPORT

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ABSTRACT

Background: Management of skeletal class III cases has always been a confusing and problematic issue in everyday practice. For this purpose various appliances have been developed for the ease of correction and management of maxillary deficiency. **Aim:** To minimize the dentoskeletal effects of facemask by class III traction using miniplates in growing patients. **Method:** This case report comprises of treatment in a deficient maxilla of an 12-year-old boy by using face mask, a bonded maxillary acrylic splint expander and miniplates. Acrylic expander was placed in maxilla for surrural disruption. Two miniplates were inserted in the premolar area of the maxilla under local anaesthesia. Facemask with class III traction resulted in favorable correction of malocclusion. **Results:** The SNA and ANB angles increased by 2° and 4° respectively. **Conclusion:** class III traction and miniplates proved to be a successful method for correction of class III malocclusion in this case.

Key words: Dental, Malocclusion, Treatment

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INTRODUCTION

Class III malocclusion can be of dental or skeletal type. Dental class III malocclusion is generally treated with camouflage treatment whereas skeletal class III cases require a more constructed treatment plan. Skeletal Class III malocclusions are relatively rare and are associated with genetic factors. The etiology may involve a retrognathic maxilla or a prognathic mandible, or both^{1, 2}. It has been found that 65% to 67% of all Class III malocclusions were characterized by maxillary deficiency³. In patients having a deficient maxilla in which the mandible is not markedly affected, treatment proceeds with stimulation and guidance of maxillary growth by orthopaedic forces.

Various extraoral appliances, such as facemasks and reverse pull headgears have been used to correct maxillary deficiency⁴⁻⁶, however, because the force is applied to the teeth, the inevitable mesial migration of the dentition can result in severe anterior crowding⁷. Furthermore, skeletal effects are often difficult to achieve with this approach. To overcome these disadvantages, many clinicians are using dental implants, mini-plates, and modified fixation screws which provide bone anchorage in orthodontic treatment⁸⁻¹⁰. Mini-screws (mini-implants) are a

more popular choice because of their ease of insertion and removal^{11, 12}.

In this case report, two mini-plates were inserted in the anterior part of the maxilla in the canine area and connected to a facemask appliance by use of elastics for correction of maxillary deficiency.

DIAGNOSIS AND ETIOLOGY

Patient was a 12-year-old boy who came to the hospital with a chief complaint of backwardly placed upper front teeth. He had no medical problems and there were no signs of temporomandibular joint dysfunction. The patient had a skeletal Class III malocclusion with maxillary deficiency whereas the parents had no such features.

The facial photographs (figure 1) showed a Class III appearance with a concave profile because of maxillary deficiency. The pretreatment intraoral photographs (figure 2) and dental casts showed Class III molar relationship bilaterally and anterior cross-bite with reverse overjet of 2 mm. Cephalometric analysis (figure 3) (table 1) confirmed the Class III skeletal pattern.



Figure 1- Pretreatment extraoral photographs



Figure 2- Pretreatment intraoral photographs



Figure 3- Pretreatment cephalometric radiograph



Figure 4- Miniplate insertion and bonded maxillary expander

➤ SNA	77 ⁰
➤ SNB	79 ⁰
➤ ANB	-2 ⁰
➤ UI-NA	29 (07) ⁰
➤ LI-NB	30 (10) ⁰
➤ GoGn-SN	37 ⁰
➤ FMA	36 ⁰
➤ IMPA	92
➤ A-N perpendicular	-9
➤ Co-Gn	121mm
➤ Co-A (94)	89mm ⁰
➤ Nasolabial angle	89
➤ ANS:PNS-Go:Pog	1:1.6
➤ SN:ANS-PNS	1:0.6
➤ SN:Go-Pog	1:1.6

Table 1- Pretreatment cephalometric values

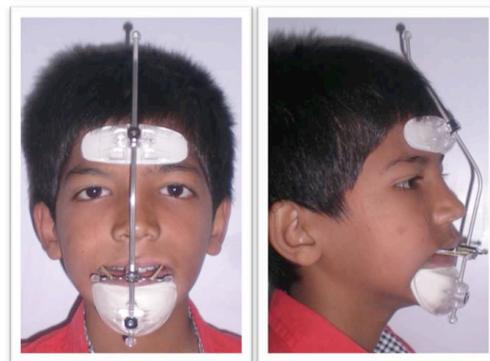


Figure 5- Facemask therapy



Figure 6: Post-treatment extraoral photographs

TREATMENT OBJECTIVES

The objectives we want to achieve for this patient were:

1. Improvement of profile
2. Improvement of smile esthetics
3. Achieving Class I molar and canine relationship bilaterally
4. Correction of skeletal relationship

	Pre-Rx	Post-Func
➤ SNA	77 ₀	79 ₀
➤ SNB	79 ₀	77 ₀
➤ ANB	-2 ₀	2 ₀
➤ UI-NA	29 ₀ (07)	27 ₀ (05)
➤ LI-NB	30 ₀ (10)	29 ₀ (10)
➤ GoGn –SN	37 ₀	39 ₀
➤ FMA	36 ₀	37 ₀
➤ IMPA	92	90
➤ A-N perpendicular	-9	-3
➤ Co-A (94)	89mm	94mm
➤ Co-Gn	121mm ₀	121mm ₀
➤ Nasolabial angle	89	94
➤ ANS:PNS-Go:Pog	1:1.6	1:1.5
➤ SN:ANS-PNS	1:0.6	1:0.7

Table 2- post treatment cephalometric values



Figure 7- Post-treatment intraoral photographs

Treatment Progress

- Phase I : Functional Jaw Orthopedics – Face Mask with Skeletal Anchorage System
- Phase II :Retention
- Phase III : Comprehensive orthodontics

Orthopedic face-mask therapy comprised a face mask, a bonded maxillary acrylic splint expander, mini-plates in between premolar roots, and heavy elastics. The bonded HYRAX was planned to expand and contract maxillary arch as per altermac technique, to disrupt the maxillary sutural system. For this purpose, a hyrax was adjusted and fabricated on the molars and premolars and Acrylic posterior bite plate was made to dis-occlude the upper and lower jaws (figure 4).

Mini-plates for Orthodontic Anchorage were placed under local anesthesia in the premolar area of the maxilla by a maxillofacial surgeon. The ideal position for miniplates insertion was evaluated by using a panoramic radiograph in order to avoid damage to the roots of the adjacent teeth.

At the time of delivery of the facial mask, bilateral 3/8-inch, 8-ounce elastics typically were connected to hooks of the miniplates to generate approximately 500 gm of anterior retraction and also

to ease the patient’s adjustment to the appliance. The force generated was then increased with the use of 1/2-inch, 14-ounce elastics and, finally, 5/16-inch, 14-ounce elastics. The direction of elastic traction was forward and downward from the hooks on the bonded maxillary expander to the adjustable crossbar of the facial mask, so that the elastics did not interfere with the function of the lips (figure 5). Patients were instructed to wear the mask 10-14hrs, although the actual amount of appliance wear varied. The patient was also told to change the elastics every day.

TREATMENT RESULTS

After 18 months of active treatment a positive overjet and Class I buccal segments were achieved and the anterior crossbite was corrected (figure 6, figure 7). The posttreatment cephalometric radiograph tracing showed a favourable increase of 2° and 4° in the SNA and ANB angles, respectively, after treatment (table 2).

DISCUSSION

In this young adolescent patient mini-plates placed in the between maxillary premolars showed no major complications; only mild irritation in areas where the plate extensions passed over the mobile mucosa and it also gave the ease to use elastics¹³. The bonded maxillary hyrax expander was given only to disrupt the maxillary sutural system, no expansion was done with the appliance.

Based on these cephalometric findings, it appears that the Miniplate could be useful not only in orthopedic treatment, but in orthodontic correction as well. Considering that mini-implant failure rates¹⁴ in the alveolar process are relatively high, the miniplates gave a better site for use of elastics¹⁵. The forces generated by elastics comprised of only one component; that is in a horizontal direction, moving the maxilla forwards, which was required in this case because of a deficient maxilla¹⁶.

The bonded maxillary hyrax expander-Miniplate approach for early Class III treatment offers several advantages over other methods:

- Forces are applied directly (by the Miniplate) to skeletal structures.
- Rapid expansion and contraction opens the midpalatal sutures for better maxillary protraction¹⁷.
- Anchorage is stable and reliable.
- The upper and lower arches remain fully accessible for orthodontic tooth movements.

As done in this case, applying a force to the teeth in order to correct the skeletal discrepancy will inevitably result in tooth movement; therefore, miniplates were used which transferred the force directly to skeletal system. The treatment process lasted for 18 months. However, since the patient was only 12 years old and still had considerable residual growth, treatment was continued by fixed appliance.

CONCLUSIONS

In this clinical study we evaluated the treatment effects produced by orthopedic face mask combined with a bonded maxillary expander and mini-plates. The major findings were as follows:

1. Treatment of Class III malocclusion with bonded maxillary expansion and a face mask using mini-plates led to an effective forward displacement of maxillary structures.
2. Maxillary changes were more with respect to mandibular changes which were nearly similar to that of pretreatment values.

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