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Case Report

Management of maxillary deficiency in a growing child with facemask therapy and RME- A case report

Pooja U[1,*], Naveen Aravind[1], Rajkumar S Alle[1], Lokesh NK[1], Mayank Trivedi[1]

[1] *Dept. of Orthodontics and Dentofacial Orthopedics, Rajarajeswari Dental College and Hospital, Bangalore, Karnataka, India*

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ABSTRACT

Class III malocclusion is one of the most difficult problems to treat. It has a multifactorial etiology involving both genetic and environmental causes. The dental and skeletal effects of maxillary protraction with a facemask are well documented in several studies. Although incorporation of expansion appliance along with facemask therapy can improve correcting both sagittal and transverse discrepancy of maxilla. The following case shows early treatment of a 9 year old boy with maxillary deficiency using an expansion screw along with facemask. Facemask therapy was followed by fixed orthodontic treatment to settle the occlusion. Treatment was completed after 14 months with positive overjet, class I molar and canine relationship on right and left side.

1. Introduction

The etiology of class III malocclusion is multifactorial, involving both genetic and environmental factors.[1] it is very critical to make a decision as the timing of early treatment is crucial for a successful outcome. Some studies have reported that early treatment should be carried out in patients to enhance the orthopedic effect.[2,3] moreover, an early benefit in terms of esthetics implies improved self-esteem, considering the psychological factor of the child. Facemask is one of the most commonly used interceptive tools to intercept developing skeletal class III malocclusion due to deficient maxilla.[4]

2. Case History

A 9 years old male patient reported with the chief complaint of decreased visibility of upper front teeth. Extraoral examination showed a deficient mid face, and a concave lateral profile (Figure 1) and intraoral examination shows maxillary and mandibular anteriors in crossbite relation with 2 mm of reverse overjet and 4 mm of overbite along with ankyloglossia. (Figure 2) cephalometric examination revealed true skeletal class III malocclusion with retrognathic maxilla and average mandible. (Figure 3)

3. Treatment Objectives

Stage 1: To correct reverse overjet and to improve the facial profile with a bonded protraction plate with hyrax expansion screw followed by facemask therapy.
Stage 2: To settle the occlusion with fixed orthodontic therapy.
Stage 3: To retain the results achieved.

Bonded protraction plate using clear acrylic was made incorporating 0.9 mm hyrax expansion screw and hooks between canine and first deciduous molar for engaging elastics from facemask, protraction plate was cemented using luting glass ionomer cement. Hyrax screw was activated as two turns per day for seven days. (Figure 4)

Following expansion protocol, patient was asked to wear the petit type of facemask daily for 14 hours engaging 5/16" elastics from the horizontal crossbar of facemask exerting heavy forces on the craniofacial segment of about 16 oz for about 14 h daily. (Figure 5)

* *Corresponding author.*
E-mail address: pooja313.u@gmail.com (Pooja U).

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The patient was monitored every 2 weeks for initial 2 months, followed by every 1 month. After 1 month of facemak therapy an edge-to-edge bite was observed. Correction of reverse overjet and improved facial profile was achieved in 5 months, after that patient was asked to continue the use of facemask and protraction plate for desired overcorrection of maxillary protraction for another 4 months. (Figures 6 and 7) cephalometric changes achieved are listed in Table 1. (Figure 8)

Stage 2 treatment was started with fixed orthodontic treatment after removal of the protraction plate with hyrax. MBT 0.022 slot brackets were used and alignment started with 0.016 NiTi archwire. This guided the eruption of premolars and in settling the occlusion with ideal overjet, overbite, class I molar, and canine relation bilaterally. (figure 7) Tongue tie was released with soft tissue diode laser (0.8w, 980nm). (Figure 8)

Retention protocol followed was upper wraparound retainer and lower canine to canine bonded lingual retainers. Periodic follow up was instructed and they were also informed that unpredictable mandibular growth could create the need for a new intervention and potential orthognathic surgery during adulthood.

Table 1: Pre and post-treatment cephalometric values

Measurements	Normal	Pre-treatment	Post-treatment
SNA (°)	82±2	77	80
SNB (°)	80±2	83	82
ANB (°)	2	6	2
N perpendicular to A (mm)	0±2	-6	-3
U1 to SN (°)	102	108	114
IMPA (°)	95	90	94
SN to MP (°)	32±4	27	30
FH to MP (°)	25±4	21	23

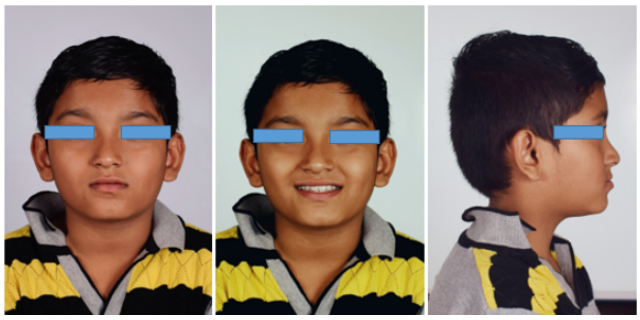

Fig. 1: Pretreatment: Extra oral photographs

4. Discussion

We have chosen facemask with RME therapy for achieving maxillary skeletal protraction. Haas[5] has mentioned in

Fig. 2: Pretreatment: Intra oral photographs

Fig. 3: Pretreatment: lateral cephalogram

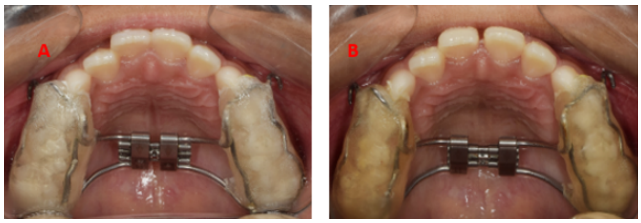

Fig. 4: A: Hyrax expander in place **B:** Hyrax expander after one week of activation

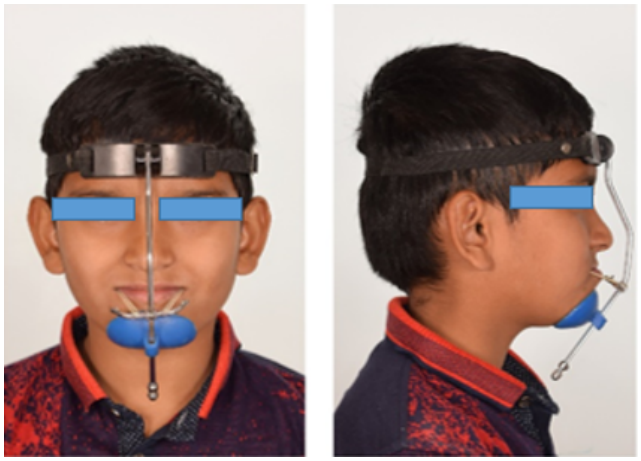

Fig. 5: Petit type facemask in place

Fig. 6: Intra oral photographs after nine month of facemask therapy

Fig. 7: Post- facemask therapy: Extra oral photographs

Fig. 8: Post-facemask therapy: Lateral cephalogram

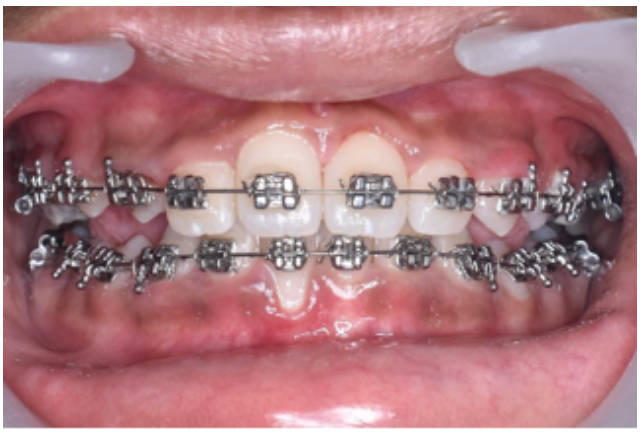

Fig. 9: Fixed orthodontic treatment

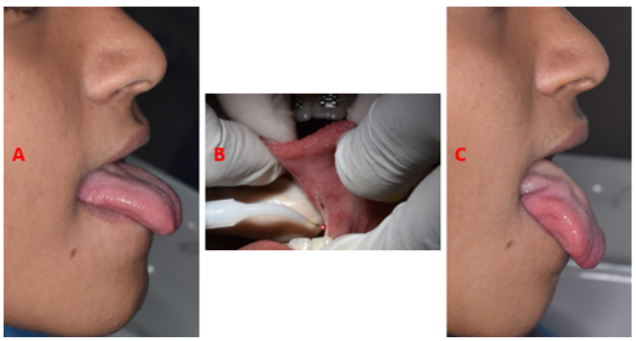

Fig. 10: Surgical correction of tongue tie A: Extent of tongue before surgery; B: Laser assisted lingual frenectomy; C: Extent of tongue after surgery

his article that rapid palatal expansion alone can advance the maxilla. A follow-up study by wertz et al.[6] found that maxillary advancement due to rapid palatal expansion treatment is limited and unpredictable. So combining RME with facemask therapy was beneficial in correcting maxillary deficiency in growing children[7] and an effective result was obtained in our study. As anchorage was taken from the forehead and chin face mask therapy not only advances maxilla but also prevents forward growth of mandible during the treatment period.

SNA angle has increased from 77^0 to 80^0 and ANB angle from 6^0 to 2^0 without much proclination of upper anteriors. A 3^0 increase in mandibular plane angle was observed this would be the result of downward and forward movement of maxilla.

The release of tongue tie will improve the tongue movement and skeletal class III tendency in the future.[8] Early diagnosis of malocclusion and its treatment is essential for the psychological development of a child and also to avoid complicated treatment procedures in future.

5. Conclusion

Facemask with RME is an effective treatment option for the management of skeletal class III malocclusion due to maxillary deficiency in an early age group. However, further follow-up of the patient is required as the mandible still continues to grow as he an adolescent.

6. Source of Funding

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7. Conflicts of Interest

There are no conflicts of interest.

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Author biography

Pooja U, Post Graduate Student

Naveen Aravind, Post Graduate Student

Rajkumar S Alle, Principal, Professor & HOD

Lokesh NK, Reader

Mayank Trivedi, Senior Lecturer

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