Facemask Therapy With Alt-RAMEC Approach To Correct Skeletal Class III Malocclusion

Case Report

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ABSTRACT

Class III malocclusion is one of the most challenging problems to treat in the mixed dentition. The etiology involves both genetic and environmental causes. With adults, orthognathic surgery and dental camouflage is the viable treatment option. Although treatment in the late mixed or early permanent dentition can be successful, results are generally better in the deciduous or early mixed dentition. A variety of treatment alternatives exists for patients in the developing stages of a Class III malocclusion. The following case shows early treatment of a young patient with Angle's class I malocclusion superimposed with class III skeletal jaw basis with severe sagittal and transverse discrepancy of the maxilla and mandible, using a facemask.

KEY WORDS

Class III malocclusion, Anterior crossbite, Alt-RAMEC approach

Class III malocclusion is associated with a deviation in the sagittal relationship if maxilla and mandible, defined by a deficiency and/or a backward position of the maxilla, or by prognathism and/or forward position of the mandible. It has been estimated that 1 to 5% of the Caucasian population has this malocclusion. Prevalence in Asian populations ranges from 9 to 19%. According to reports, prevalence in the Indian population is at 3.4%.[1] Several factors including genetics, ethnicity, environmental and habitual have been implicated in the etiology of this malocclusion.

Early techniques for the management of class III malocclusion centred on severely restricting the growth of the mandible. Delaire reintroduce facemask therapy for maxillary protraction in 1976, it is more than a century after it was first described in Germany. Petit[2] modified the facemask of Delaire by increasing the amount of force and shortening the treatment period. McNamara[3] suggested that rapid maxillary expansion (RME) may enhance the protraction effect of maxillary suture system. In the last two decades, RME and facemask combination has become the standard protocol in the management of growing patient with maxillary deficiency.[4] It has been reported that the amount of maxillary protraction was 5-6 mm in 5 months under the protocol of alternate rapid maxillary expansion and treatment done using facemask and expansion with Alt-RAMEC approach in young patients.[5]

Diagnosis and etiology

A 10 years and 11 months old female patient presented with the chief compliant of forwardly placed lower front teeth with Angle's class I Dental malocclusion superimposed on class III skeletal jaw basis.

Extra oral finding showed concave profile with anterior divergence, average clinical FMA and average nasolabial angle. (Figure 1)

Intra oral findings suggested Angle's class I molar relationship bilaterally with class III incisor relationship with negative overjet of 2 mm and overbite of 4mm. Permanent incisors and first molars in both the arches were present and mandibular canines were erupting.

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Fig 1 Pre-treatment extra oral photographs

Fig 2 Pre-treatment extra oral photographs

Fig 3 Pre-treatment OPG and Lateral ceph

Fig 4 With Facemask and RME

PARAMETERS	PRE-TREATMENT	POST-FUNCTIONAL
MAXILLA		
SNA	75	78
N Perpendicular-Pt A (mm)	-5	-3
Angle of convexity	-13	-7
Midfacial length, Co-Pt A(mm)	71	78
MANDIBLE		
SNB	80	80
N Perpendicular-Pog (mm)	-1	-2
Effective mand. length, Co-Gn(mm)	97	104
Facial angle	90	89
MAXILLA-MANDIBLE		
Witts	BO 6mm ahead of AO	BO 3mm ahead of AO
ANB	-5	-2
VERTICLE		
FMA	21	23
GoGn Sn	27	28
Y-Axis	64	64
MAXILLARY INCISOR		
U1-NA (mm)	5	7
U1-NA	27	30
U1-SN	105	108
U1_PP	67	66
MANDIBULAR INCISOR		
L1-NB (mm)	3	-2
L1-NB	23	17
IMPA	91	84
L1-APog(mm)	4	2
SOFT TISSUES		
Nasolabial angle	90	88
H-angle	6	11
OTHERS		
Interincisal angle	131	139
Saddle angle	128	127
Articular angle	139	135

Fig 5 Post Functional extra oral photographs

Fig 6
intra oral photographs

Fig 7 Post Functional OPG and Lateral cep h

Deciduous maxillary canines and molars in maxillary and mandibular arch were also present. (Figure 2)

Cephalometric findings suggested retrognathic maxilla and orthognathic mandible with average inclination of upper and lower anterior teeth. (Figure 3)

Treatment objectives

The purpose of treatment was to correct the sagittal and transverse arch discrepancies through stimulation of maxillary growth and redirection of mandibular growth and to correct concave profile. To achieve class I canine relationship along with ideal overjet and overbite with coinciding midlines. And also to correct rotation and inclination of individual tooth. An alternative to this treatment was to delay fixed-appliance therapy until the permanent dentition had erupted. However, this plan would have required a camouflaged treatment at later stage.

Treatment plan

The treatment planning included the following assessment of growth potential: Average growth pattern with 65–85% growth remaining according to cervical vertebral maturation index. Skeletal maturity index showed stage 4.

The appliance included upper maxillary bonded splint with Hyrax expansion screw (9mm) and petit type facemask. In the first phase, Alt RAMEC approach was carried out for 8 weeks that is one week of opening the expansion screw and following week of closing the screw. The follow up was taken every week. In the second phase, Petit type of face mask was delivered with 3/8" 8oz elastics. (Figure 4) After two weeks elastics were changed to ½" 14oz and continued for another 14 days. Follow up was taken every two weeks. The appliance was worn full time (about 20 hours/day) for 11 months and then records were taken. The patient was retained using a Frankel-3 appliance (20 hours per day), with the patient removing the appliance only during activities such as eating and playing sports.

Treatment result

Patient compliance was excellent with both the facemask and the elastics. The patient displayed a bilateral end on molar relationship. The SNA angle had increased while SNB remained the same resulting in a normal jaw relationship (ANB = -2). Normal overbite (2 mm) and overjet (1mm) were achieved, and the midlines were centered. Buccal cross bite was corrected. The patient's face appeared symmetrical with competent lips. The esthetic balance was significantly improved in the lateral view and the lips were in a normal relationship. Cephalometric analysis confirmed that the concave profile had been straightened.

Discussion

The facemask therapy for the management of midface deficient class III malocclusion has conventionally been recommended in the deciduous and mixed dentitions. However, clinical corrections of the malocclusion has been shown to occur by a combination of skeletal and dental movements. The orthopaedic approach has a significantly lower cost and risk potential associated with making it an attractive alternative to surgery. We have chosen Facemask RME therapy for achieving maxillary skeletal protraction for correction of the patient's maxillary deficiency.

Conclusion

This case report shows that skeletal Class III malocclusion with maxillary deficiency in a growing individual can be successfully managed using the Alt-RAMEC approach with facemask procedure. Thus careful case selection, patient cooperation, and long-term stabilization ensure a treatment result that is successful, stable, and aesthetic.

References:

1) Surana A. IBO Case Report: Management of Skeletal Class III Malocclusion with Combined Rapid Maxillary Expansion: Facemask Therapy and 5-Year Follow-up. J Ind Orthod Soc 2012;46(4):216-222.

2) Petit H. Adaptations following accelerated facial mask therapy.

In: Clinical alteration of the growing face. McNamara, JA, Ribbens KA, Howe RP (Eds). Monograph 14, Center for Human Growth and Development, University of Michigan, Ann Arbor 1983

3) McNamara JA. An orthopedic approach to the

treatment of Class III malocclusion in young patients. J Clin Orthop 1987;21:598-608.

4) McNamara JA Jr, Brudon WL. Orthodontics and dentofacial orthopedics. Ann Arbor, Mich: Needham Press 2001;375-85

5) Wang YC, Chang PM, Liou EJ. Opening of circumaxillary sutures by alternate rapid maxillary expansions and constrictions. Angle Orthod 2009;79:230-4.