CASE REPORT

MANAGEMENT OF TRANSVERSE MAXILLARY DISCREPANCY AND ANTERIOR OPEN BITE IN HYPERDIVERGENT SKELETAL CLASS III CASE BY RME-FACEMASK THERAPY

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ABSTRACT

Treatment of the Class III malocclusion poses a challenge to the clinician. The timing of treatment varies from early intervention during the pre-pubertal stages of growth, to intervention after the patient has completed their active growth. The treatment modalities range from dentofacial orthopaedic treatment, to camouflage orthodontic treatment, to a combined orthognathic surgical and orthodontic approach. The present case report shows early treatment of a young female patient with severe transverse and sagittal discrepancy of the maxilla and mandible, using a facemask.

KEYWORDS

Class III malocclusion, orthopaedic, facemask.

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INTRODUCTION

The dentofacial disharmony associated with Class III malocclusion is challenging from both the diagnostic and the treatment aspects. Class III malocclusion is characterized by deviation in the sagittal relationship of the maxilla and the mandible caused by a deficiency and/or a backward position of the maxilla, or by prognathism and/or forward position of the mandible.[1] In Asian societies, the frequency of Class III malocclusion is higher due to a large percentage of patients with maxillary deficiency. The incidence of this malocclusion in the white population has been reported to be 1% to 5%.[2-4] In the Asian populations, however, the incidence ranges from 9% to 19%[5-7].

Different treatment modalities have been advocated for treatment of Class III malocclusion. They include early orthopaedic treatment using protraction facemask or chin cup therapy, orthodontic camouflage or combined surgical /orthodontic approach for patients with severe skeletal discrepancies. Early treatment of Class III malocclusion has been advocated to avoid complications like gingival recession with relation to lower incisors,[8] compromised dental and facial esthetics,[9] eliminating an anterior functional shift of the mandible,[10] and decreasing the chances of later orthognathic surgery.[11] Orthopaedic treatment is usually carried out in children with active growth, with a goal of obtaining maximum skeletal and minimum dental change.

The present case report shows treatment of a young female patient with transverse and sagittal discrepancy of the maxilla and mandible, using a facemask therapy.

CASE REPORT

Diagnosis

A 13-year-old female reported to the department with the chief complaint of forwardly placed lower jaw.

Extra oral examination revealed mesoprosopic face type with concave profile and potentially competent lips with an interlabial gap of 3 mm was present.

On intraoral examination, patient was in permanent dentition with all teeth present except third molars. There was anterior and posterior cross bite with negative overjet of 0.5

mm. There was an anterior open bite of 2 mm (Figure 1). She had apparently symmetrical maxillary and mandibular arch forms with the molars and canines in Class III relationships. Centric relation, as determined by mandibular manipulation, was coincident with centric occlusion, suggesting a true Class III malocclusion rather than a pseudo-Class III.

TREATMENT OBJECTIVES

The treatment objectives were as follows.

(I) Correction of anterior and posterior cross bites.

(ii) Leveling and aligning both the Arches.

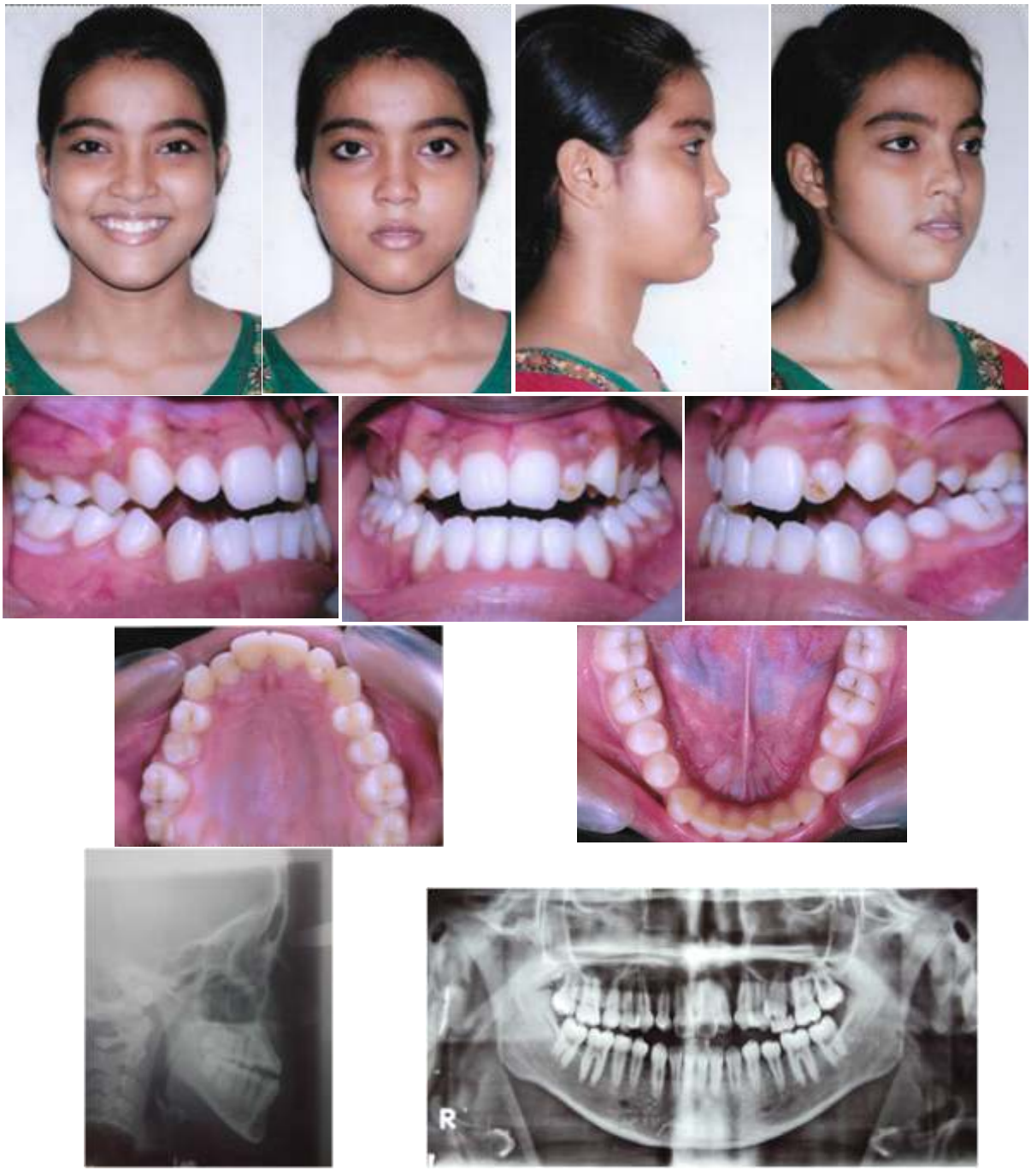
(iii) Correction of anterior open bite.

(iii) Correction of molar relation on both sides from Class III to Class I occlusion.

(iv) Stable Class I canine.

(v) Achieving lip competency.

FIGURE 1-PRE TREATMENT RECORDS



TREATMENT PLAN

To correct the vertical and anteroposterior maxillary deficiency, it was decided to protract the maxilla using a facemask while simultaneously expanding it using RME device for correction of transverse discrepancy and disruption of the maxillary suture system and facilitating maxillary protraction, followed by finishing and detailing with fixed orthodontic appliance. In anticipation of late mandibular growth which may offset the treatment changes, Frankel III appliance was planned for retention phase.

TREATMENT PROGRESSION

Initially hyrax screw (leone 11 mm) was given for maxillary expansion and opening of sutures and patient was advised to activate quarter turn twice a day12 for 2 weeks and petit type facemask was delivered along with 8 ounce extroral elastics for 1 month followed by 14 ounce elastics for another 9 months. Patient compliance was excellent with both the facemask and the elastics. After that fixed mechanotherapy was started in PEA technique. Initial alignment started with 0.016 round NiTi wires followed by sequential 0.017 × 0.025 rectangular NiTi and SS wires and case was finished in 0.019 × 0.025 SS wires. Fixed treatment was completed in one and a half year period (Figure-2). Frankel III appliance was given as a retention appliance.

TREATMENT RESULTS

At the end of treatment, patient displayed a bilateral Class I canine relation and a Class I molar relationship (Figure 3). The arch forms were symmetrical and well aligned. The SNA angle had increased while SNB decreased resulting in a normal jaw relationship (ANB = 1°)(Table- 1). Overbite (1?mm) and overjet (1?mm) were achieved, and the midlines were coinciding. Vertical skeletal measurements remained near-constant (FMA and Gonial angle increased by 1°). Posterior crossbite was corrected. The patient's face appeared symmetrical with competent lips. The esthetic balance was significantly improved in the lateral view and the profile of patient was straightened.

DISCUSSION

Many studies have demonstrated the importance of early treatment in Class III patients.8-11 RME Facemask therapy is the best for achieving maxillary skeletal protraction, redirecting mandibular growth

FIGURE 2 – MID TREATMENT PICTURES WITH RME & FACEMASK

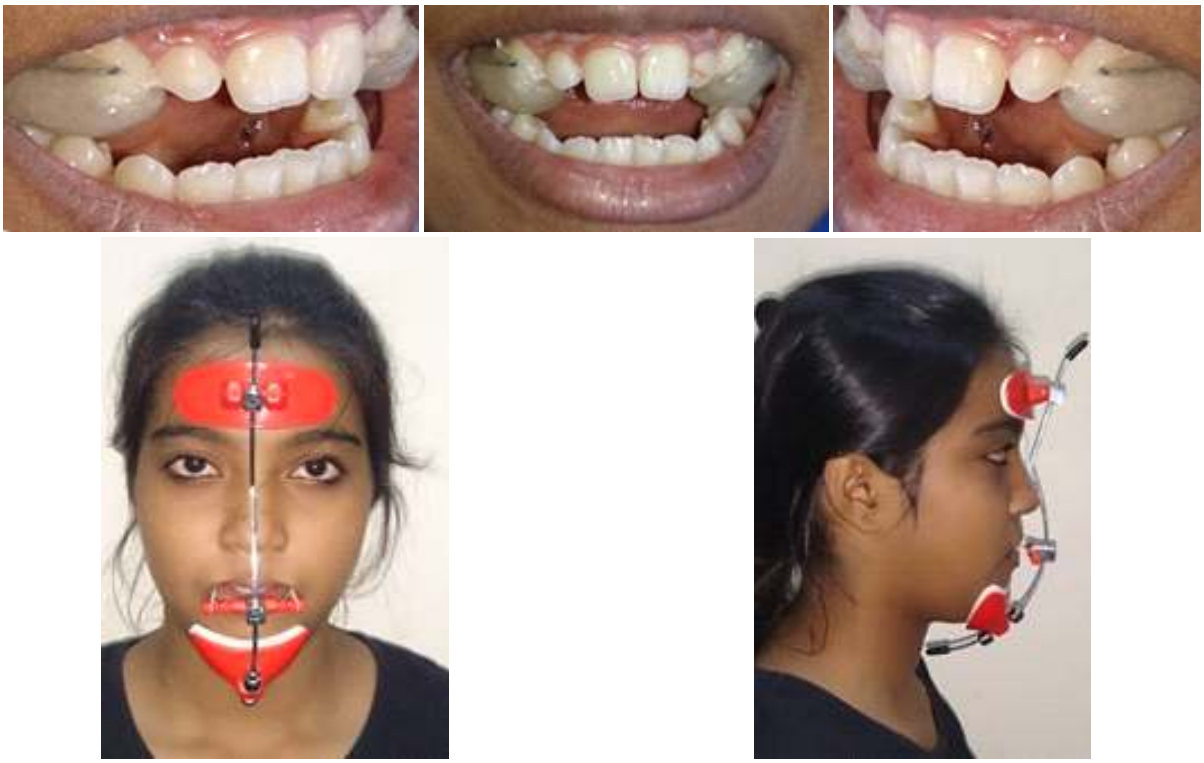


FIGURE 3 - POST TREATMENT PHOTOGRAPHS

FIGURE 4 – PRE, MID & POST CEPHALOGRAMS

FIGURE 5 SUPERIMPOSITION

Table-1

Parameter	Pre treatment	Post treatment
SNA	78	79
SNB	80	78
ANB	-2	1
WITS APPRAISAL	-4	--1
ANGLE OF CONVEXITY	-2	0
GONIAL ANGLE	138	139
Y AXIS	65	66
FMA	37	38
IMPA	78	76
UPPER LIP TO S LINE	-1 mm	0 mm
LOWER LIP TO S LINE	2.5 mm	1.5 mm

in downward and backward direction and aids in correction of skeletal class III cases obscuring the need for orthognathic surgery. Maxillary protraction is recommended for patients with skeletal Class III malocclusion and maxillary deficiency.

The application of protraction facemask therapy to the maxilla and the maxillary dentition produces significant tension in the circummaxillary sutures and the maxillary tuberosity regions. The tension produced within the sutures is thought to cause an increase in vascularity in the region with a concomitant differentiation of the cellular tissues resulting in an increase in osteoblastic activity in the region[13-14]. The sutures that take part in this process involve the Frontomaxillary, nasomaxillary, zygomaticomaxillary, zygomaticotemporal, pterygopalatine, intermaxillary, ethmomaxillary and the lacrimomaxillary sutures.[15]

Most of the studies on the effects of posteroanterior traction of the maxillary complex in Class III patients have demonstrated that improvement in intermaxillary sagittal skeletal relationships was associated with an increase in vertical skeletal relationships which can be particularly unfavorable in hyperdivergent Class III patients. But, in recent studies, the vertical skeletal features do not influence the short term outcomes of RME/FM therapy16. As in our case, vertical measurements did not show any marked difference.

Wells[17] reported that the failure rate for correction of Class III malocclusion with RME/FM at 5 year recall was 20%, and it increased to 25% at 10 year recall. Late mandibular growth was the primary contributing factor. Frankel III appliance18 is advocated as a retention appliance to ensure success after correction in hyperdivergent class III cases.

CONCLUSION

RME Facemask therapy gives excellent results in growing class III malocclusion subjects by redirecting growth of maxillary complex and mandible obscuring the need for surgery. So it should be considered as a treatment option in growing class III subjects.

Conflict of interest

The authors declare that there is no conflict of interests regarding publication of this paper.

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