

Treatment of a Skeletal Class III Case in a Growing Patient with Face Mask Therapy

Dr. Vrinda M¹, Dr. Irin Sebasatian², Riswana A.M.³,
Dr. Gopikrishanan⁴, Dr. Pradeep Philip George⁵, Dr. Jibin Skaria⁶

^{1,2}Postgraduate
Department of Orthodontics
Annoor Dental College & Hospital, Muvattupuzha

³Postgraduate
Department of Pedodontics
Annoor Dental College & Hospital, Muvattupuzha

⁴Professor & HOD
Department of Orthodontics
Annoor Dental College & Hospital, Muvattupuzha

⁵Professor
Department of Orthodontics
Annoor Dental College & Hospital, Muvattupuzha

⁶Senior Lecturer
Department of Orthodontics
Annoor Dental College & Hospital, Muvattupuzha

Abstract

A developing Skeletal Class III can be one of the most challenging problem for Orthodontists. In Skeletal Class III cases, early treatment is preferred as growth can be favourably altered during this growing stage. After growth ends, orthognathic surgery is the only remaining option for Skeletal Class III correction.

The following is a case report of a successful treatment of developing Skeletal Class III malocclusion with maxillary deficiency in a 13 year old female patient in late mixed dentition. The treatment objective was to achieve a more esthetically harmonious facial profile by correcting the Skeletal Class III. The treatment plan included implementing a reverse pull Petit type face mask with anterior expansion in order to protract the maxilla. The results showed a significant improvement in Class III skeletal relationship and facial profile.

INTRODUCTION

Skeletal Class III with maxillary deficiency is one of the most difficult problems to treat in the mixed dentition period. It has multifactorial etiology, which include both genetic and environmental causes.¹ Maxillary deficiency may occur as a result of skeletal or dental discrepancies and is a source of esthetic and functional impairment to the individual. Since maxillary deficiency is the most prevalent type which require orthognathic surgery, early treatment of this discrepancy is of paramount importance as it can minimize or even avoid surgeries at a later stage.² This case report presents the use of face mask with anterior expansion screw for the successful management of maxillary deficiency in a 13 year old patient.

DIAGNOSIS:

A 13 year old female patient reported with her parents with the chief complaint of irregularly placed upper and lower front teeth. No relevant pre and post-natal history or family history was reported. On extraoral examination, the patient showed an orthognathic profile and straight divergence with deficiency in maxillary projection. Her lower lip was positioned ahead of the upper lip. She had an average nasolabial angle and mentolabial sulcus. Her smile was unesthetic, revealing 7mm of upper incisors. Intraoral examination showed the patient to be in a mixed dentition stage with anterior crossbite in relation to 12, 21, 32, 33, 42, posterior open bite and crowding in upper and lower anteriors. The first molars were in a super Class I relation on both sides





and incisors are in a class III relation. In OPG, full set of complement teeth were present except 18 and 28 and primary teeth 53, 54 and 65 were present. Pre-treatment cephalogram showed CVMI stage 4 indicating deceleration stage. Hand wrist radiograph showed SMI stage 4.

Cephalometric analysis indicated skeletal Class III jawbase, due to retrognathic maxilla, with a vertical skeletal pattern. The upper incisors were proclined and the lower incisors did

not show proclination. The upper lip was normally positioned and the lower lip was positioned forward with respect to the Steiner's S-line. No mandibular deviation on closure or clicking of the TMJ was observed.

TREATMENT OBJECTIVES:

The treatment objectives were:

- ❖ To improve the skeletal jaw relationship by increasing the length of maxilla and pro-

tracting the maxilla anteriorly in relation to the cranium.

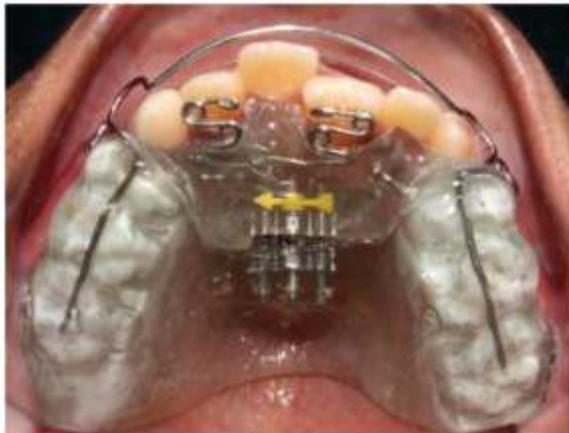
- ❖ To allow adequate space for eruption of permanent teeth.
- ❖ To achieve well-aligned maxillary and mandibular arches.
- ❖ To achieve positive overjet.
- ❖ To relieve upper and lower anterior crowding.
- ❖ To correct proclined upper incisors, posterior open bite and crossbite in 12,21,32,33,42.
- ❖ For correction of protruded lower lips.

TREATMENT PLAN:

To correct the skeletal Class III with

anteroposterior maxillary deficiency, it was decided to protract the maxilla using a reverse pull Petit type facemask with intraoral splint while simultaneously expanding it anteriorly using jack-screw as it disrupts the maxillary suture system and promotes maxillary protraction. Z-springs were incorporated in relation to 12 and 21 for correction of the cross bite. After the desired skeletal correction is obtained, fixed orthodontic therapy will be done after the eruption of all permanent teeth.

The intraoral splint had hooks incorporated on the buccal aspect at the position of the deciduous canines to engage the elastics for a facemask. This appliance was cemented in place, in the patient's mouth. The screw was activated one turn daily for a period of 10 days. The patient was advised to wear the



appliance daily for 14 hours. The direction of pull was 15 mm above and 20-30° below occlusal plane.

TREATMENT RESULTS

Patient compliance was excellent with both the facemask and the elastics. The anterior cross bite was corrected. The patient exhibited excellent frontal and profile esthetics. The smile was esthetic and the patient and parents were satisfied with the treatment results.

DISCUSSION

Class III malocclusions are associated with

maxillary retrognathism, mandibular prognathism or a combination of both. Numerous studies have demonstrated the importance of early treatment in maxillary deficiency patients. For most of the skeletal Class III patients with maxillary deficiency seen in the early mixed dentition or late deciduous dentition, Facemask is the customary choice.

Here, we have chosen Facemask therapy for achieving maxillary skeletal protraction. Jack-screw was also incorporated in the intraoral splint to achieve anterior expansion. Z-springs were incorporated in relation to 12 and 21 to correct the cross bite.



According to Itoh et al³ and Hata et al⁴, there was a possibility of anterior maxillary constriction when the maxilla was protracted. This was also counteracted by palatal expansion appliances. A recent study by Kim et al⁵ involving a meta-analysis on 440 articles relating to Class III malocclusion confirmed that the results of maxillary protraction were similar in both expansion and non-expansion group and the average duration was much higher in the non-expansion group. Thus the expansion appliance resulted in faster improvement in the treatment compared to the non-expansion group.

An in vitro study with a 3-D finite element method showed that an anteriorly directed force when applied to the buccal surfaces of the maxillary first molar with a downward pull from 30-45° to the occlusal plane gave the most translatory effect.⁶ The treatment effects of the protraction facemask therapy were a combination of skeletal and dental changes of the maxilla and mandible.

As the result of protraction force, the maxilla moved downward and forward with a slight upward movement in the anterior and downward movement in the posterior with a slight extrusion of the posterior teeth. As a result the downward and backward rotation of the mandible improved the maxillomandibular skeletal relationship in the sagittal dimension but lead to an increase in the lower facial height. This rotation was a major contributing factor in the establishment of a positive anterior overjet.⁷

Hence, Skeletal Class III cases should be corrected at the earliest, to permit the growth redirection, especially when the primary etiologic factor is the maxilla or when dental/functional factors are involved.

CONCLUSION

This case report shows that skeletal Class III with maxillary deficiency in a growing individual can be successfully managed using

facemask therapy with jack-screw for anterior expansion. Thus, careful case selection, patient cooperation and long-term stabilization ensures a successful treatment result.

REFERENCES

1. Pattanaik S, Mishra S. Treatment of Class III with facemask therapy. Case reports in dentistry. 2016 Jan 27;2016.
2. Muthukumar K, Vijaykumar NM, Sainath MC. Management of skeletal Class III malocclusion with face mask therapy and comprehensive orthodontic treatment. Contemporary clinical dentistry. 2016 Jan;7(1):98.
3. Itoh T, Chaconas SJ, Caputo AA, Matyas J. Photoelastic effects of maxillary protraction on the craniofacial complex. Am J Orthod. 1985; 88(2):117-24.
4. Hata S, Itoh T, Nakagawa M, Kamogashira K, Ichikawa K, Matsumoto M, Chaconas SJ. Biomechanical effects of maxillary protraction on the craniofacial complex. Am J Orthod Dentofacial Orthop 1987; 91:305-11.
5. Kim JH, Viana MA, Graber TM, Omerza FF, BeGole EA. The effectiveness of protraction face mask therapy: a meta analysis. Am J Orthod Dentofacial Orthop 1999; 115(6):675-85.
6. Tanne K, Hiraga J, Sakuda M. Effects of directions of maxillary protraction forces on biomechanical changes in craniofacial complex. Eur J Orthod. 1989; 11(4):382-91.
7. Singh K, Verma VK, Panda S, Sachan A. Management of skeletal Class III malocclusion in an early mixed dentition with face mask therapy: A case report. J Dent Res Updates. 2014;1(1):55-60.