

TREATMENT OF SKELETAL CLASS III MALOCCLUSION WITH FACEMASK THERAPY- CASE REPORT

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Abstract

Orthopedic correction of skeletal Class III malocclusion in a growing patient is crucial as it can circumvent future surgical procedures. Further, as surgery is done only at a later stage, early treatment helps to avoid the detrimental effects produced by the facial disfigurement on the patient's social life. This case report describes the treatment of a child aged 9 years 6 months who had a skeletal Class III malocclusion. Patient's facial profile was concave with anterior facial divergence. Intra oral examination depicted reverse overjet along with mesial step molar relation. The treatment plan involved the use of a reverse pull headgear (facemask). The patient was treated with RME along with face mask therapy for six months period. After six months, significant improvement was recorded in patient's facial profile with correction of skeletal class III malocclusion.

Key words: Class III malocclusion, Facemask, Maxillary expansion

Class III malocclusion most commonly occurs due to maxillary deficiency or excessive growth of mandible. Class III malocclusion is growth related problem and become more severe and difficult to treat if left untreated in the early ages.¹ Treatment modalities vary depending upon developing and developed class III malocclusion. Facemask therapy, Reverse twin block, Class III bionator and chin cup are used to intercept the developing class III malocclusion. Camouflage and Orthognathic surgery are treatment strategies for developed class III malocclusion. Prevalence rate of class III malocclusion is less as compared to class II and class I malocclusion². Edge to edge bite, reverse or negative overjet, cross bite, flaring and protrusion of lower anteriors, mesial step molar relation, and class III molar relation are some important dental findings seen in class III malocclusion patients. In the mixed dentition period, especially in maxillary deficiency cases, facemask therapy is the treatment of choice for class III malocclusion.

The present case report describes the early management of class III malocclusion using RME with facemask therapy in 9 year old female patient.

Case report:

A 9-year-old healthy female patient reported with the chief complaint of forward placement of lower front teeth as compared to upper front teeth with large lower jaw. The etiology was genetic with a history of consanguineous marriage.

On extra oral examination, patient's facial profile was concave, anterior divergent face and obtuse nasolabial angle. Lower lip was positioned ahead of the upper lip (*figure 1*).

On intraoral examination. all hard tissues and soft tissues appeared to be normal with presence of 11,12,53,14,55,16,21,22,24,65,26,41,42,83,46,31, 32,36. occlusion relationship was mesial step molar relation bilaterally with reverse overjet of 3 mm and anterior cross bite in relation to 11,12, 53, 21, 22 (*figure 2*). The patient was advised for orthopantomogram, and lateral cephalogram (*figure 3*).

Cephalometric analysis showed a Class III sagittal relationship ANB=-3°, AO-BO = -5.5 mm) with a retrognathic maxilla (SNA = 79°, N perp to A = -2.5 mm), and prognathic mandible (SNB = 84°). Lower lip was positioned ahead of the upper lip with respect to Rickett's Esthetic plane (UL-E line)

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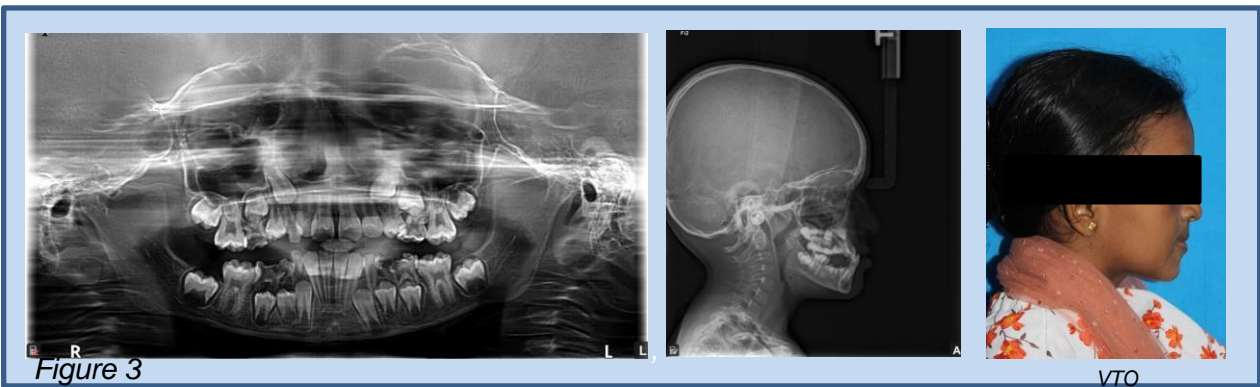
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Diagnosis

Angle's class III malocclusion on class III skeletal base, with anterior crossbite with respect to 41,42,31,32 increased overbite and reverse overjet distolabial rotation of 16,26,31,32,42 palatally placed 12 with average growth pattern and competent lips.

The patient had class III skeletal malocclusion with retrognathic maxilla and prognathic mandible

of treatment can be a successful alternative to surgery or premolar extractions. A post facemask fixed appliance therapy is required in this case to settle the occlusion and crossbite with respect to 12 has to be corrected. Maxillary protraction appliance is indicated in case where retarded maxillary growth is a major component of class III malocclusion



Figure 4

Treatment objectives

- (1) obtaining ideal aesthetics
- (2) skeletal class III correction
- (3) correction of molar and canine relationships
- (4) obtaining ideal overjet and overbite

The patient was treated with face mask with jackscrew (figure 4). The expansion screw was activated 2 turns / day for the 1st week and one turn was advised thereafter till desired amount of expansion was achieved. The protraction elastics was attached to hooks placed buccal to the maxillary canines with a downward and forward pull of 20° to the occlusal plane. patient was instructed to wear facemask for a duration of 14 hours per day and to change the elastics daily.

Discussion

The case reported shows that early management of class III malocclusion with a combination of rapid maxillary expansion and facemask is very effective. In properly selected cases, this modality

Protraction appliance with expansion appliance has been used for early orthopaedic intervention of class III malocclusion

Early mixed dentition period is ideal for facemask therapy.⁵ The ideal timing of facemask therapy as summarized by various authors are given in Table 1. Facemask was used in the present case report. It consists of a forehead cap and chin cup with a stainless-steel rod running into the midline connecting forehead cap to chin cup. A crossbar at the level of mouth is used to engage the extra oral elastics

Elastics that delivered 500g of force per side as measured by Dontrix gauge. In the first week of facemask therapy, force level was 150g on each side then it was increased to 300g in second week on each side and maintained for next 6 months.

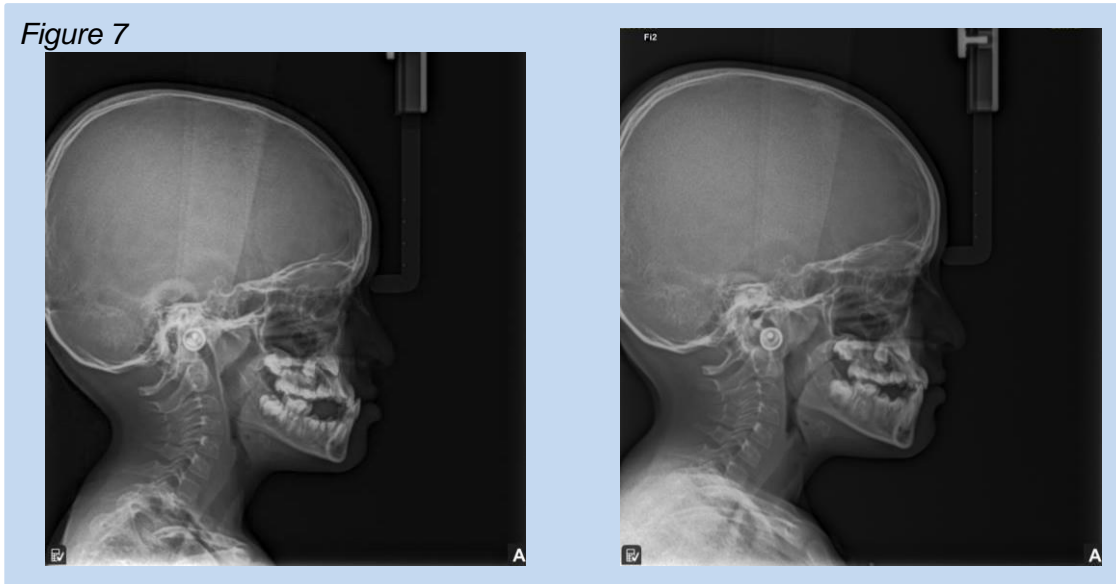
Correction of anterior tooth crossbite, ideal skeletal relationship was achieved with significant improvement of patient profile after 6 months of facemask therapy (figure 5,6,7)

Table 1: Optimum time to start facemask therapy

Authors	Optimum time to start facemask therapy
Bacetti, Mc Gill, Franchi, McNamara ⁸ .	Early mixed dentition.
Baik ¹¹	Face mask/expansion therapy in younger children was not significantly different from older children
Kim, Viana, Graber ¹²	Before the patient is 10 years of age.
Takada ¹³	Pre and mid pubertal group showed significant increase in SNA and maxillary length, while late pubertal group showed only a less significant increase in SNA.
Kapust ⁹	4 to 7 and 7-10 age group responded better to treatment than 10-14 age group.
Franchi, Bacetti ¹⁴	Early mixed or late deciduous dentition produces significant favourable modifications in both maxillary and mandibular structures, whereas late treatment (late mixed dentition) induces only a restriction of mandibular growth.
William Proffit ⁴	The optimal time to intervene a class III malocclusion is when incisors erupt



Figure 7



Pre treatment

Post treatment

Slow maxillary expansion was used along with facemask therapy in this case. Several circummaxillary sutures play an important role in the development of the nasomaxillary complex including the frontomaxillary, nasomaxillary, zygomaticotemporal, zygomaticomaxillary, pterygopalatine, intermaxillary, ethmoidomaxillary and lacrimomaxillary suture.¹⁵ These sutures are patent till eight years of age. Patients in the primary and early mixed dentition do not require maxillary expansion for protraction. However, by the late mixed dentition period, maxillary sutures become tortuous and fuse. The use of an expansion appliance helps in “disarticulating” the maxilla and initiate cellular response in the circummaxillary sutures thus allowing for a more positive reaction to protraction forces.

Tanne K, et al. reported that 45° to 30° downward pull in facemask therapy gave more translatory effect.⁶

Ngan PW, et al. reported that 30° angulation pull was sufficient to give a more positive response.⁷

Baccetti T, et al. reported that early mixed dentition period is the correct age for facemask therapy.⁸

Kapust AJ, et al. reported that 4-7 years and 7-10 years age group responded better to facemask treatment than 10-14 years age group.⁹

Kim JH, et al. reported that before 10 years of age time is correct for facemask therapy.¹⁰

William Proffit reported that correct time to treat growing class III malocclusion cases is when the incisors erupt.⁴

Class III malocclusion is a growth related problem so long term monitoring of growth is still required in early correction using facemask therapy. The patient is still being monitored for long term stability.

Conclusion

The case focuses on early management of class III malocclusion, thus providing normal skeletal, dental development along with psychological development, in later ages. Class III patients with maxillary deficiency can be treated using appliances such as the protraction facemask to eliminate anterior crossbite, CO/CR discrepancy, and maximize the growth potential of the Nasomaxillary complex. Ideally, treatment using protraction facemask is done during 6-8 years. Combination of maxillary expansion with the use of protraction appliance will increase the amount of skeletal effect.

References

1. Kharbanda OP. Orthodontics-Diagnosis and Management of Malocclusion and Dentofacial deformities Elsevier II edn. 2013: 786.
2. Halicioğlu K, Yavuz I, Ceylanç I, Erdem A. Effects of face mask treatment with and without rapid maxillary expansion in young adult subjects Angle Orthod. 2014; 84: 853-61.
3. Solano-Mendoza B, Iglesias-Linares A, Yañez-Vico RM, Mendoza-Mendoza A, Alió-Sanz JJ, Solano-Reina E. Maxillary protraction at early ages The revolution of new bone anchorage appliances J Clin Pediatr Dent. 2012; 37: 219-29.
4. Proffit W. Contemporary Orthodontics 4th edition Elsevier. 2007.
5. Turley PK. Managing the developing class III malocclusion with palatal expansion and facemask therapy Am J Orthod Dentofacial Orthop. 2002; 122: 349-52.
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: 382-91.
7. Ngan PW, Hagg U, Yiu C, Wei SH. Treatment response and long-term dentofacial adaptations to maxillary expansion and protraction Semin Orthod. 1997; 3: 255-64.
8. Baccetti T, McGill JS, Franchi L, McNamara JA Jr, Tollaro I. Skeletal effects of early treatment of class III malocclusion with maxillary expansion and face mask therapy Am J Orthod Dentofacial Orthop. 1998; 113: 333-343.
9. Kapust AJ, Sinclair PM, Turley PK. Cephalometric effects of face mask/ expansion therapy in Class III children: a comparison of three age groups Am J Orthod Dentofacial Orthop. 1998; 113: 204-212.
10. Kim JH, Viana MA, Graber TM, Omerza FF, BeGole EA. The effectiveness of protraction face mask therapy: A meta-analysis Am J Orthod Dentofac Orthop. 1999; 115: 675-685
11. Baik HS. Clinical results of the maxillary protraction in Korean children. Am J Orthod Dentofacial Orthop 1995;108:583-592.
12. Jeong-Hwan Kim, Marlos A.G. Viana, Tom M. Graber, Frank F. Omerza, Ellen A. BeGole. The effectiveness of protraction face mask therapy: A meta-analysis. Am J Orthod Dentofac Orthop 1999;115:675-85.
13. Takada K, Petdachai S, Sakuda M. Changes in dentofacial morphology in skeletal Class III children treated by a modified maxillary protraction headgear and a chin cup: a longitudinal cephalometric appraisal. Eur J Orthod 1993;15(3):211-21.
14. Franchi L, Baccetti T, McNamara JA. Post-pubertal assessment of treatment timing for maxillary expansion and protraction therapy followed by fixed appliances. Am J Orthod Dentofacial Orthop 2004;126:555-68.
15. Ngan P: Treatment of Class III malocclusion in the primary and mixed dentition. In Bishara S. Textbook of Orthodontics. Saunders,2003:375-414

Conflict of Interest: None Declared