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RESEARCH ARTICLE

BEAUTY BEHIND THE MASK – EARLY CORRECTION OF A CLASS III MALOCCLUSION- A CASE REPORT

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ABSTRACT

Treatment of class III malocclusion in growing subjects is a challenging part of contemporary orthodontic practice. Many treatment approaches are given in the literature. However successful orthopedic correction through growth modification has decreased the surgical correction of growing class III patients. A case of skeletal class III malocclusion in mixed dentition is presented, which was treated with face mask therapy and maintained with chin cup therapy to restrict the growth of Prognathic mandible and modulate craniofacial growth favorably to attain a good esthetic profile and an appreciable phase I achievement.

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INTRODUCTION

Class III is a malocclusion that is very easy to identify and is often difficult to treat. Early treatment of Class III malocclusion has been advocated to reduce the need of treatment in the permanent dentition, when camouflage orthodontic treatment or surgery becomes the only options. A series of treatment approaches can be found in the literature regarding orthopedic treatment in Class III malocclusion provided the etiologies of the malocclusion should first be clarified, and then an appropriate treatment modality should be decided.

Definition

Angles (1899) definition of malocclusion is the mesial occlusion of the mandibular teeth by more than one half the width of a single cusp. But his classification did not take skeletal pattern into account.

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Incidence

Prevalence of class III malocclusion varies among different ethnic groups. Caucasian stand1-4%. In Asian countries, the prevalence of class III malocclusion is more due to increased percentage of patients with maxillary deficiency. Japanese4-5% and Chinese 4-14% (Allwright and Burndred, 1964). Indian group had a range of 0-4.76% (Daniel *et al*., 2012)

Aetiology

Class III malocclusion is a complex and wide ranging. Marking etiological factor is Heredity: common well known are Hapsburg family. Skeletal class III malocclusion may be due to a dominant gene, recessive or multifactorial inheritance. Whatever may be the inheritance heredity plays an important role in the aetiology of class III malocclusion. various other etiolological factors being Enlarged tonsils, Habitual protruding of the mandible during the growing period, Difficulty in nasal breathing, Congenital anatomical defects, Diseases of the pituitary gland, Hormonal disturbances, Trauma, Premature loss of 6th year molar, Irregular eruption of permanent incisors, Early loss of deciduous incisors, Unfavourable anterior incisal guidance, flat anteriorly

positioned tongue, Relative size and position of the cranial base, maxilla and mandible, Habitual head position, the position of the foramen magnum and spinal column.

Classification of class iii malocclusion

I.According to Moyers:

- Osseous: according to the osseous growth pattern
- Muscular: according to acquired muscular reflex pattern
- Dental: problem in dental positioning.

II.Congenital

- Developmental
- Hybrid

III.According to tweed

- Pseudo classIII malocclusion
- True class III malocclusion

IV.Skeletal

- Prognathic mandible
- Retrognathic maxilla
- Combination of Prognathic mandible and retrognathic maxilla
  Dental
- pseudo class III
- Occlusal interferences/ premature contacts
- Improper inclination of maxillary and mandibular incisors.

How is pseudo class iii differentiated from true class iii malocclusion?

PSEUDO CLASS III	TRUE CLASS III
Normal Class I Skeletal base.	Class III skeletal base
Class I relation in rest position.	Class III relation in rest position.
Associated with functional interference	Not associated with functional interference.
Shift from Class I to III in centric occlusion.	Class III in centric occlusion.

Features of a class III malocclusion

Occlusal features

- Class III molar relation.
- Class III canine relation.
- Incisor relation-edge to edge or reverse overjet.
- Lower incisors are retroclined.
- Deep bite or open bite will be seen depending of growth pattern.
- Crowding in some cases.
- Upper arch narrow-lead to cross bite.

Skeletal features

- Prognathic mandible.
- Retrognathic maxilla.
- Combination.
- Maxilla is narrow and mandibular base wide.

Soft tissue features

- Profile- concave.
- Divergence- anterior.
- Lips- incompetent.
- Lower lip- everted.
- Tongue – placed anteriorly.
- Upper lip-may be short

Rationale forearly treatment of class iii malocclusion

The objective of correcting class III malocclusion early is to provide more favorable dentofacial development.

Goals: Uncorrected anterior crossbite may lead to incisal wear of lower incisors, retroclination of maxillary incisors, leading to thinning of labial alveolar plate and gingival recession. Early management is advisable to prevent the unrestorable esthetic and bony changes.

i. Early orthopedic treatment using facemask or chin cup therapy improves the skeletal discrepancy and thereby minimizes excessive dental compensation
ii. Early orthopedic treatment eliminates functional shift which left unattended may lead to altered growth direction
iii. It simplifies the phase II orthodontic management with fixed appliance therapy
iv. It even eliminates the need for orthognathic surgical correction at a later period in life. And also to some extent it minimizes the work during surgical correction
v. It gives way for a pleasing esthetic smile by improving the psychosocial development of the child. (Peter nagan, 2005)

Management of class III Malooclusion

Dental Class III

- Orthodontic appliances

Skeletal Class III - Growing child

- Retrognathic maxilla- Face mask,
- Functional regulator III
- Reverse activator
- Prognathic mandible- Chin cup
- Mandibular cervical headgear
- Splints
- Removable mandibular retractor
- Combinations- face mask or FR III with chin cup.

Skeletal Class III- Adult

- Camouflage- using class III elastics
- Surgical management.

Pseudo class III

- Occlusal equilibration.

SNA	75º	77º	82º
SNB	82º	80º	80º
ANB	-6º	-3º	2º
FMA	23º	25º	25º
Lower facial height	58mm	61 mm	62mm-64mm
Wits appraisal	-6mm	-4mm	BO coincides with AO
Co- Gn	102mm	104mm	

Pretreatment photographs

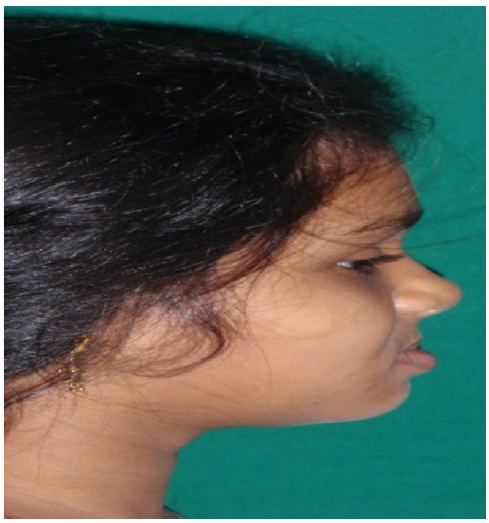

Fig. 1. Profile view pre treatment

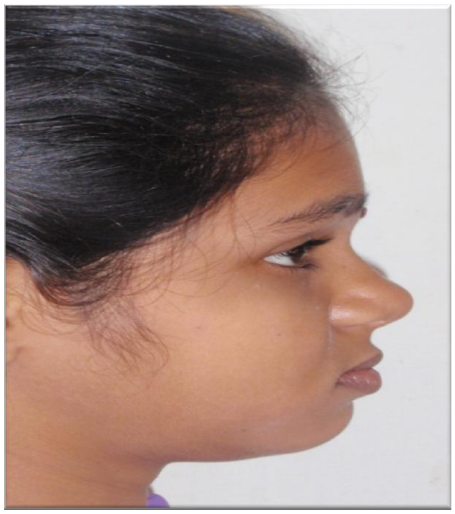

Fig. 2. Profile view post treatment

Fig. 3. Intra-oral pretreatment

Fig. 4. Intra oral pretreatment Lateral view

A case report

Our patient was 9 years old tamilian female who reported to Tamilnadu government dental college and hospital Chennai with her parent's chief complaint of forwardly placed lower front teeth. Her family history was revealed and found that her Father had similar complaint and has undergone orthognathic surgery at the age of 30 yrs. on clinical examination extra oral features: were concave profile, everted lower lip (Fig. 1) short upper lip, obtuse nasolabial angle, low clinical FMA, and decreased lower anterior facial height. Intra oral features were Reverse overjet, Class III molar relation, short upper arch, wide mandibular base, Mild posterior cross bite. She was in mixed dentition period.

Investigations

Case history and clinical examination, facial photographs, Functional analysis, Study models, OPG, Lateral cephalogram and Hand wrist radiograph. With the above clinical examination and cephalometric findings the case was diagnosed as A case of angles class III malocclusion on a class III skeletal base due to retrognathic maxilla and mild prognathic mandible.

Problem list: Skeletal class III Malocclusion a combination of retrognathic maxilla and prognathic mandible, class III molars, class III canines, reverse overjet (Fig. 3a and 3b) mild posterior crossbite, low FMA, obtuse nasolabial angle, concave profile.

Treatmentobjective: Was to correct the skeletal class III malocclusion and to establish positiveoverjet, to correct posterior crossbite, and to establish good esthetic profile.

Treatment plan and progress

Since the patient reported to us in late mixed dentition and she was at the peak of pubertal growth velocity period, the

treatment plan was to proceed with orthopaedic appliance with facemask therapy for retrognathic maxilla with rapid maxillary expansion for the posterior crossbite and associated chin cup therapy for restricting the growth of prognathic mandible. Bonded RME was given as an anchorage for maxillary protraction. (Fig. 4a) The RME was activated twice a day morning and evening at the same time over two weeks. Force applied- 400 gm per sidewith 8 ounce elastics (Fig. 4b) Patient instructed to wear for 12 to 14 hrs/day. After correction of posterior crossbite a retention period of 3 months was maintained in over corrected position. Facemask therapy was continued for 10-12 months.

Treatment progress

Post treatment intra oral photographs

Fig. 5a

Fig. 5b

At the end of 12 months patient classI molars and class I canines were achieved with positive overjet (Fig. 5a and 5b) and corrected posterior crossbite condition and a good aesthetic profile achieved (Fig. 2).

Patient advised to be under chin cup therapy post treatment

Fig.6.

DISCUSSION

The success of orthodontic treatment in a growing patient with a skeletal class III malocclusion depends on his or her individual growth and, to what extent the growth modification can be successful is a challenging question for many clinicians. Skeletal class III correction should be corrected as early as possible ruling out the etiological factors. Since this patient had a strong heredity as a cause and moreover the child had internal motivatiory factor which simplified the Ist phase of orthopaedic management. The ideal period for orthopaedic correction or face mask therapy isearly mixed dentition period (Maheshwari and Gupta, 2001) and as the patient reported in peak pubertal growth period the treatment was successful.

Early treatment of Class III patients with maxillary deficiency using appliances such as the protraction facemask with RME can be used to eliminate anterior crossbite and reverse overjet, CO/CR discrepancy, and maximize the growth potential of the nasomaxillary complex. In addition, it can be used together with the GTRV analysis as a tool to help clinicians in predicting patients with excessive mandibular growth that may not be able to be camouflaged with orthodontic treatment. Protraction of the maxilla below the center of resistance produced counterclockwise rotation of the maxilla and the total facial height was increased by inferior movement of the maxilla and downward and backward rotation of the mandible (Tahmina *et al*., 2000) which was favorable for this patient's growth pattern.

In a prospective clinical trial, protraction facemask treatment starting in the mixed dentition was found to be stable 2 years after the removal of the appliances (Baik, 1995) this is probably due to the overcorrection and the use of a retainer for 1 year. Thus the over corrected position was retained with no relapse. Patient was advised to wear chin cup (Fig. 6) though she had mild prognathic mandible as she had a strong heredity as etiological factor (Mitani and Fukazawa, 1986). Cephalometric findings pre and post and normal values

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