

EARLY TREATMENT OF CLASS III MALOCCLUSION

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ABSTRACT

The objective of the study was to evaluate the treatment results of mild class III cases treated at an early age. Class III malocclusion presents as a concave profile, dental mesio-occlusion, anterior cross bites and skeletal imbalance including maxillary deficiency, mandibular excess or a combination. Instead of delaying the treatment to later age and treating the patient with camouflage or surgical procedures, patients having mild class III were selected for early treatment with face mask, Frankel functional regulator, reverse twin block and mandibular inclined plane. The results were quiet encouraging. The design of the study was analytical and observational. The study was conducted in the Department of Orthodontics, Khyber College of Dentistry from June 1998 to February 2002.

A total number of 55 cases, 38 males and 17 females were selected to be treated for mild class III problems. The age of the patients ranged from 6-9 years. The patients were treated with functional appliances, mandibular inclined planes and face masks. As orthodontic treatment with orthopedic appliances is mostly dependent on patient compliance, availability and co-operation, some of the patients could not complete the treatment. The results of ten patients for each modality are therefore, presented showing marked improvement in the dental and skeletal problems.

It was concluded that young children having mild class III problems when provided with functional orthopedic appliances can have better chances with camouflage treatment at a later age and the need of surgery can be eliminated.

INTRODUCTION

The class III malocclusion presents as a concave profile and a prominent chin, the mandibular molars are found to be positioned too far anterior in relation to the maxillary molars. The mesio-buccal cusp of maxillary 1st molar occludes with the distobuccal cusp of mandibular 1st molar and the mesiobuccal cusp of mandibular 2nd molar¹. Maxillary incisors are lingual to the mandibular incisors presenting as anterior cross bite². The skeletal imbalance comprises of:

- Maxillary deficiency which is considered to be extended over antero-posterior, vertical and lateral directions giving rise to a concave profile short face height and a narrow maxilla³.
- Mandibular excess, definite familial and racial tendencies are present in mandibular prognathism

The treatment of class III malocclusion needs proper management at specific timings. In mild to moderate class III cases an early intervention with the use of functional appliances mandibular inclined plane and face mask can resolve the problem satisfactorily⁴.

In young children the treatment of class III malocclusion includes:

- Orthopedic force with
 - a face mask applied to maxilla and mandible to promote the growth of deficient maxilla and restrain the growth of rapidly growing mandible, the forces having their effects on the growth sites⁶.
 - Chin cup applied to prognathic mandible to restrain its rapid growth
- Functional appliances⁵ also work in the same manner as chin cup, which tend to rotate the mandible downward and backward, this downward positioning of the chin encourages the eruption of the teeth and as a result increase in the height of face is observed

The use of functional orthopedic appliances shows good response in giving a normal relation to the skeletal bases and a proper increase to the facial height.

Usual effect of reverse head gear has been to produce forward movement of maxillary teeth with

little or no true skeletal effect on the maxilla. Reverse head gear applies a reciprocal downward and backward force to the mandible. Repositioning of the mandible in this direction is often observed and is frequently the major effect'.

Delaire and co-worker in France achieved forward positioning of maxilla with reverse headgear if treatment is begun at an early age².

MATERIALS AND METHODS

Young patients having mild class III were selected for the treatment and follow up.

The selection criteria was as given below:

- Young Children 6 — 9 years
- Mild Class III
- Short face height
- Normal or protrusive lower incisors

The patients were treated with three different treatment modalities; face mask, inclined planes and functional appliances.

Mild class III patients having a concave profile, class III molar relationship, retrognathic maxilla, prognathic mandible, anterior cross bite and prominent lower anterior teeth having an almost normal face height were selected for treatment with the face mask. The face mask was combined with a maxillary acrylic splint cemented to the maxillary dentition, force being applied by attaching the splint to the maxillary bow with the help of 5 x 16 heavy elastics for at least 20 hours per day. The treatment period extended from 10 to 12 months plus an additional six month period of retention with a bionator.

Other patients having mild class III with a concave profile, more or less normal maxilla, mild mandibular prognathism, anterior cross bite and deep bite tendencies were selected for treatment with mandibular inclined plane. The plane was cemented to the lower anterior teeth. The appliances were used for 3 to 4 weeks.

Patients with mild class III, having retrognathic maxilla, prognathic mandible, deep bite, anterior cross bite, lower lip prominence and a concave profile were selected for treatment with functional appliances, FFR III and reverse twin block. The treatment was started with the FFR III appliance having labial pads to stimulate the maxillary growth. Treatment extended for a period of 8-10 months, patients having good co-operation showed results of a conver-

sion of cross bite to an edge to edge bite and were further treated with reverse twin block for another 6-8 months.

The pre and post treatment clinical records were evaluated for profile, molar relationship and anterior cross bite, where as the cephalometric records were assessed for sagittal and vertical relationships. In addition upper and lower teeth were also assessed for their positions with their respective skeletal bases.

RESULTS

Out of the 55 patients selected for treatment with different appliances, some of the patients could not complete their treatment for different reasons (transfer of residence, lack of interest, non co-operation of patients and/or parents etc)

The results of 10 patients for each treatment modality is being presented.

The patients showing contribution of both the skeletal bases towards the developing class III were selected for treatment with facemask. These children had deficient maxilla, <SNA values being (77°-80°) and mildly prognathic mandible < SNB values being (80°-82°), straight or slightly proclined mandibular incisors <IMPA value being (91°-94°). The use of face mask caused changes in the skeletal bases as well as the dentition. The treatment effects on the maxilla are shown by the forward movement of point A resulting in an increase of <SNA changing from (77.9°-80°) to (80°-81°) the mean change being 2.1° the results show an enhancement of maxillary growth. The changes observed in <SNB points towards redirectioning of mandibular growth. <SNB changes from (80°-81°) to (79°-80°) the mean difference being 1.2° this change is visible as backward rotation of the mandible. Changes in <N-ML increasing by 2° and <NSL-ML increasing by 3° confirm the downward rotation of mandible as a treatment result. On clinical examination the patients showed a positive response by an obvious reduction in the chin and incisors prominence, concave profile to straight profile, class III to class I occlusion. (Table I)

Patients with mild class III having more or less normal maxilla, <SNA between (80°-81°) and a slightly prognathic mandible, <SNB (80°-81°), were selected for treatment with mandibular inclined plane. The patients also had a prominence of lower anterior teeth, anterior cross bite and a concave profile. The treatment results showed a difference in the inclination of the teeth. The inclined plane applied forces on

the upper anterior teeth and forced them to procline that can be confirmed by change in angulations between upper teeth to maxilla, the angle changing from (100°-106°) to (108°-114°). The obvious visible result was the proclination of the upper teeth. Other effect of the same appliance was on the mandible positioning the continuous use of the said appliance forced the mandible to take a downward rotation <NL-ML changing from (20.5°-22.7°) and <NSL-ML changing from (31.7°-33.8°) the result showing in the form of increased face height. Slight backward positioning of the mandible was also observed and confirmed by changes in <SNB, decreasing from (80.2°-79°) (Table II).

Patients of very young age 6-7 years having mid face deficiency <SNA (77°-79°) and protrusive mandible <SNB (79°-81°), and a normal <IMPA (90°-91°) were selected for treatment with Frankel appliance and reverse twin block. Frankel appliance when initially used for six months, the vertical opening enhanced the downward and forward eruption of the maxillary posterior teeth, encouraged the mandible to take a posterior position and so an edge

TABLE I: TREATMENT RESULTS WITH FACE MASK

Measurements	Pre treatment	Post treatment
SNA	77.9	80.0
SNB	80.3	79.1
ANB	-1.3	0.33
Y-AXIS	67.7	68.6
NL-ML	32	32.3
IMPA	92	90.6
UI-NL	101.6	112.3

TABLE II: TREATMENT RESULTS WITH MANDIBULAR INCLINED PLANE

Measurements	Pre treatment	Post treatment
SNA	80.9	81.1
SNB	80.2	79
ANB	.7	1.2
Y-AXES	66	65
NL-ML	20.5	22.7
NSL-ML	31.7	33.8
IMPA	93.5	91.6
UI-NL	1.3	114

TABLE III: RESULTS OF TREATMENT WITH FUNCTIONAL APPLIANCES

Measurements	Pre treatment	Post treatment
SNA	76.8	79.9
SNB	80	79.4
ANB	-2.5	00
Y-AXIS	65	65
NL-ML	20	20.5
NSL-ML	31.5	31.9
IMPA	91	90
UI-NL	113	125

TABLE IV: COMPARISON OF CHANGES WITH DIFFERENT TREATMENT MODALITIES

Angular measurements	Face mask	Inclined plane	Functional app.
SNA	2.1	0.2	3.1
SNB	-1.2	-1.2	-6
ANB	-.97	-.5	-.2
Y-AXIS	-.9	-1	0
NL-ML	2.00	12	-5
NSL-ML	-3	2.1	.4
IMPA	1.4	1.9	1
Upper Inc-NL	10.7	11	12

to edge bite resulted. The obvious results were change in the maxillary growth <SNA increasing from (76.8°-79.9°). A little change in <SNB was also observed decreasing from (80°-79°) mild change in the vertical direction were observed. Further treatment was continued with a reverse Twin block. The use of reverse twin block further encouraged the mandible to grow downward and backward. (Table III)

DISCUSSION

The purpose of the treatment of class III malocclusion is to provide a rapid resolution of this malocclusion .to predict the response of treatment at a very young age is really difficult The choice of appliance, growth, tissue response and most important patient co-operation are the factors that determine the successful management of mild class III cases.

The developing class III malocclusions are treated with different treatment modalities, having effects on different tissues, skeletal and dental. The mandibular

repositioning i.e. downward and backward relocation is a treatment result commonly seen with all the approaches. Whereas maxillary growth enhancement in the sagittal and vertical direction is a positive finding in patients treated with facemask and functional appliances.

Numerous case reports confirm the reduction of skeletal disharmony by changes in the size and position of maxilla and mandible ^{3,5,6}.

ANB changes are observed in almost all the cases treated with different appliances. ANB changes from — ye to +ve are all related to the forward and downward movement of maxilla featuring more forward and downward displacement of point A^{8,9,10} , and also the downward and backward rotation of mandible^{8,10}

Other studies also suggest early intervention to prevent the existing problem from getting worse and minimize or eliminate the need for comprehensive orthodontic treatment at a later age'.

CONCLUSION

This study concludes that early treatment of developing class III with above mentioned modalities produce the following results:

- Forward and downward movement of maxilla and the maxillary dentition
- Downward and backward rotation of mandible
- Decrease in the prominence of mandibular incisors
- Slight increase in the lower face height

Clinical and cephalometric findings of patients having mild class III malocclusion

Profile	Straight Concave	33 32
Ant post position of Maxilla	Orthognathic Retrognathic	39 16
Ant post position of mandible	Orthognathic Prognathic	39 16
Lateral relationship of Maxilla	Normal Narrow	25 30
Ant post relationship of posterior teeth	Cross bite Edge to edge	20 35
Total patients		55

It is suggested that in developing class III cases having dental and skeletal imbalance, treatment should be recommended at an early age with a number of available techniques keeping in mind that good targets can be achieved if growth, good tissue response and patient co-operation is available.

Early treatment can reduce the obvious developing skeletal imbalance and also decreases the need for comprehensive orthodontic treatment at a later age.

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