

Different Non – Surgical Treatment Modalities for Class III Malocclusion

Dr. Handa Amit Satish¹, Dr. Suchita Daokar², Dr. Mandira Gulati³.

Class III malocclusions are usually growth-related discrepancies & are associated with deviation in the sagittal relationship of the maxilla and the mandible, characterized by a deficiency and/or a backward position of the maxilla, or by prognathism and/or forward position of the mandible or both^{1,2,3}.

A class III malocclusion is defined by the presence of a class III molar and incisor relationship, which may range from a reduced overjet or edge-to-edge incisor relationship to a frank reversed overjet, the severity typically reflecting the underlying skeletal pattern^{1,4}.

Treatment planning in class III cases is notoriously difficult and primarily influenced by the likelihood of future growth, skeletal discrepancy, size of the reverse overjet, extent of crowding, and degree of existing dento-alveolar compensation.

An old orthodontic maxim states “**the best time to treat a crossbite is the first time it is seen.**”⁵ Thus, Class III malocclusion should be intercepted and treated at an early stage so as to prevent an orthodontic problem from progressing into severe dento-facial anomaly.

So, 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 become the only options.¹

The clinician should determine whether the crossbite is skeletal or dental in origin from the profile analysis, cephalometric readings & intra oral findings⁶.

In this paper, the non-surgical orthodontic treatment of three patients with a Class III malocclusion is discussed and the use of compensation mechanics is illustrated.

Though a series of treatment approaches can be found in the literature regarding treatment in Class III malocclusion. However, as with other types of malocclusion, there are really three main approaches to the correction of a class III malocclusion, i.e. growth modification, camouflage orthodontic treatment and surgical approach.

- A) **Growth modification:** A class III malocclusions usually present in the mixed dentition. A decision is required at this stage as to whether correction of the incisor relationship and the underlying skeletal discrepancy should be attempted with interceptive treatment. This treatment can be aimed at modifying growth, either with reverse-pull headgear (with or without maxillary expansion) or a functional appliance. Success of this treatment will depend on establishing a positive overjet and overbite, and the nature and direction of future growth.

Case 1:-A 12 year old female reported with the chief complain of backwardly placed upper front teeth. On examination the patient was diagnosed as skeletal class III malocclusion because of retrognathic maxilla. Patient’s parents also reported a familial tendency for class III malocclusion. Reverse overjet, deep bite, highly positioned maxillary canines, class III molar relationship was seen (Figure 1).

Cephalometric values:-

Sr. no	Cephalometric variable	Pre treatment values	After facemask values	Post treatment values
1	Facial angle (FH to N-Pog)	89 ⁰	85 ⁰	87 ⁰
2	Y-growth axis	54 ⁰	57 ⁰	57 ⁰
3	Angle SNA	78 ⁰	80 ⁰	81 ⁰
4	Angle SNB	82 ⁰	78.5 ⁰	80 ⁰
5	Mandibular plane angle	25 ⁰	26 ⁰	27 ⁰
6	Wits appraisal	BO ahead of AO by 1.5mm	AO ahead of BO by 0.5mm	AO ahead of BO by 1mm
7	Inter Incisal angle	132 ⁰	145 ⁰	129 ⁰
8	Upper incisor to NA	33 ⁰ / 2.5mm	34 ⁰ / 2mm	32 ⁰ / 4mm
9	Lower incisor to NB	19 ⁰ / 2mm	13 ⁰ / 1.5mm	22 ⁰ / 3mm

The treatment was initiated with a rapid maxillary expansion screw which was bonded intra-orally & activated with 1 turn / day for 8 days. The intention with this expansion screw was to open up the circum maxillary sutures. This was followed by a reverse pull headgear & extra-oral elastics to protract the retrognathic maxilla. To start with light forces were applied around 200-300 grams, which were later increased to around 500 grams on each side (Figure 2). Within a period of 6-7 months the maxilla got protracted and positive overbite & overjet was achieved (Figure 3). Fixed orthodontic treatment was initiated to eliminate the deep bite, rotations, co-ordination of arches and refining the occlusion & the case was debonded and upper and lower retainers delivered (figure 4).

(Figure 1):- Case 1 pre treatment photographs.



Figure 2:-With face mask and extra-oral elastics and Hyrax screw bonded:-

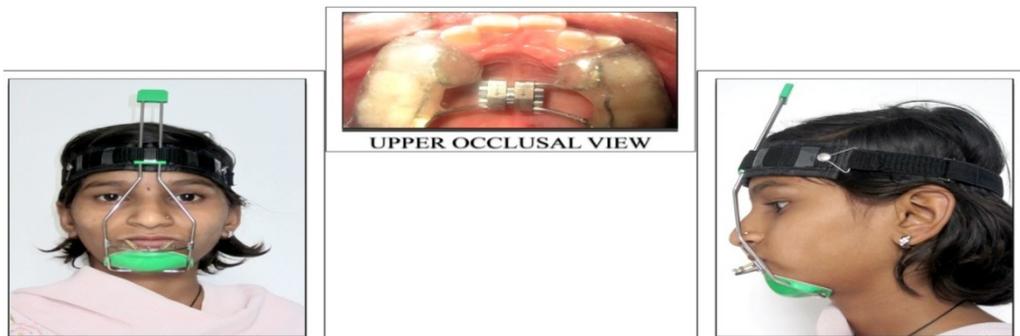


Figure 3:- After FACEMASK:-



Figure 4:- POST OP (At the day of debonding the fixed appliances)



B) Orthodontic camouflage : Definitive treatment can be carried out in the permanent dentition if the skeletal discrepancy is mild and facility for dento-alveolar compensation still exists. Comprehensive correction in the permanent dentition typically involves the use of fixed appliances with class III inter-arch elastic traction. Extractions are often required in the upper arch of class III cases because of crowding; however, when attempting camouflage, lower arch extractions are also commonly required to create space for retraction of the lower labial segment. Mid-arch extractions are usually undertaken in both arches, although in adult patients a single lower incisor extraction can be considered. The prolonged success of treatment depends on establishing a positive overjet and overbite, and the pattern and magnitude of further growth.

Case 2:-A 19 year female reported with chief complain of irregular placed upper front teeth and abnormal relationship between upper and lower front teeth. On examination the patient was diagnosed as skeletal class III malocclusion and anterior crossbite. Class III molar relationship existed on both sides & positive overbite only with right central incisor (Figure 5).

Sr. no	Cephalometric variable	Pre treatment values	Post treatment values
1	Facial angle (FH to N-Pog)	88°	87°
2	Y-growth axis	57°	58°
3	Angle SNA	80°	81°
4	Angle SNB	81°	80°
5	Mandibular plane angle	26°	27°
6	Wits appraisal	AO & BO coincides	AO ahead of BO by 0.5mm
7	Inter Incisal angle	135°	133°
8	Upper incisor to NA	30° / 5mm	32° / 6mm
9	Lower incisor to NB	24° / 3mm	22° / 2mm

Orthodontic treatment was initiated in this case and after completion of leveling & alignment phase intra-oral class III elastics i.e. from maxillary molars to mandibular canines were given. The anterior cross-bite got corrected because of the class III mechanics with the help of intra-oral elastic traction. Thus a pleasing facial profile with mild to moderate class III malocclusion can be treated orthodontically (Figure 6).

Figure 5:- Case 2 treated orthodontically with the help of Class III elastic traction. Pre-op photographs:-

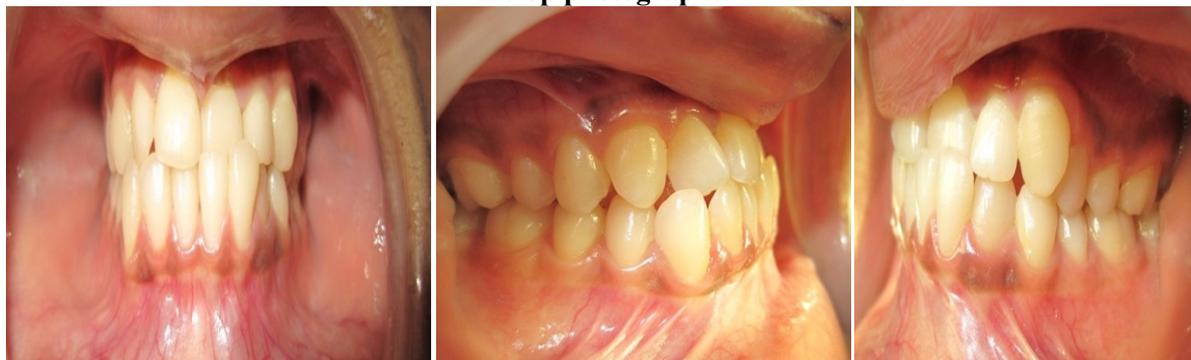
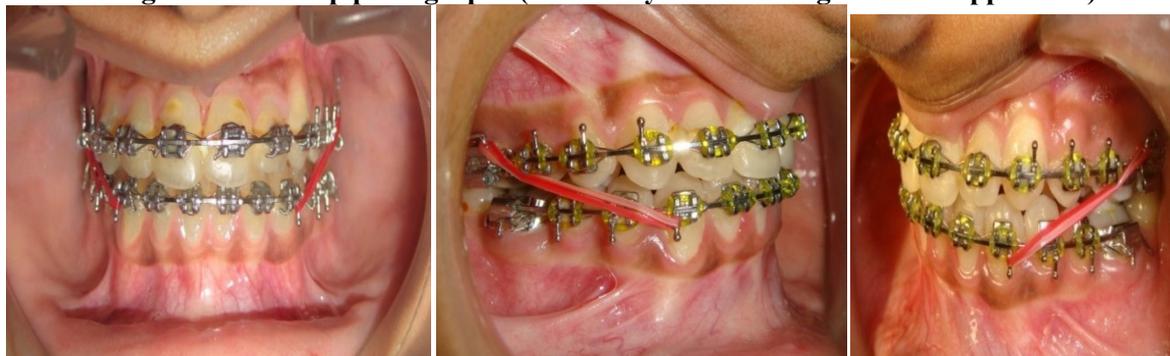


Figure 6:-Post--op photographs (At the day of debonding the fixed appliances)



Case 3:- A 27 year old male reported with chief complain of backwardly placed upper front teeth. On examination the patient was diagnosed as skeletal class III malocclusion with anterior crossbite. A concave profile, anterior crossbite with both central incisors & reverse overjet, class I molar relation on both sides existed (figure 7).

Sr. no	Cephalometric variable	Pre treatment values	Post treatment values
1	Facial angle (FH to N-Pog)	88 ⁰	87 ⁰
2	Y-growth axis	66 ⁰	67 ⁰
3	Angle SNA	80 ⁰	81 ⁰
4	Angle SNB	82 ⁰	81 ⁰
5	Mandibular plane angle	32 ⁰	33 ⁰
6	Wits appraisal	BO ahead of AO by 1.5mm	BO ahead of AO by 0.5mm
7	Inter Incisal angle	136 ⁰	128 ⁰
8	Upper incisor to NA	25 ⁰ / 5mm	26 ⁰ / 6mm
9	Lower incisor to NB	27 ⁰ / 5mm	21 ⁰ / 3mm

Orthodontic treatment was initiated and upper and lower arches were bonded. Initial leveling and alignment was initiated and mandibular first pre-molars were extracted on both the sides. Mandibular anteriors were retracted and upper anteriors were aligned to achieve positive overbite and overjet. Thus a moderate skeletal class III malocclusion was orthodontically treated by camouflage (Figure 8).

Figure 7:- A skeletal class III Case treated orthodontically with camouflage treatment. Pre-op photographs:--



Figure 8:- Post-Op (At the day of debonding):-



Conclusion:-

The non-surgical treatment options to treat Class III malocclusions were been discussed and case reports illustrated. Treatment was undertaken using a combination of orthopedics treatment options , compensation mechanics and fixed orthodontic appliance treatment only and suggests that in some, carefully selected cases, this approach can be a viable treatment option.

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Author's Information:-



1) Dr. Handa Amit Satish,
M.D.S., Orthodontics And Dentofacial
Orthopaedics, Aurangabad, Maharashtra,
India.



2) Dr. Suchita S. Daokar,
Professor and P.G. Guide,
Department of Orthodontics,
Aurangabad, Mah., India.



3) Dr. Mandira Gulati,
B.D.S.,
Practicing As Dental Surgeon,
Delhi, India.