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Treatment of Adult Class III Malocclusion with Orthodontic Camouflage-A 2 Case Report

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ABSTRACT

Class III malocclusion with multifactorial etiology manifests with dental or skeletal discrepancies, if severe could lead to compromised facial esthetics and function, thereby decreasing the self-esteem in an individual especially during growing period. Treatment of Class III malocclusion with negative overjet becomes very daunting especially in patients with cessation of growth. Two such cases treated by orthodontic camouflage to produce optimal skeletal and dent alveolar relationship with the help of unilateral extraction of lower 1st premolar, are illustrated in this case report.

Key words: Class III malocclusion, Extraction, Torque.

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INTRODUCTION

Class III malocclusion is best described by discrepancies of dental or skeletal components in antero-posterior or vertical directions. Retrognathic and narrow maxilla, prognathic and wider mandible, and or a combination of both are the common clinical presentations of skeletal class III malocclusion. The magnitude of the discrepancy may compromise facial esthetics variably and motivates individuals to seek orthodontic correction.

The Class III malocclusion may be hereditary in occurrence further affected by environmental factors such as mouth breathing habit. Its prevalence varies among different ethnic groups ranging between 1% and 4% in Caucasians,' 4% and 5% among the Japanese" and 4% and 14% among the Chinese. However its frequency is higher among Asians as large percentage of patient's exhibit maxillary deficiency. In European royal families, the mandibular prognathism is commonly inherited. The heritability of mandibular prognathism among Brazilian families was estimated to be 0.316. Since it is an autosomal dominant inheritance with incomplete penetration, the expression of mandibular prognathism is influenced by a major gene. The success or failure of early treatment could depend on inclination of the condylar head, the maxilla-mandibular vertical relationship together with the width of the mandibular arch. Successful outcomes with 95% degree of accuracy were predicted using ramal and corpus length, mandibular position, and gonial angle.

Treatment strategies in class III: The class III malocclusion can be treated at various stages during the dental and skeletal development or after the cessation of jaw growth.

Growth Modification

Antero-posterior and Vertical Maxillary Deficiency: Both of these contribute to Class III malocclusion. The effect is direct in cases where maxilla is small or in posterior position. If the maxilla does not grow vertically, the effect on the mandible is indirect, which then rotates upward and forward during normal growth, thereby leading to mandibular prognathism. This appearance is more related to position rather than size of the mandible.

Since maxillary deficiency is commonly a component of skeletal Class III malocclusion, the recent treatment strategy is aimed at promoting maxillary growth, for which the data from randomized clinical trials are not available. However In children, inhibiting mandibular growth or stimulating maxillary growth tends to modify the growth in skeletal Class III malocclusion.

There are three approaches to manage maxillary deficiency: Frankel's functional appliance is the most effective method followed by reverse-pull headgear (facemask) and Class III elastics to skeletal anchors is the least effective.

Class III Camouflage

Dental compensation or camouflage of simple class III malocclusions can be done in adult patients whereas severe cases require Orthodontics and/or Orthognathic Surgery. Moderately severe Class III malocclusions can be corrected by retracting the mandibular incisors into the available extraction space and proclining the maxillary incisors. Skeletal anchorage can be additionally used to distalize the entire mandibular dentition.

These types of cases can be managed by various approaches including extraction usually premolars in the lower or both arches, horizontal or vertical extra-oral tractions and distalization of lower molars. For non-growing class III patients, midline maxillary osteotomy followed by expansion device is recommended for treatment of cross bite.

Orthognathic Surgery

When the facial esthetics is compromised by skeletal problem, the surgical orthodontic treatment is the preferred choice for patients severe facial asymmetry and do not present any potential for facial growth. The class III dental and skeletal relationships are treated by orthodontic surgical treatment which promotes advancement of maxilla and retrusion of mandible. The success of orthognathic surgery relies on the Pre-surgical orthodontic preparation which dictates the skeletal movements at the time of surgery. The complete correction of skeletal discrepancies can be achieved by recognizing and correcting the prevailing dental compensations.'

Orthognathic patients respond well to the combination of Lefort I. The nasomaxillary soft tissue profile can be improved by Lefort I advancement. Rotating the maxilla-mandibular complex can modify occlusal plane and incisal axis. Maxillary retrusion is often noticed in prognathic mandible patients, and rotation of the maxillo-mandibular complex clockwise allows for more mandibular setback and may improve the depressed paranasal contour.

Aim of this paper is to discuss two class III malocclusion cases treated by unilateral premolar extraction.

CASE REPORT 1

A male patient of age 18 years visited the Department of Orthodontics and dentofacial Orthopaedics at Bhojia dental College, Bhud Baddi with the chief complaint of forwardly placed lower front teeth. Extra oral examination [Figure 1] showed that he had a leptoprosopic facial form with good facial symmetry, concave profile with anterior divergence, competent lips, acute nasolabial angle, shallowmentolabial sulcus, low mandibular plane angle, and a non-consonant smile arc.

No signs/ symptoms of temporomandibular joint dysfunction. Intraoral examination [Figure 2] revealed Class III molar relation bilaterally. There was presence of reverse overjet of 1 mm. Lateral cephalogram [Figure 3, Table 1] showed he had orthognathic maxilla (83) and prognathic mandible (86) with ANB (-3), Wits (-6mm) depicting a skeletal Class III jaw bases. Patient had a hypo divergent growth pattern on account of Sn-Go-Gn (23), FMA (24) and Jaraback ratio of 72.7%.

Treatment Objective

To obtain optimum overjet and overbite, establish stable occlusal relationship, obtain skeletal balance, and improve the facial features by a pleasing smile arc and soft tissue esthetics.

TREATMENT

After analyzing all diagnostic records, the patient was in the stage 6 of CVMI with 0% growth remaining. The patient refused surgical procedures and opted for orthodontic treatment and camouflage. He was treated with extraction of 1st premolar in lower right quadrant (44).

Treatment Progress

Alignment and leveling: Treatment began with bonding of MBT .022" slot brackets and banding

Figure 1: Pretreatment extra oral photographs.

Figure 2: Pretreatment Intraoral photographs.

Figure 3: Pretreatment Radiographs.

Table 1: Pre-treatment Cephalometric Values.

MEASUREMENTS	PRE TREATMENT
SNA	83º
SNB	86º
ANB	-3º
Beta Angle	39º
SN-GoGn	23º
FMA	24º
Jaraback ratio	72.30%
1 to NA	-6mm
1 to SN	127º
IMPA	95º
Nasolabial Angle	81º
Upper lip to E-Line	-4mm
Lower lip to E-Line	+1mm

of first and second molars. Arches were initially aligned. The arch wire sequence progressed from 0.014" NiTi to 0.017"x0.025" SS for 9 months.

After leveling and alignment extraction of 44 was done.

Retraction and space closure: Individual canine retraction of 43 was done with an active tieback and midlines were matched [Figure 4]. Labial crown torque in anterior and palatal crown torque in posteriors in upper arch and Labial crown torque in lower arch was given on 0.019 x 0.025" SS wire for attaining ideal overjet and overbite [Figure 5]. This was followed by space closure with T loop (0.018"x0.025" TMA) in upper arch [Figure 6] and E-chain retraction

force in lower arch and Class III elastics for 3 months.

Finishing: 0.018 x 0.025" SS wire wrt U/L arch. W-elastics were given for 3 months.

TREATMENT RESULTS

The overall treatment result was 3 years [Figures 7-9] [Table 2]. The ABO Discrepancy index was 27 pretreatment and 8 post treatments. The ABO Objective grading (post treatment) was 7. A Class I dental relation was achieved and overbite improved. The overjet is good. Facial Balance & smile esthetics improved. TMJ was asymptomatic after treatment. The OPG shows no evidence of significant root resorption.

CASE REPORT 2

A male patient of age 21 years visited the department of Orthodontics and dentofacial Orthopaedics at Bhojia Dental College, Bhud Baddi with the chief complaint of forwardly placed lower front teeth. Extra oral examination [Figure 10] showed that he had a mesoprosopic facial form with good facial symmetry, concave profile with anterior divergence, competent lips, acute nasolabial angle, shallow mentolabial sulcus, low mandibular plane angle, and a non-consonant smile arc. No signs/ symptoms of temporomandibular joint dysfunction. Intraoral examination [Figure 11] revealed as Class III molar relation. There was presence of reverse overjet of 3 mm. Lateral cephalogram [Figure 12] showed he had prognathic maxilla (86) and prognathic mandible (92) with ANB (-6), Wits (-7mm) depicting skeletal Class III jaw bases. Patient had a hypo divergent growth pattern on account of Sn-Go-Gn (24), FMA (23) and Jarabak ratio of 69.5%.

TREATMENT OBJECTIVE

To obtain optimum overjet and overbite, establish stable occlusal relationship, obtain skeletal balance, and improve the facial features by a pleasing smile arc and soft tissue esthetics.

Figure 4: Mid Treatment Photographs.

Figure 5: Torquing wires.

Figure 6: Tear drop loop for space closure.

Figure 7: Posttreatment extra oral photographs.

Figure 8: Posttreatment intraoral photographs.

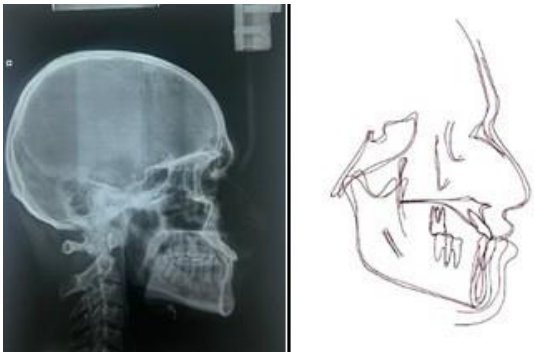

Figure 9: Treatment Changes Cephalometrically.

Table 2: Pre *vs* post-treatment Cephalometric Values.

MEASUREMENTS	PRE TREATMENT	POST TREATMENT
SNA	83º	84º
SNB	86º	85º
ANB	-3º	-1º
Beta Angle	39º	38º
SN-GoGn	23º	24º
FMA	24º	21º
Jarabak ratio	72.30%	70.50%
1 to NA	-6mm	39/5mm
1 to SN	127º	126º
IMPA	95º	78º
Nasolabial Angle	81º	89º
Upper lip to E-Line	-4mm	0mm
Lower lip to E-Line	+1mm	0.5mm

Figure 10: Pretreatment extra oral photographs.

Figure 11: Pretreatment intra oral photographs.

Figure 12: Pretreatment radiographs.

TREATMENT

After analyzing all diagnostic records, the patient was in the stage 6 of CVMI with 0% growth remaining. Orthosurgical correction of skeletal discrepancy was proposed, however, patient refused to undergo any surgical treatment, hence one phase therapy with unilateral extraction of lower left first premolar was done.

Treatment Progress

Alignment and leveling: Treatment began with bonding of MBT .022" slot brackets and banding of first molars. Lower posterior bite plane was given to relieve the anterior cross bite and attain the normal overjet. Arches were initially aligned. The arch wire sequence progressed from 0.016" NiTi to 0.017"x0.025" SS in upper arch and from 0.014" NiTi to 0.018"x0.025" SS in lower arch.

After leveling and alignment extraction of 34 was done.

Retraction and space closure: Individual canine retraction of 33 was done with an active tieback force. This was followed by space closure with Omega loop (α bend = 35º and β bend= 15º) [Figure 13].

Finishing: 0.018 x 0.025" SS wire wrt U/L arch. Class III elastics were given.

TREATMENT RESULTS

The case was completed in 1.5 years [Figures 14-16] [Table 3]. The ABO Discrepancy index was 18 pretreatment and 8 post treatments. The ABO Objective grading (post treatment) was 7. A stable occlusal relation was achieved and overbite improved. Anterior cross bite was relieved. Facial Balance & smile esthetics improved. TMJ was asymptomatic after treatment.

DISCUSSION

Management of skeletal class III malocclusion usually involves surgical intervention. These

Figure 13: Mid treatment photographs showing omega loop for space closure.

Figure 14: Post treatment extra oral photographs.

Figure 15: Post treatment intra oral photographs.

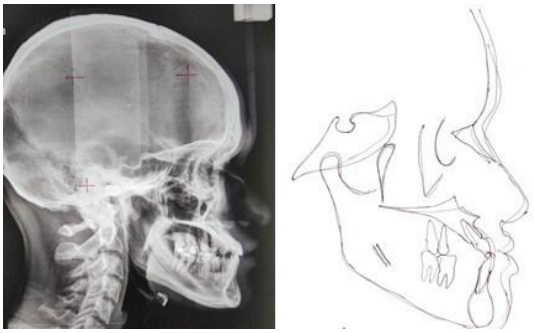

Figure 16: Post treatment cephalogram& superimposition.

Table 3: Pre *vs* post -treatment Cephalometric Values.

MEASUREMENTS	PRE TREATMENT	POST TREATMENT
SNA	86º	85º
SNB	92º	89º
ANB	-6º	-4º
Beta Angle	36º	36º
SN-GoGn	24º	27º
FMA	23º	25º
Jarabak ratio	69.50%	67.50%
1 to NA	6mm	6mm
1 to SN	125º	125º
IMPA	88º	75º
Nasolabial Angle	104º	82º
Upper lip to E-Line	-3mm	-4mm
Lower lip to E-Line	-0.5mm	-2mm

adult patients had no clinically significant maxillomandibular growth potential left to establish treatment goals. Orthognathic surgery to protract the maxilla with the possibility of mandibular setback, combined with fixed orthodontic treatment, was discussed with them. However, patients refused surgical procedures and opted for orthodontic treatment and camouflage. Orthodontics alone helped to camouflage some skeletal and dental aspects of the malocclusion therefore, improving function, stability and esthetics. Asymmetric extraction in mandibular arch was carried rather than symmetric extraction to correct the midline deviation of mandibular arch and obtain Class I canine relationship in short period of time. Case reported by Weisner (2009) in which he did unilateral extraction and used single Miniscrews implant to correct midline and anterior cross bite. Another case was reported by Guilherme et al., (2010), in which they used asymmetric intermaxillary class III elastics to correct the unilateral class III molar relationship. Bacetti et al., (2001) reported more favorable prognosis when intervention to correct anterior cross bite was implemented at an early age. Yamashiro and Takada (1995) reported a non-surgical management of adult class III case with extraction of lower first molar with lower midline deviation to the opposite side. Jiuxiang and Yan (2003) have reported treating 13 skeletal class III patients with lower second molar extractions. Farret et al., (2016) used miniplates as anchorage units for mandibular dentition distalization for camouflage of a class III malocclusion. The result of our cases as well as those of others shows that surgery with involved risk, cost and prolonged treatment duration can be avoided and camouflage treatment can be attempted to successfully treat mild to moderate skeletal class III cases.

CONCLUSION

Not all skeletal class III cases require surgical intervention. Moderate cases of skeletal class III can be successfully treated with camouflage. Proper application of biomechanics and using the right appliances can make the most difficult challenge an easy task.

REFERENCES

1. Sobral MC. Compensatory treatment of Angle Class III malocclusion with anterior open bite and mandibular asymmetry. Dental Press J Orthod 2012; 17:138-45.
2. Zere E, Chaudhari PK, Sharan J, et al. Developing Class III malocclusions: challenges and solutions. Clin Cosmet Investig Dent 2018; 22:99-116.
3. Newman GV. Prevalence of malocclusion in children six to fourteen years of age and treatment in preventable cases. J Am Dent Assoc 1956; 52:566-75.
4. Ishii H, Morita S, Takeuchi Y, et al. Treatment effect of combined maxillary protraction and chincap appliance in severe skeletal Class III cases. Am J Orthod Dentofacial Orthop 1987; 92:304-12.
5. WC A. A survey of handicapping dentofacial anomalies among Chinese in Hong Kong. Int Dent J 1964; 14:505-19.
6. Liu H, Wu C, Lin J, et al. Genetic etiology in nonsyndromic mandibular prognathism. Arch Craniofac Surg 2017; 28:161-9.
7. Proffit WR, Fields HW, Larson B, et al. Contemporary orthodontics-e-book. Elsevier sci 2018.
8. Al-Khalifa HN. Orthopedic Correction of Class III Malocclusions during Mixed Dentition. Open J Stomatol 2014.
9. Levin AS, McNamara Jr JA, Franchi L, et al. Short-term and long-term treatment outcomes with the FR-3 appliance of Fränkel. Am J Orthod Dentofacial Orthop 2008; 134:513-24.
10. Maino G, Turci Y, Arreghini A, et al. Skeletal and dentoalveolar effects of hybrid rapid palatal expansion and facemask treatment in growing skeletal Class III patients. Am J Orthod Dentofacial Orthop 2018; 153:262-8.
11. Beattie JR, Paquette DE, Johnston Jr LE. The functional impact of extraction and nonextraction treatments: a long-term comparison in patients with “borderline,” equally susceptible Class II malocclusions. Am J Orthod Dentofacial Orthop 1994; 105:444-9.
12. Freeman CS, McNamara Jr JA, Baccetti T, et al. Treatment effects of the bionator and high-pull facebow combination followed by fixed appliances in patients with increased vertical dimensions. Am J Orthod Dentofacial Orthop 2007; 131:184-95.