

INTEGRATED ORTHO-SURGICAL APPROACH FOR MANAGEMENT OF ADULT SKELETAL CLASS-III MALOCCLUSION

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ABSTRACT

Inpatients with severe dentofacial deformity beyond the scope of growth modification or orthodontic camouflage, the only possible solution left is surgery to reposition the jaws or dentoalveolar segments to their proper relationship. The correction of skeletal Class III malocclusion with severe mandibular prognathism in an adult individual is one such situation that requires combination of surgical and Orthodontic therapy. The case report of an adult individual with Class III malocclusion, having mandibular excess in sagittal and vertical plane and treated with orthodontics, bilateral sagittal split osteotomy for the correction of skeletal, dental and soft tissue discrepancies is herewith presented. The surgical-orthodontic combination therapy has resulted in near-normal skeletal, dental and soft tissue relationship, with marked improvement in the facial esthetics which in turn, has helped the patient to improve the self-confidence level.

KEY WORDS

Orthognathic Surgery, Bilateral sagittal split osteotomy, surgical orthodontics

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INTRODUCTION

The combination treatment for skeletal malocclusions in adult individuals has been used not only to achieve a functional and stable occlusion but also to establish normal skeletal relationships with esthetically pleasing soft tissue profile.¹ Orthognathic surgery and Orthodontic therapy are compliment to each other in these types of cases to achieve the desired results.² Accurate clinical examinations followed by the right diagnosis and treatment planning are essential.

Class III malocclusion is considered to be one of the most difficult and complex orthodontic problems to treat. Prevalence of class III malocclusion in Caucasians ranges from 0.8 to 4.0% and rises up to 12 to 13% in Chinese and Japanese populations, while in North Indian population, class III malocclusion is found in up to 3.4% of the population.³⁻⁵

Individuals with class III malocclusion frequently show combinations of skeletal and dentoalveolar components. Several distinct cephalometric features have been reported in class III patients, such as a short anterior cranial base length, acute cranial base angle, a short and retrusive maxilla, proclined maxillary incisors, retroclined mandibular incisors, an excessive lower anterior face height, obtuse gonial angle and a prognathic mandible.

Skeletal class III malocclusion may either be associated with maxillary retrusions, mandibular protrusion, or a combination of the two.^{6,7} These complex cases require careful treatment planning, an integrated approach and patient cooperation.⁸ A poor facial appearance is often the patient's chief complaint, but it may be accompanied by functional problems, temporomandibular disorders, or psychosocial handicaps.⁹ In this case report, we present the treatment of an adult female with skeletal class III malocclusion.

CASE REPORT

Diagnosis and Etiology

A 20-year-old Bengali female presented with

the chief complaint of an unesthetic facial and dental appearance. The patient had no relevant history of medical problem and no signs and symptoms of temporomandibular disorders. She presented with a severe class III malocclusion with 3.5-mm reverse overjet. The family had no history of skeletal class III malocclusion. External examination revealed that patient had a leptoprosopic facial form and dolicocephalic head form. Lateral view and oblique view showed pronounced mandibular prognathism and midface deficiency with concave profile. Extraoral examination also revealed that the labiomental fold was diminished, nasolabial angle was acute, increased anterior facial height, obtuse gonial angle and presence of slight skeletal asymmetry. [Figures 1,2,3]

Intraorally the patient had class-III molar and canine relationships, reverse horizontal overjet in the incisor region, mandibular anterior teeth were lingually inclined (natural compensation) presence of crowding in mandibular anterior region and maxillary teeth were slightly protrusive.

Patient was advised for Orthopantomogram, Lateralcephalogram and postero anterior Cephalogram. [Figure 4,5]

Clinical examination and evaluation of diagnostic records showed that patient has Class III skeletal malocclusion with mandibular prognathism and presence of crowding in lower arch, lingually inclined lower anteriors.



Figure 1 - Pre treatment extra oral profile



Figure-2 Pre Treatment Extra oral frontal photo at rest



Figure-3 Pre Treatment Extraoral frontal photo at smile



Figure - 4 Lateral Cephalogram



Figure - 5 Orthopantomogram

OBJECTIVES OF THE TREATMENT

1. To attain a pleasing profile by improving the relationships of jaw bases
2. Correction of crossbite
3. Correction of crowding in the mandibular anterior teeth region.
4. Adequate torque for maxillary and mandibular incisors.

TREATMENT PLAN

1. Preliminary phase of pre-surgical fixed orthodontic treatment for decompensation and coordination of the dental arches.
2. Correction of mandibular prognathism and skeletal asymmetry via asymmetric mandibular setback surgery.
3. Post-surgical orthodontic finishing and detailing.



**Figure - 6 Treatment progress
Intraoral right lateral photo**



**Figure -7 Treatment progress
Intraoral Frontal photo**



**Figure-8 Treatment progress
Intraoral left lateral photo**



**Figure-9 Intraoral occlusal
photograph of maxillary arch**



**Figure-10 Intraoral occlusal
photograph of mandibular arch**



**Figure-11 Surgical
splint**



Figure-12 Nemoceph software Prediction



**Figure-13 Cephalometric analysis
through nemoceph**



**Figure-14 Surgical osteotomy
cut on left side**



**Figure-15 Excised bony
segment**



**Figure-16 Immediate post-operative
occlusion & miniplate fixation**

Bilateral sagittal split osteotomy with presurgical and post surgical orthodontics was planned to achieve esthetically acceptable, functionally optimum occlusion with straight facial profile and minimum traumatic surgical exposure to the patient. Presurgical orthodontics in both the arches was done to relieve maxillary and mandibular crowding. Maxillary and mandibular arches were aligned upto 0.019 × 0.022 stainless steel wire with 0.022 slot pre adjusted edgewise appliances. The mandibular incisors were decompensated by proclining them in normal inclination and the arch forms were coordinated. [Figure 6,7,8,9,10]

Earlier it was confirmed that patient had a skeletal asymmetry by postero-anterior cephalogram the differential set back of 9 mm on the right side and 8 mm on the left side was estimated to achieve class I molar and canine relation and to match the midline. Before orthognathic surgery, the surgical splint was prepared. The surgical splint was fabricated after mock surgery of mandibular asymmetric set back. [Figure11]

The extent of mandibular set back was confirmed with treatment simulation using Nimo-ceph software [Figure-12,13]

SURGICAL PROCEDURE

Retromolar area was exposed using modified third molar incision. Bilateral sagittal split osteotomy with short lingual split was carried out using surgical saws and the differential setback was achieved.

Fixation was done using four-hole miniplates and screw on both sides. Intermaxillary elastics were placed on braces for 14 days in immediate postoperative phase. The patient was followed closely after the procedure and was guided to perform opening and lateral movements. [Figure-14,15,16]

After that fixed appliances were removed and a retention appliance was delivered.

To get the estimation of the skeletal and dental Parameter by combined orthosurgical procedure the cephalometric analysis was done.

DISCUSSION

This case report describes the treatment of an adult male with dental and skeletal class III relationships. Surgical-orthodontic treatment was the best option for achieving an acceptable occlusion

Orthodontic treatment was resumed 6 weeks after the surgery. [Figure-17,18,19,20,21,22]



Figure-17 Post Treatment Intraoral right lateral photo



Figure-18 PostTreatment Intraoral Frontal photo



Figure-19 Post Treatment Intraoral left lateral photo



Figure-20 Post Treatment Extraoral Profile



Figure-21 Post Treatment Extraoral frontal photo at rest



Figure-22 Post Treatment Extraoral frontal photo at smile

Table-1 (Cephalometric parameters)

PARAMETER	PRETREATMENT	PRESURGICAL	POST TREATMENT
<i>Horizontal (Skeletal)</i>			
SNA	84°	84°	84°
SNB	90°	90°	85°
ANB	-6°	-6°	-1°
A-Nperp (mm)	-1mm	-1mm	-1mm
Pg-Nperp (mm)	13mm	13mm	4mm
<i>Vertical (Skeletal & Dental)</i>			
N-ANS (_HP)	56mm	56mm	58mm
ANS-Gn (_HP)	75mm	75mm	74mm
PNS-N (_HP)	56mm	56mm	56mm
MP-HP<	29°	30°	26°
SN-Go Gn	29°	29°	30°

and a good esthetic result in this case. An experienced multidisciplinary team approach ensures a satisfactory outcome. Presurgical orthodontics removes all the dental compensations and suggests the location and extent of the skeletal discrepancy. Normal skeletal base relationship is achieved by osteotomy and setback of the prognathic mandible, postsurgical orthodontics guides the normal occlusal rehabilitation by correcting any emerging dental discrepancies.

Skeletal class III anomalies are one of the most complicated problems in both childhood and adulthood of all dentofacial abnormalities.¹⁰⁻¹¹ Many studies have demonstrated that transverse dental compensation is correlated with skeletal asymmetry.¹²⁻¹⁵ Inclinations of the occlusal plane observed in the posteroanterior cephalograms are important characteristics to determine the extension of facial asymmetry. Class III skeletal problems are treated with a combination of orthodontic and orthopedic mechanics in growing individuals whereas, correction of the Class III malocclusion usually requires complex surgical procedures during adulthood for attainment of an optimal aesthetic and functional result in Class III patients.¹⁶

CONCLUSION

Skeletal class III anomalies are one of the most complicated problems in both childhood and adulthood of all dentofacial abnormalities.¹⁰⁻¹¹ Many studies have demonstrated that transverse dental compensation is correlated with skeletal asymmetry.¹²⁻¹⁵ Inclinations of the occlusal plane observed in the posteroanterior cephalograms are important characteristics to determine the extension of facial asymmetry. Class III skeletal problems are treated with a combination of orthodontic and orthopedic mechanics in growing individuals whereas, correction of the Class III malocclusion usually requires complex surgical procedures during adulthood for attainment of an optimal aesthetic and functional result in Class III patients.¹⁶

The Orthodontics–surgical combination therapy has been successful in this case of skeletal Class III malocclusion. It is also evident that the self-confidence level of the individual was raised considerably following total change in perception.

The objective of orthognathic surgery is to achieve adequate improvement in function, esthetic and stability thus enhances the personality, life style and channel the patient into self esteem. For

successful outcome of orthognathic surgery both orthodontist as well as the oral and maxillofacial surgeons are equal contributors.

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