

## Case Report

# Case report on the surgical correction of skeletal Class III by maxillary advancement

### ABSTRACT

Class III malocclusion is exhibited either due to excessive mandibular growth, deficient maxillary growth, or both. Neither growth modification nor camouflage offers a solution for patients with severe Class III malocclusion. Surgery to realign the jaws or reposition dentoalveolar segments is the possible and stable treatment option. A combination of orthodontic and orthognathic phases offers remarkable results along with enhanced psychosocial acceptance. In this case report, Lefort I osteotomy was performed with maxillary inferior repositioning and advancement in a 25-year-old patient with skeletal Class III.

**Keywords:** Lefort-I osteotomy, maxillary advancement, skeletal Class III malocclusion

### INTRODUCTION

Skeletal Class III malocclusion may either be associated with maxillary retrusion, mandibular protrusion, or a combination of the two.<sup>[1]</sup> These complex cases require careful treatment planning, an integrated approach, and patient cooperation. A poor facial appearance is often the patient's chief complaint, but it may be accompanied by functional problems. The combination of orthodontic treatment and orthognathic surgery is often used for adult patients with severe skeletal Class III discrepancies. The Class III malocclusion was originally thought to be caused by excessive mandibular growth. More recently, the diagnosis and treatment planning paradigms have shifted to indicate a greater role for maxillary deficiency alone or combined with mandibular growth excess.<sup>[2,3]</sup> In maxillary deficient cases, decreased vertical development of the maxilla increases the prominence of the chin by allowing the mandible to rotate upward and forward. This is accompanied by minimal incisal and gingival visibility which adds to the esthetic problems associated with skeletal Class III. Reduced lower anterior face height, deep overbite, and passive lip seal associated with a Class III malocclusion

have a better prognosis because treatment-induced backward rotation of the mandible will assist in camouflaging the Anteroposterior (AP) discrepancies.<sup>[4]</sup>

The aim of the present article is to emphasize the importance of surgical intervention in maxillary deficient case.

### CASE REPORT

A 25-year-old female patient reported to the department of orthodontics and dentofacial orthopedics, with the chief complaint of backwardly placed upper front teeth.

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She also complained of mild forward positioning of the lower jaw along with anterior crossbite. On extraoral examination, the patient revealed to have a mild concave profile and a clinically low Frankfort mandibular plane Angle (FMA) which could be attributed to vertically deficient maxilla leading to the upward and forward rotation of the mandible. The patient exhibited a normal nasolabial angle, competent lips with mild protrusion of the lower lip. During smile, decreased incisal exposure without revealing gingiva was other relevant findings. Intraoral examination revealed Class III molar and canine relation with anterior crossbite of 2 mm and mild crowding in the lower anterior region and missing maxillary left second molar [Figure 1].

### Diagnosis and treatment plan

The patient was diagnosed as a skeletal Class III with ANB of  $-6^\circ$  and hypodivergent jaw bases with FMA of  $20^\circ$  [Figure 2]. It was planned to treat the patient surgically by maxillary down fracture and advancement. Advancing the maxillary base would allow the correction of anterior crossbite and bring about fullness in the malar region. This would also increase the incisor exposure.

### Treatment objectives

The following treatment objectives were planned:

1. Correct the skeletal Class III anteroposterior jaw relationship
2. Coordinate the widths of the dental arches
3. Achieve an ideal overjet and overbite relationship
4. Relieve dental compensation by straightening the mandibular incisors to an upright position over the basal bone
5. Increase incisor exposure and enhance smile esthetics.

### Treatment progress

The preoperative orthodontic preparation was performed with preadjusted, 0.022 inch, edgewise appliances [Figure 3]. The leveling and alignment procedures were performed over 8 months. Facebow transfer and mock surgery was performed to assess the amount of maxillary advancement, and surgical splint was made on the mounted models [Figure 4]. LeFort I procedure with clockwise rotation, 8 mm advancement, and 3 mm anterior inferior repositioning was performed [Figures 5 and 6]. Six weeks after the surgery, finishing was performed with 0.014-inch stainless steel maxillary and mandibular archwires. The appliances were removed after 14 months of active treatment. Fixed lingual retainers were bonded to the lingual surfaces of the anterior teeth in both arches. Maxillary and mandibular Essix retainers were delivered with instructions to use them 24 h/day for the next 12 months.

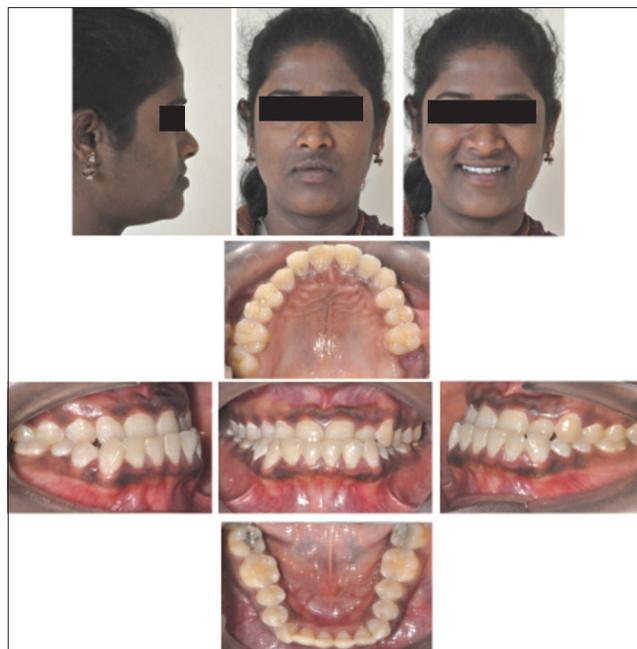


Figure 1: Pretreatment photographs

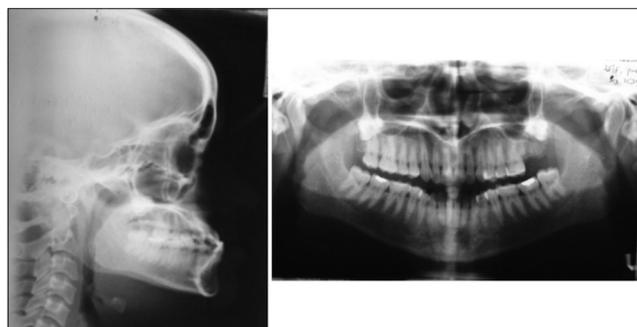


Figure 2: Pretreatment radiographs



Figure 3: Treatment progress with initial aligning 0.016 NiTi archwires

### Treatment results

The ideal overjet and overbite was established after the surgery. Class I canine and molar relationships were established. The cephalometric changes included

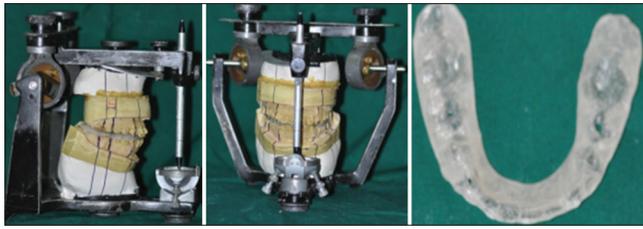


Figure 4: Mock surgery for maxillary advancement and surgical splint

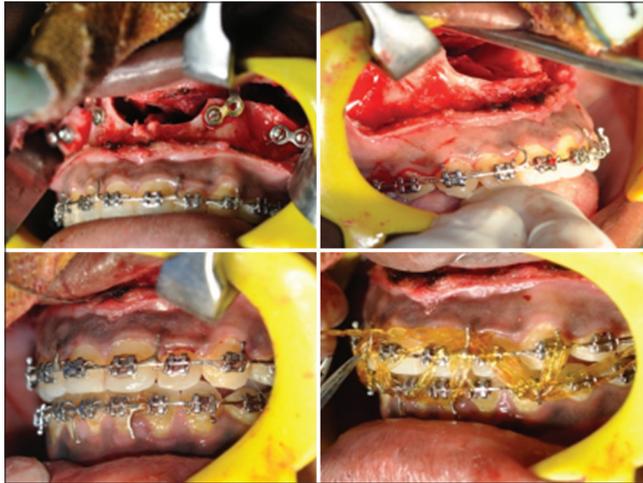


Figure 6: Lefort I surgical photographs

an increase in the ANB angle and the correction of inclinations of maxillary and mandibular incisors. The profile was remarkably improved along with increase in the midfacial height. The advancement of the maxilla also improved the mid-face deficiency sagittally. Down fracturing the maxilla led to opening of the mandibular plane angle, thereby rotating the mandible downward and backward. The maxillary incisor exposure was increased at rest and smile esthetics improved [Figures 7-10 and Table 1].

## DISCUSSION

The combined orthodontic orthognathic treatment is the option for severe skeletal Class III cases. In isolated maxillary advancement, there is an 80% chance of no significant change (<2 mm) in the position of the maxilla postsurgically and essentially no chance of more than a 4-mm change.<sup>[5]</sup> The results gathered from the University of North Carolina clinical trial suggested that half of the sample had only the maxilla advanced. The rest of the sample had the mandible setback, although mandibular surgery usually was combined with maxillary surgery. Less than 10% of the patients had mandibular surgery alone.<sup>[6]</sup> Therefore, maxillary deficiency is as important or more important in the development of Class III problems as compared to mandibular excess as

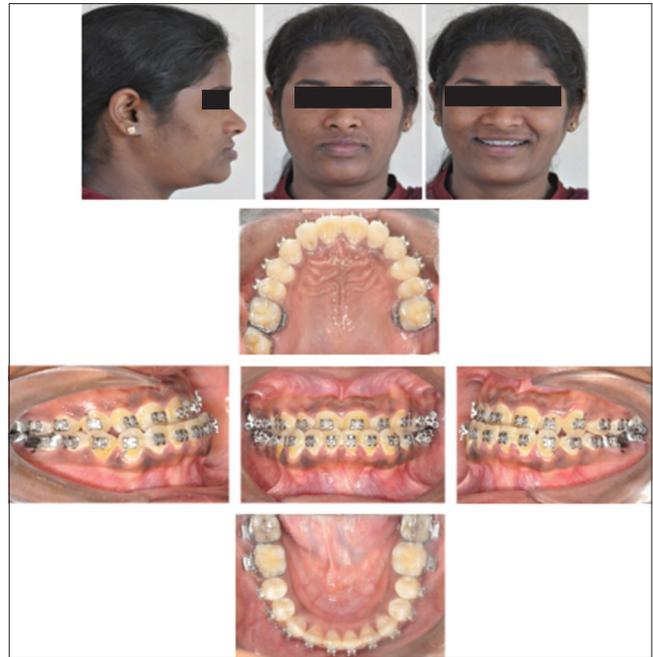


Figure 5: Presurgical photographs

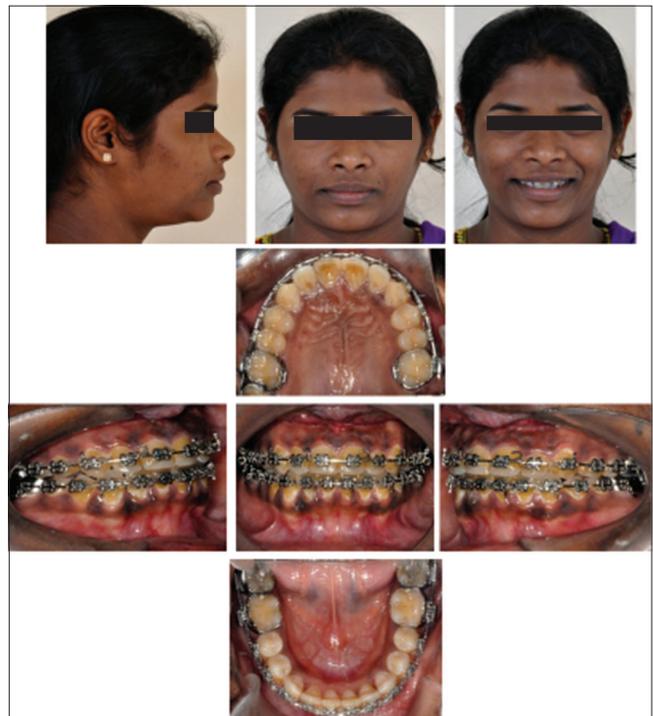


Figure 7: Postsurgical photographs

shown in the present case report. According to the research, horizontal maxillary advancement had excellent stability at 1 year; a relapse of 0%–100% was reported in cases of maxillary inferior repositioning with wire fixation; therefore, it has been observed that rigid fixation is much more stable.<sup>[7-9]</sup> The amount of mandibular relapse was also found to be correlated



Figure 8: Posttreatment photographs



Figure 9: Posttreatment cephalogram

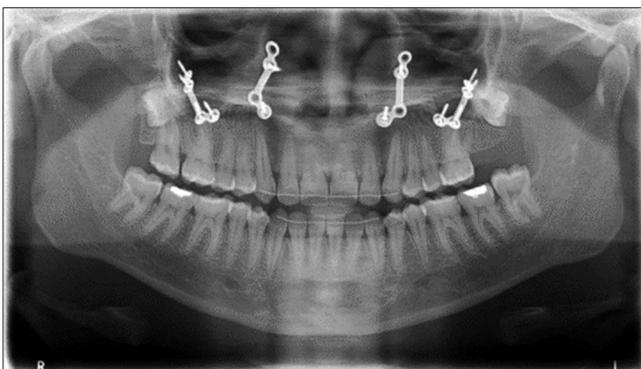


Figure 10: Posttreatment orthopantamogram

Table 1: Pre and post treatment cephalometric values comparison

Measurement	Pre-treatment value	Post-treatment value
SNA	76°	82°
SNB	82°	82°
ANB	-6°	0°
GO-GN - SN	20°	22°
FMA	20°	21°
IMPA	91°	102°
UPPER 1 TO SN	125°	114°

to the amount of setback in the wire fixation sample, but not in rigid fixation sample.<sup>[10,11]</sup>

### CONCLUSION

In the present case report, combined orthodontic and surgical treatment of maxillary advancement with inferior positioning provided the patient with improved facial esthetics and stable functional occlusion.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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