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Case Report

# Mandibular pitching in management of severe open bite– A case report

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ABSTRACT

**Aim:** This case report outlines the management of severe skeletal open bite with SFOA.
**Background:** Different treatment modalities are available to treat Class III Skeletal open bite. But the best treatment outcome can be achieved only when the treatment plan is individualized for every patient.
**Case Description:** A 18-year-old male patient with an Open bite and a class III skeletal base. Treated by Surgery first approach followed by Orthodontic treatment to transform the patient profile and smile.
**Conclusion:** SFOA can be considered as a good option in patients with mandibular prognathism.
**Clinical Significance:** Mandibular anterior pitch-up surgery offers an immediate solution in patients with severe skeletal open bite.



## 1. Introduction

Apertognathia, identified as an open bite, despite being one of the most prevalent malocclusions, is strenuous to treat owing to its multifactorial etiology. This often influences the aesthetics in addition to causing impairment of the articulation in certain scenarios thereby leading to adverse psychological conditions.

When orthognathic surgery is performed without any decompensation, the post-surgical dental decompensation is usually coincident with the innate compensatory adaptation process.[1] Therefore, orthognathic surgery without presurgical de-compensation may be a reliable treatment modality in class III patients.[2] SFA protocol enables the orthodontist to achieve good facial esthetics and occlusion with minimum pre-operative orthodontics.

This case report explains the sequence of treatment in a patient with skeletal class III malocclusion with open bite.

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## 2. Case Report

An 18-year-old male patient who was distressed about his appearance sought treatment to the Department of Orthodontics with the major complaint of forwardly placed lower jaw. On general examination, the patient was found to be moderately nourished and his skeletal age corresponds with his chronological age.

On extraoral examination, the patient presented with a slopped forehead, concave and upturned nose with pointed nose tip, average nasolabial angle, positive lip step, an increased lower facial height, concave profile with anterior divergence, high clinical FMA, shallow mentolabial sulcus and oblong face.

On intraoral examination, the patient had Angle's Class III molar relationship with an open bite of 6mm, reverse overjet of 4mm with lower midline shift to left by 2mm, crossbite concerning 13,14,15,24,25, proclined upper and retroclined lower incisors and congenitally missing lower lateral incisors – 32,42.

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**Figure 1:** Pre-treatment extra-oral photographs and radiographs

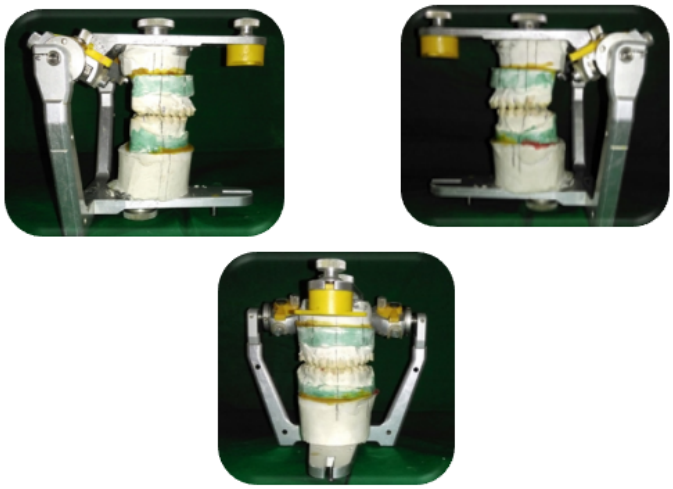

**Figure 2:** Articulated models with mock surgery

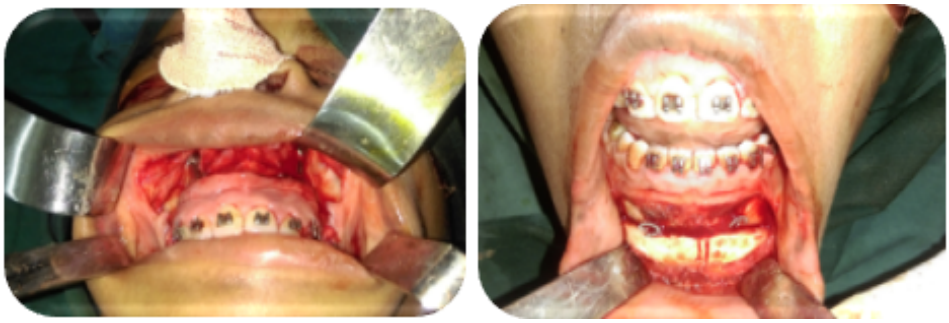

**Figure 3:** Surgical photographs

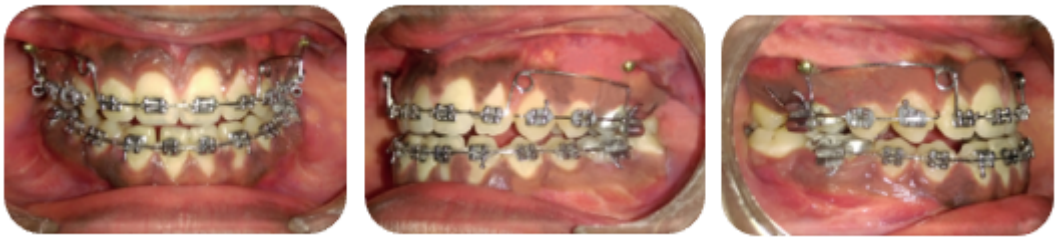

**Figure 4:** Post- surgical photographs

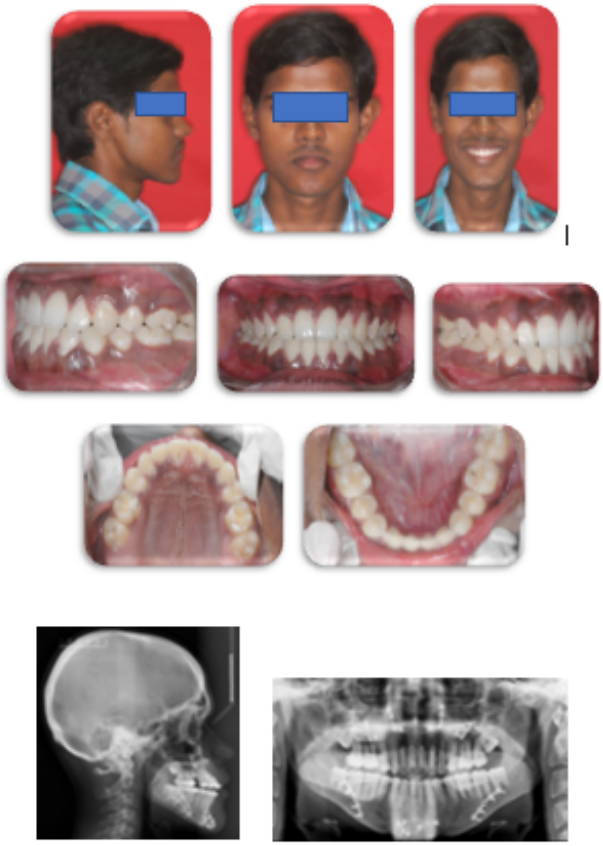

**Figure 5:** Post-treatment photographs and radiographs

**Figure 6:** Follow-up photographs and radiographs

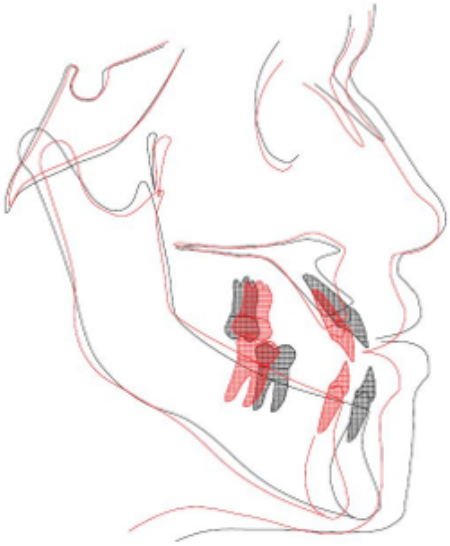

**Figure 7:** Superimposition of pretreatment and post treatment radiographs

**Table 1:** Pre and post treatment cephalometric comparisonvalues

| Cephalometric criteria | Pre | Post |
|---|---|---|
| ANB | -4 | +4º |
| Wit's | 11 | 0 mm |
| NAPg | -11 | 2mm |
| NF to 1 | 25mm | 33mm |
| NF to 6 | 24 mm | 25 mm |
| 1 to NA | 39º, 9mm | 27º, 5 mm |
| 1 to SN | 125º | 118 º |
| 1 to MP | 36mm | 37mm |
| 6 to MP | 29mm | 32 mm |
| 1 to NB | 24 º, 5mm | 28 º, 5mm |
| IMPA | 77 º | 82 º |
| nasolabial angle | 96 º | 107 º |
| facial angle | 109 º | 96 º |

Analysis of the lateral cephalogram revealed a skeletal class III malocclusion due to retrognathic maxilla and prognathic mandible, backwardly rotating mandible on a high mandibular plane angle with a protrusive chin. OPG analysis reveals a lateral shift of mandible with congenitally missing lower lateral incisors 32,42, erupting 37,47 and impacted 18,28.

In reckon with the clinical examination and radiographic findings, the patient was diagnosed to have a skeletal Open bite with Angle's Class III Molar relation on a class III skeletal base attributing to backwardly rotating mandible with proclined upper anteriors and retroclined lower incisors with an open bite of 5mm, reverse overjet of 4mm with lower midline shift to left by 2mm and crossbite concerning 13,14,15,24,25, and congenitally missing lower incisors in relation to 32 and 42.

## 3. Treatment Plan

The surgery first approach (SFA) embodies maxillary advancement by 6mm, Mandibular set back of 2mm associated with Anterior pitch up by Bilateral Sagittal Split Osteotomy followed by Vertical Reduction & Advancement Genioplasty of 4mm. In order to address the proclination of maxillary incisors and also to obtain molar correction into a class I relationship, on table extraction of 15,25 during surgery was planned. The post-surgical orthodontic treatment was planned to achieve complete space closure of the extracted teeth and to obtain a bilateral class I relationship of molar and canine with coincident dental and facial midlines.[2]

## 4. Treatment Progress

Based on the diagnostic data, the above discussed treatment plan was executed as three distinct phases of management[3].

### *4.1. Phase I: Pre-surgical orthodontic phase*

As given by Jin Young Choi, MEMO[4] STRATEGY (Maximum efficiency Minimum Orthodontics) was employed. The treatment was commenced by bonding 0.022" ×0.028" MBT pre-adjusted edgewise prescription appliance. After two months of initial alignment with NiTi wires, upper and lower arch impressions and supplementary pre-surgical records including radiographs and photographs were taken for surgical planning.

Face bow transfer was performed and the mock surgery was done manually with the pre-surgical dental models which were articulated into a non-arcon semi-adjustable SAM3 articulator. Abiding by the treatment plan, an intermediate acrylic splint was made after the advancement of the maxillary model. The mandibular cast was then positioned anterior upwards mimicking the pitch up movement and the final occlusal splint was fabricated.

### *4.2. Phase II: Surgical phase*

A Lefort I osteotomy of the maxillary arch was performed by advancing it to 6mm. A bilateral sagittal split osteotomy cut with a set back of 6mm was made in the mandible with an anterior pitch up to correct anterior open bite and to achieve class I molar bilaterally. This was followed by vertical reduction with advancement genioplasty.[5] Extraction of 15,25 was carried out during the surgery.

### *4.3. Phase III: Post-surgical orthodontic phase*

Upon gaining satisfactory healing, 0.019" ×0.025" SS for retraction and 0.021" ×0.025" SS as final stabilizing wires were used. With the envision to maintain the molar position, implants were placed between the first and second molars and the molars were tied to the implants. At the end of retraction, the incisors were in an edge-to-edge relationship after which protraction arches were utilized to bring labial crown torque and extrusion in the anterior dental region. Once the settling was completed, debonding of the fixed appliance was executed with Begg's wrap-around retainer in the upper arch and lower lingual bonded retainer. The treatment was completed in a duration of 15 months with symmetrical facial midline, harmonious facial profile, and dental occlusion.[6]

## 5. Treatment Results

Evaluation of post-treatment records showed that the treatment objectives have been achieved. Follow-up evaluation was done four years after the completion of the treatment in which the lateral cephalometric analysis showed improvement in the Maxillomandibular relationship as shown in Table 1.

## 6. Discussion

Open bite is defined as the lack of vertical overlap of anterior teeth in centric occlusion with a prevalence of 0.5% in the south Indian population.[7] Skeletal class III patients with AOB and mandibular excess are most favorably treated with orthognathic surgery owing to the shortening of mandibular excess and reducing anterior facial height.

Postoperative stability is best in skeletal class III due to the relaxation of masticatory and hyoid muscle with backward repositioning of mandible.[8] The visual impact of the facial decompensation during pre-surgical orthodontics would aggravate the deformity at soft tissue levels, aggravating the mental status and affecting the quality of life.[9]

Surgery first approach has leverage over conventional orthognathic surgery in terms of patients cooperation, treatment time, and effective decompensation . Furthermore, complications such as gingival recession or root resorption can occur during preoperative orthodontic treatment which is overcome by SFOA. According to Liao et al, in open bite cases, the surgery-first orthognathics approach provides significant benefits to patients with skeletal class III open bite receiving bimaxillary surgery along with rapid profile improvement and reduced treatment time.[10]

## 7. Conclusion

The "surgery first" approach, combined with orthodontic biomechanics, provides significant benefits to skeletal Class III patients compared with traditional surgical-orthodontic treatment. Among its advantages are rapid profile improvement, more efficient and effective decompensation, and greatly reduced treatment time which outweighs its disadvantages. This new treatment approach may become a standard clinical option soon. The stability of the new mandibular position after four years remains the same. The overall treatment results seem to have had an affirmative impression on his personality and his self-esteem and improved his quality of life.

## 8. Source of Funding

None.

## 9. Conflict of Interest

None.

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