Case Study

Class III Malocclusion Surgical-Orthodontic Treatment: A Case Report

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ABSTRACT

22-year-old female, presented with c/c of forwardly placed lower jaw. Extraorally, the patient had a concave profile, incompetent lips, positive lip step, and . Intraorally, the patient had Angle's class III malocclusion with an overjet of (–1) mm, and cross-bite wrt 22,32. The patient was skeletal class III due to macrognathic and prognathic mandible with average growth pattern, and proclined upper and lower incisors. The patient was managed orthosurgically with bilateral sagittal split osteotomy surgery (mandibular setback 6mm on right side and 5mm on left side ) and advancement genioplasty. The case report discusses in detail the diagnosis and comprehensive management of the skeletal class III case.
INTRODUCTION:
Occlusal discrepancies and severe dental and facial deformities in adults usually require treatment combined with orthodontics and orthognathic surgery to achieve optimal, stable, functional, and esthetic results. To achieve this, the orthodontist and the surgeon must be able to correctly diagnose dental and skeletal deformities and establish an appropriate treatment plan for that patient. In Class III malocclusions, the mandible is typically the aberrant skeletal component of the patient's craniofacial anomaly. The standard approach for adults with dentofacial deformities is surgical-orthodontic treatment. Proper evaluation of patients requires examination of facial soft and hard tissues. When planning surgery for Class III patients, the lip position is an important point to consider. This article describes the treatment of a Class III patient including the jaw surgery, Bilateral sagittal split osteotomy procedures were performed to set back the mandible. After treatment, orthognathic surgery patients benefit from an improved smile, more positive esthetics, increased self-esteem, and consequently a better quality of life. Orthognathic surgery involves the surgical correction of the components of the facial skeleton to restore the proper anatomical and functional relationship in patients with dentofacial skeletal abnormalities. An important component of orthognathic surgery is the bilateral sagittal split osteotomy (bsso), which is the most commonly performed jaw surgery, either with or without upper jaw surgery. Indications for a bilateral sagittal split include horizontal mandibular excess, deficiency, and/or asymmetry. It is the most commonly performed procedure for mandibular advancement and can also be utilized for a mandibular setback of small to moderate magnitude.

Case report
The patient was a 22 year old woman presenting with the chief complaint of “protruding lower jaw”. No familial history of such a malocclusion was reported. She had previously had her lower left second molar extracted. Extra oral examination indicated a concave profile fig.1.3 with an apparently normal mid face accompanied by mandibular prognathism with incompetent lips. (Fig.1.3 )

Pre Treatment Extraoral Photographs

1.1
1.2
1.3
Pre Treatment Intraoral Photographs

1.4

1.5

1.6

1.7

1.8
Pre Treatment Orthopantomogram (Fig 1.9)

Pre-Treatment Lateral Cephalogram (Fig 1.10)
Midtreatment Photographs:

2.1

2.2

2.3

2.4

Mid Treatment Orthopantomogram (Fig 2.5)
Presurgical Extraoral Photograph (Fig 3.1-3.3)

Presurgical Intraoral Photograph 3.4

3.5

3.6
During Surgery Photographs

4.1

4.2

4.3

4.4

4.5

4.6
Postsurgical Extraoral Photograph

5.1  
5.2  
5.3  

Postsurgical Intraoral Photograph

5.4  
5.5  
5.6
Postsurgical Orthopantomogram Fig-5.7

 Postsurgical Lateral Cephalogram Fig-5.8
Settling Phase (fig 6.1)

Fig 6.2

Fig 6.3
After Debonding Photographs

7.1  7.2  7.3

7.4

7.5  7.6
**Composite Analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-Treatment</th>
<th>Post – Treatment</th>
<th>Normal value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNA</td>
<td>78°</td>
<td>79°</td>
<td>82° ± 2</td>
</tr>
<tr>
<td>SNB</td>
<td>85°</td>
<td>78°</td>
<td>80°±2</td>
</tr>
<tr>
<td>ANB</td>
<td>-6°</td>
<td>1°</td>
<td>2°</td>
</tr>
<tr>
<td>FMPA</td>
<td>26°</td>
<td>28°</td>
<td>16-35°</td>
</tr>
<tr>
<td>Y-axis</td>
<td>62°</td>
<td>66°</td>
<td>53-66°</td>
</tr>
<tr>
<td>Wits</td>
<td>BO is ahead of AO by 6mm</td>
<td>BO is ahead of AO by 1mm</td>
<td>BO is ahead of AO by 1mm</td>
</tr>
<tr>
<td>U1-NA</td>
<td>7.5mm</td>
<td>4mm</td>
<td>4mm</td>
</tr>
<tr>
<td>L1-NB</td>
<td>6mm</td>
<td>3mm</td>
<td>4mm</td>
</tr>
<tr>
<td>U1-NA ANGULAR</td>
<td>44°</td>
<td>23°</td>
<td>22°</td>
</tr>
<tr>
<td>L1-NB</td>
<td>27°</td>
<td>24°</td>
<td>25</td>
</tr>
<tr>
<td>Inter-incisal angle</td>
<td>115°</td>
<td>134°</td>
<td>130-150°</td>
</tr>
<tr>
<td>U1-sn</td>
<td>123°</td>
<td>104°</td>
<td>102°+/~ 2</td>
</tr>
<tr>
<td>Nasolabial angle</td>
<td>104°</td>
<td>105°</td>
<td>102°+/~4</td>
</tr>
<tr>
<td>Upper lip-e line</td>
<td>5mm behind</td>
<td>4mm</td>
<td>4mm behind</td>
</tr>
<tr>
<td>Lower lip- e line</td>
<td>3mm ahead</td>
<td>-1mm</td>
<td>2mm behind</td>
</tr>
</tbody>
</table>

Tmj examination was not suggestive of any pathology. On intra-oral examination, all teeth except the previously extracted lower left second molar were found to be erupted in the oral cavity. Molar relationships were angle’s class III on right side class I on left side. Negative overjet was present. (Fig.1.5 and 1.6)

Panoramic and lateral Cephalogram views were obtained. (fig 1.9 and 1.10)

**On clinical and radiographic examination** the patient was diagnosed as retroclined maxillary anterior teeth on class iii skeletal base with prognathic mandible.
1. Treatment objectives: correction of proclination of upper anteriors
2. Correction of prognathic mandible
3. Correction of incompetent lip
4. Correction of lip trap
5. Correction of negative overjet
6. Achieving class I canine and class I molar relationship on both side
7. To achieve good esthetic harmony and functional occlusion and structural balance (Table I)

Treatment plan:
Treatment starting with 14, 24 extraction. Lower space utilization to reduce the proclination. By giving preadjusted edgewise appliance-using MBT bracket system 0.022 slot. Level and align the arches. Mandibular setback- asymmetric-single jaw surgery (FIG 4.1-4.6) and advancement genioplasty.

Treatment progress:
Treatment started with 14, 24 extraction, pre-adjusted edgewise fixed appliances (0.022” slot, mbt prescription) were placed in the upper and lower dentitions, with all second molars included in the strap up. The arches were leveled, aligned. And coordinated for a period of 8 months, progressing from light 0.016” HANT wires to 0.019“ x 0.025” rigid, rectangular steel wires. On 0.019” x 0.025” rigid, rectangular steel wire retraction done with soldered j hook. Expected “worsening” of the malocclusion occurred, with accentuation of the profile concavity as well as mandibular asymmetry. Following this, model surgery was performed and a surgical splint constructed. The patient was then referred to the oral surgeon and a bilateral sagittal split osteotomy with asymmetric mandibular setback was performed and advancement genioplasty. Post-surgery, the patient functioned into the splint for a period of 6 weeks until she returned to the orthodontist. Finishing and detailing procedures were carried out and settling of the posterior occlusion was achieved in 4 months, using triangular elastics bilaterally (fig 6.1,6.2 and 6.3). Following debonding, the upper and lower arches were stabilized with bonded retainers.

Treatment result:
As a result of combined orthodontic and orthognathic treatment, the mandibular prognathism was addressed and the asymmetry of the mandibular midline was corrected. (Fig 7). Together with the correction of the sagittal relationship of the upper and lower jaws, a straight and esthetic profile was obtained. A class I occlusal and skeletal relationship was achieved with acceptable interdigitation and normal incisor relationship. (Fig 7.5 and 7.6).

DISCUSSION:
Orthognathic surgery is usually reserved for dentoskeletal disproportions that are so severe that they cannot be corrected using orthodontic appliances alone. It is generally accepted that the main benefits of orthognathic treatment are likely to be psychosocial in nature and that the majority of patients who seek treatment do so because of concerns about their Dentofacial esthetics. Johnston et al reported that patients requiring orthognathic surgery were less happy with the appearance of their face, teeth, and profile when compared with controls. This patient was a 22 year old woman who was deeply concerned about her facial appearance. Growth modification was no longer feasible while camouflage treatment would not be sufficient to address the patient’s esthetic concerns. The presence of a prognathic mandible with cross bite and mid-line deviation, along with a relatively normal mid–face, influenced the decision in favor of a single-jaw surgery. They considered normal incisal relationship achieved to be influential on the soft tissues overlying both incisors leading to a better lip competence and posture.
CONCLUSION:
combined orthodontic and surgical management of skeletal class III malocclusion in adult patients is a stable and accepted treatment modality that allows the achievement of both profile correction as well as acceptable occlusion. The decision for a one-jaw versus two-jaw surgery should depend on objective evaluation of the patient’s profile, the extent of the skeletal discrepancy and stability factors.

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