COMBINED ORTHODONTIC AND SURGICAL APPROACH FOR CORRECTION OF LONG FACE SYNDROME: A CASE REPORT

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Abstract
Treating a long face deformity requires a well planned multidisciplinary approach. Excessive lower face height is the primary distinguishing clinical characteristic of long face patients. The surgical approach to correct this deformity almost always includes a LeFort-I osteotomy to superiorly reposition the maxilla, though other adjunctive surgical procedures can be added as per individual case requirements. Beginning with diagnosis and treatment planning to post surgical orthodontics, orthodontists play a vital role in planning and sequencing the entire procedure. This article highlights a combined orthodontic and surgical approach for correction of long face deformity in an adult female patient.

Introduction
Sassouni’s description of ‘skeletal open bite’ in the 1960s emphasized the importance of evaluation of vertical development of face in cephalometric diagnosis. The term ‘long face syndrome’ was coined in 1970s after the development of surgical techniques to vertically reposition the maxilla [1]. Long face individuals make up slightly less than a quarter of the dento-facial deformity group who seek treatment in the USA. The primary distinguishing characteristic of these patients is a large total face height, manifesting almost entirely in the elongation of the lower third. A major component of the problem nearly always is an inferior rotation of the posterior maxilla leading to a downward and backward rotation of the mandible.

For long face patients with no prospect for successful growth modification, there is no real alternative to surgery. In addition to the superior repositioning of the maxilla, additional surgical procedures may be indicated in the mandible to achieve facial harmony.

Case report
A 21 year old female patient reported with the chief complaint of excessive visibility of teeth and gums at rest and on smile.

Extraoral examination of the patient revealed a
convex facial profile, incompetent lips with increase in incisor visibility and increased anterior facial height. Fig 1) IOPA radiograph revealed horizontal bone loss around the lower anterior teeth which extended up to the apical third (Fig 4).

The cephalometric analysis showed a steep mandibular plane and gonial angle with increased lower anterior facial height (LAFH). There was an excessive but uniform descent of the palatal plane resulting in a downward and backward rotation of the mandible. Both upper and lower anterior teeth were supererupted. (Table 1)

On evaluation of records, the case was diagnosed as one of long face syndrome (Skeletal open bite with increased LAFH). After a joint discussion with Oral and Maxillofacial surgery department, a comprehensive ortho-surgical treatment plan was formulated. Various stages of treatment plan were as follows:

1) Phase I: Presurgical orthodontics to remove the compensation (excessive eruption of anterior teeth in forward and incisal direction) of the malocclusion after the extraction of all first bicuspids.

2) Phase II: Surgical phase- The surgical procedures were planned not only by keeping hard tissue landmarks in mind but also after taking soft tissue into consideration.

Maxilla: LeFort I osteotomy with superior repositioning. The quantum of superior repositioning was based on the planned incisor position at the end of treatment. A 2mm reduction in lip length was expected owing to surgical wound contracture. Expected sagittal and vertical correction of the mandible following this procedure was 4 to 5 degrees of autorotation resulting in a decrease in steepness of the mandibular plane.

Mandible: Reduction and advancement genioplasty to reduce LAFH and further decrease the facial convexity.

3) Phase III: Post surgical orthodontics for settling and further detailing of occlusion, followed by retention phase.

4) Phase IV: Periodontal therapy to improve bone support of lower anterior teeth.

Treatment

Phase I: After extraction of all first bicuspids, treatment was initiated using PEA (018° Roth prescription). Being a type A anchorage situation, Nance button and lingual arch were used throughout in this phase. After 11 months of treatment all spaces were closed with overjet and overbite reduced to within normal limits (Fig 6). An improvement in the facial esthetics was noticed (Fig 7). A 17x23 SS arch stabilizing arch wire was placed for 3 weeks. Nance button and lingual arch were removed before surgery.

A surgical splint (Fig 9) was fabricated on articulated models after facebow transfer on a semi-adjustable articulator (Hanau H-2) and model surgery (Eight mm impaction of the maxilla)(Fig 8).

Phase II: LeFort I osteotomy was performed and the maxilla was impacted by 8mm and stabilized in its new position using L-shaped Titanium plates (Fig 10). Alar base cinch was performed to prevent nasal flaring after surgery. Six mm reduction and 4mm advancement genioplasty was performed along with the above procedure (Fig 10).

Phase III: Setting of occlusion was started after 15 days of surgery with short vertical elastics for 4 weeks.

Treatment results

Pre and post treatment comparison of cephalometric values (Hard and soft tissue) are shown in Table 1.

Patient’s profile showed a significant improvement (Fig 11). This resulted from a decrease in the LAFH, lip competence and reduction in the facial convexity both due to autorotation of the mandible and advancement genioplasty. The good intercuspation of teeth with class I molar and canine relation was maintained (Fig 12). Overjet and overbite were reduced to normal. (Fig 12). LAFH was reduced by 8mm. Bone support of the lower incisors was reassessed by IOPA radiographs, which revealed no deterioration in bone levels (Fig 4). The patient is under the care of the periodontist for improvement of the alveolar bone status around the mandibular incisors.

Discussion

Altered function has traditionally been associated with vertical growth problems, especially anterior open bite [2]. However, vertical jaw proportions are inherited just as are anteroposterior, with very similar heritability [2] and thus long face pattern seems to to run in the families.

Gummy smiles and/or anterior open bite are most common complaints of patients reporting for treatment of long face syndrome [1]. Patients with long face syndrome clinically present with:

- Excessive anterior face height, particularly the lower third.
- Lip incompetence
- Tendency towards anterior open bite,
Fig. No. 5 Lateral Cephalog ram Pre R Mid R Post R

Fig. No. 6 Mid R Intra Oral

Fig. No. 7 Mid R Extra Oral
Fig. No. 8 Face bow transfer & Mounting

Fig. No. 9 Surgical Splint

Fig. No. 10 Surgical Phase

Fig. No. 11 Post R Extra Oral
Fig. No. 12 Post R Intra Oral

Fig. No. 13 Pre & Post Superimposition
### Table 1
Comparison of Cephalometric values (Pre and Post-treatment)

<table>
<thead>
<tr>
<th>Value</th>
<th>Norm</th>
<th>Pre-Tx</th>
<th>Post-Tx</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SNA</td>
<td>82°</td>
<td>79</td>
<td>83</td>
</tr>
<tr>
<td>2. SNB</td>
<td>80°</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td>3. ANB</td>
<td>2°</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4. Go-Gn to S-N</td>
<td>32°</td>
<td>39</td>
<td>32</td>
</tr>
<tr>
<td>5. Occ to S-N</td>
<td>14°</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>6. 1 to N-A</td>
<td>22° (4 mm)</td>
<td>48 (19)</td>
<td>20 (5)</td>
</tr>
<tr>
<td>7. 1 to N-B</td>
<td>25° (4 mm)</td>
<td>38 (17)</td>
<td>20 (6)</td>
</tr>
<tr>
<td>8. FMA</td>
<td>25°</td>
<td>34</td>
<td>29</td>
</tr>
<tr>
<td>9. Gonial angle</td>
<td>128±7°</td>
<td>138</td>
<td>129</td>
</tr>
<tr>
<td>10. LAFH</td>
<td>67-69 mm</td>
<td>80</td>
<td>72</td>
</tr>
<tr>
<td>11. Pog to N Perp</td>
<td>-2 to 4</td>
<td>-13</td>
<td>-10</td>
</tr>
<tr>
<td>12. Jarabak ratio</td>
<td>62-65</td>
<td>59</td>
<td>66</td>
</tr>
<tr>
<td>13. N to ANS</td>
<td>50</td>
<td>65</td>
<td>49</td>
</tr>
<tr>
<td>14. HP to PNS</td>
<td>50.6</td>
<td>66</td>
<td>52</td>
</tr>
<tr>
<td>15. Nasolabial angle</td>
<td>102±8°</td>
<td>88</td>
<td>100</td>
</tr>
</tbody>
</table>
however 1/3 of the patients have normal or excessive overbite.
- A tendency towards mandibular deficiency and class II malocclusion, although the anteroposterior relation varies from severe class II to mild class III.
- A tendency towards more crowding in lower than upper teeth.
- A tendency towards narrow maxilla (50% of the patients)

Cephalometrically, the patients nearly always have:
- Rotation of palatal plane down posteriorly.
- Excessive eruption of maxillary posteriors.
- Rotation of mandible downward and backward secondary to maxillary descent.
- Excessive eruption of maxillary and mandibular incisors.

Fields et al [3] demonstrated three cephalometric criteria which in combination could label the patient as long face pattern with high confidence, they are: (a) Increased mandibular plane angle, (b) Increased total anterior facial height, (c) Decreased percentage of upper versus lower face height.

Treatment of long face syndrome depends on the age at which the patient reports as well as the severity of the dysplasia [1]. The treatment goal for the patient reporting in preadolescence having potential for growth should be to restrain and control maxillary descent and prevent eruption of posterior teeth. For adults with little or no growth potential there is no real alternative to surgery. The choice of the surgical procedure is dictated by the relative contribution of the maxilla/mandible to the condition as well as soft tissue considerations. A decrease in the face height can be accomplished by superior repositioning of the maxilla via total or segmental osteotomy, a mandibular surgery to bring the lower jaw forward and upward to correct the anterior open bite and superior repositioning of the chin via a mandibular lower border osteotomy. Genioplasty is a useful adjunct to other surgical procedures but is unlikely to be adequate by itself. According to Sarver, the guidelines for choosing between maxillary and mandibular surgery are quite clear, in patients whose face height should be reduced, maxillary surgery is the primary procedure. Mandibular ramus osteotomy is recommended only as a secondary procedure for these patients.

When the maxilla is moved upward, the postural position of mandible alters in concert with the new maxillary position and occlusal forces tend to increase. This controls any tendency for the maxilla to immediately relapse downward, and contributes to excellent stability of the result [4, 5].

References


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