

Surgical Correction of Skeletal Class-2: A Case Report

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ABSTRACT

Background: Correction of skeletal deformities in adult patients with orthodontics is limited. Orthognathic surgery is the best option for cases when camouflage treatment is questionable and growth modulation is not possible. This paper describes a case of young Indian female having severe class-II skeletal relation with gummy smile. The case was managed with a combination of presurgical orthodontic treatment followed by an orthognathic surgery in maxilla and then another phase of orthodontic treatment for final occlusal detailing and at a second stage advancement genioplasty was performed. Anterior maxillary setback and 6mm superior positioning of maxilla at 1st stage and at the 2nd stage 4mm advancement genioplasty were performed. Although the anteroposterior discrepancy and the facial convexity were so severe, highly acceptable results were obtained, both esthetically as well as occlusally.

Keywords: Vertical Maxillary Excess, Anterior Maxillary Setback, Gummy Smile, Genioplasty.

INTRODUCTION

Patients with Class II malocclusions with protrusive maxillary teeth, deficient mandible, excess overjet and normal overbite can sometimes be successfully treated non-surgically. However, when vertical maxillary excess is seen with a gummy smile, orthognathic surgery may be indicated when camouflage treatment would not compensate for the skeletal problem. In vertical maxillary excess, clinically recognizable smile features are manifested by a gummy smile, exposure of the maxillary incisors, incompetent lips, increased lower facial height and high mandibular plane angle.⁽¹⁾ Such cases of skeletal Class II malocclusion require a combination of orthodontics and orthognathic surgical treatment ⁽¹⁾. The treatment of severe dentofacial deformities in adult patients is a challenging task for both the orthodontist and the oral surgeon. Treatment is difficult because of the skeletal and facial disharmony, absence of jaw

growth and a tendency toward relapse.⁽²⁾The surgical orthodontic correction of vertical maxillary excess by superior repositioning of the maxilla is generally an acceptable treatment plan on the basis of skeletal stability and aesthetic soft tissue changes. The goal of present day orthodontics is not only to bring about dental corrections but also to achieve a balance between the craniofacial structures. Surgical management of patients with significant skeletal deformities has been widely practiced worldwide ⁽³⁾. Facial appearance acceptance is a very important factor in determining social relationships. Significant dentofacial deformities are seen to be less attractive leading to non-acceptance of an individual ⁽⁴⁾. Differences of behavior toward attractive and unattractive people has been well documented ⁽³⁾. This case report describes the orthodontic-surgical approach in the treatment of a female patient with vertical maxillary excess, gummy smile and a deficient mandible.

Received: Sept. 17, 2017; Accepted: Dec. 2, 2017

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Fig 1: Pre-Surgical Extra-Oral and Intra-Oral Photograph.

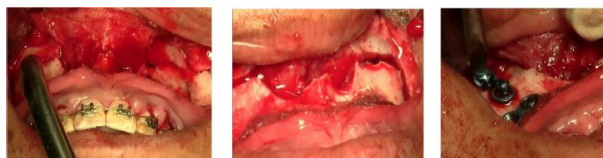


Fig 2: Intra-operative photographs.



Fig 3: Intra-operative photographs.



Fig 4: Post Treatment Photographs.



Fig 5: Pre-Operative lateral cephalogram.



Fig 6: Post-Operative lateral cephalogram,

CASE REPORT

A Young Hindu Female Patient aged 19 years visited the Department of Oral and Maxillofacial surgery with the Chief Complain of "Forwardly Placed Upper Front Teeth". Significant extra oral clinical findings are skeletal class-2 jaw relation with Convex profile, Deficient Chin with excessive exposure of gingiva on smiling and incompetent lips. Intra-oral findings include Class-1 Molar and Canine Relation with 7mm overjet and 5mm overbite and crowding into lower anterior region. In the Cephalometric findings

SNA- 86°, SNB - 77°, ANB-9°, FMA-25°, ANS-PNS is 60mm, Go to PoG distance is 77mm with 131 mm total facial height and 10 mm upper incisor exposure.

TREATMENT OBJECTIVES:

Treatment objectives involved providing orthodontic therapy to level and align the teeth in both arches to prepare for orthognathic surgery. With ideal upper and lower arch, the teeth could be set in an ideal position via a splint with the impaction and distalisation of the maxilla when a Anterior segmental maxillary osteotomy was performed. This would reduce the excessive gingival exposure on smiling. Dental corrections included achieving an ideal overjet and overbite, correct spacing in upper anterior teeth, crowding in mandibular anterior region, correction of upper and lower anterior teeth proclination, Class I molar and canine relations. Soft tissue corrections includes Improvement of profile, Correct the nasolabial angle, Reduction of gingival display in anterior maxillary teeth region and correction of gummy smile and Achieve lips competence.

A Surgical prediction tracing was performed for surgical treatment planning. The surgery required would be 6mm superior positioning of maxilla and anterior maxillary setback and 4mm advancement genioplasty. It was decided to perform Advancement genioplasty at a later stage to improve patients compliance.

TREATMENT PROGRESS:

PRE-SURGICAL ORTHODONTIC TREATMENT: Upper and lower first premolars were extracted and retraction of lower anterior teeth were done. This resulted in a increased overjet and upper anterior space closure was done. Space were left in upper maxillary 1st premolar region for anterior maxillary setback.

ORTHOGNATHIC SURGERY:

PRE-SURGICAL PROCEDURE: Upper and lower impressions were taken, and study casts were prepared. The models were mounted on a semi-adjustable articulator. A full orthognathic model surgery was performed. Final and intermediate splints were fabricated using orthodontic cold-cure resin

SURGICAL PROCEDURE:

- ✦ Surgery was performed under general anesthesia.
- ✦ After marking of the incision intraoral vestibular incision was placed, subperiosteal dissection was done and bone were exposed.
- ✦ Maxillary osteotomy was performed using the surgical saw followed by a thin osteotome by cutting bilaterally in the mesial and distal of the extraction socket of the upper first bicuspid. A strip of bone measuring 6mm was removed from each side and from the superior side of maxilla. This was done to facilitate the posterior repositioning of the anterior segment of the maxilla.
- ✦ The maxillary segments were aligned and positioned in the intermediate splint. The patient's occlusion was placed into the intermediate splint, and an Intermaxillary fixation with wires and elastics was done.
- ✦ The maxilla was fixed in the new position using 2mm mini titanium alloy plates and 2×6mm titanium screws in the areas of the pyriform rim and maxillary buttress. The Intermaxillary fixation and intermediate splint were removed.
- ✦ Layer by layer closure was done. The wound was checked daily for one week for signs of ischemia
- ✦ The splint was kept in place for 4 weeks, and the patient was placed on a liquid and semisolid diet. The splint was removed and the occlusion was checked.

POST-SURGICAL ORTHODONTICS:

Post Surgical orthodontics was continued after surgery to close minor spaces distal to the cuspids in the upper and lower arches. The goals of this phase of treatment were to rehabilitate and restore the neuromuscular function and get final occlusal settling. Occlusal function and settling was greatly improved through the use of intermaxillary elastics.

2ND SURGICAL PROCEDURE:

- ✦ Patient was convinced for genioplasty for further improvement in esthetics.

- ✦ Surgery was carried out under General Anesthesia.
- ✦ Vestibular incision was placed in mandible from 1st molar on right side to 1st molar on left side. Blunt dissection was done and bone were exposed. Mental nerve was identified and preserved on right and left side.
- ✦ Midline was marked by placing groove at mandibular symphysis region. Marking points were joined using surgical saw and thin osteotome.
- ✦ Bone fragment was detached and advancement of 4mm was done.
- ✦ Fragment was secured using 2 plates of 2mm 4 hole with gap titanium miniplates and 2×8 mm titanium screw.
- ✦ Layer by layer closure was done. Wound was checked daily for any signs of infection or ischemia.

TREATMENT RESULT

After completion of 6 months of post-surgical orthodontics, an improved facial symmetry with more balanced facial thirds, an aesthetic smile and lip fullness were seen. Incisor display on rest and on smiling was improved. Superimposition of the pre and postsurgical cephalometric tracing showed the amount of setback of the maxillary segment and dental changes. It also highlighted the amount of superior repositioning of the maxilla. After stage-1 surgery lip closure was inadequate but after genioplasty lip closure were achieved. Class-1 molar and canine relation was maintained. The required overjet and overbite is maintained.

DISCUSSION

Treatment of vertical maxillary excess requires meticulous planning and appropriate treatment plan selection just like any other condition. Anterior maxillary osteotomy is a versatile surgical procedure which can be effectively used in cases having gummy smile.⁽⁵⁾

The major disadvantage of conventional surgical procedures was the inclusion nasal floor in their osteotomy segment⁽⁵⁾ To include the nasal floor, the

structures attached in the floor region have to be stripped during the procedure. Apart from that, because of the involvement of nasal floor, after the reduction of excess and placement of segment, it largely changes the nasal soft tissue architecture after surgery. Widening of alar base and anti-tip rotation of the nasal tip^(6,7) which exposes the nasal apertures excessively in the frontal view is the most encountered complication. The major reason for performing Anterior Maxillary Osteotomy is to decrease the excess height and posterior positioning of the segment, but the accompanying

nasal changes are inevitable in these traditional techniques. These nasal changes tend to give unsightly appearance to these patients after surgery. Though techniques like alar cinch suturing are available to reduce the complications, the recent studies⁽⁸⁾ questioned the real efficacy of this technique. The main cause for the alar widening is the lateral dissection and stripping of structures lateral to the nasal wall. Thus, the advantage of this technique is that there is no lateral dissection at all as the osteotomy line is well below the nasal floor and walls which results in negligible alar widening. Another advantage of this technique is that the intraoperative time will be considerably less compared with traditional procedures because of not involving the nasal floor region, and the bleeding also is considerably less because the nasal mucosa is not detached, which tends to bleed profusely.⁽⁹⁾ Surgical superior impaction of the maxilla is a modality chosen in cases where the vertical excess of the maxilla has caused a downward and backward rotation of the mandible and an excessive tooth exposure at rest while the lip length is within the normal range.

The above patient was clearly a case for superior impaction of the maxilla. The patient had excessive incisor exposure at rest and excessive gingival exposure in smiling. Exposure of all the upper incisors and a small amount of gingiva on smile is considered youthful appearance and aesthetic. But, the excessive gingival exposure in this patient affected the aesthetics negatively.

In this patient, a preoperative concave soft tissue profile was corrected, demonstrated by the increased facial convexity angle, decreased SNB, and increased ANB. The cephalometric changes included

decrease in the PNS to ANS linear measurement from 64mm to 60mm; increase in Go to Pg distance from 77 mm to 81mm after genioplasty.

CONCLUSION

Anterior Maxillary Osteotomy is recommended as the treatment modality of choice in patients with maxillary or Dento-alveolar protrusion. The technique is simple, postoperative complications are minimal, and soft tissue changes in response to surgery are more predictable. Through the Anterior maxillary osteotomy technique, the upper lip was moved backward along with posterior movement of the anterior maxilla and decrease in gummy smile . Anticlock wise rotation of mandible by advancement genioplasty along with anterior maxillary set back gives satisfactory result and reduction in gummy smile.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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