

Surgical Treatment of Class II Div 1 Malocclusion: A Case Report

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ABSTRACT

Background: Treatment of skeletal Class II malocclusions poses many problems if treated by orthodontic treatment alone. Before the introduction of surgical intervention, the orthodontist was limited to extractions, extensive elastic wear, or a combination of both. With the development of surgical procedures, another alternative became available.

A case report is presented of an adult Class II, Division 1 malocclusion with convex profile, retrusive chin, excessive overjet, incompetence lips and crowding in both the arches. Cephalometric examination revealed bimaxillary retrusion; the mandibular retrusion was severe with deficient chin. Treatment consisted of full-banded orthodontic appliance combined with a surgical mandibular advancement using a bilateral sagittal split osteotomy and augmentation genioplasty. There was a marked improvement in chin position and mandibular relation. Thus, there was a marked reduction in facial convexity.

Keywords: Facial convexity, malocclusion, orthodontics.

INTRODUCTION

A 19 year old female reported in the Dept. of orthodontics & Dentofacial orthopedics, College of dentistry, Indore with chief complaint of irregular teeth and recessive chin. Extraoral examination revealed dolichofacial face with increased lower anterior face height, convex profile, recessive chin and obtuse nasolabial angle, lip incompetence. Intraoral Examination showed V shaped upper arch, anterior crowding in both the arches. Molar relation on right side was full cusp class II while it was end on left side. Overjet was of 9 mm & overbite of 3 mm.

Pretreatment Cephalometric evaluation –

1. Retrusive maxilla and mandible (SNA 76° and SNB 65°). Mandible showed more severe

retrognathism and it was rotated downward and backward (ArA 161°). COGS analysis also revealed retrusion of both maxilla (NA -8 mm) and mandible (NB -30.5 mm, NPg -35 mm). There was more severe mandibular retrusion, deficient chin (B-Pg 4.5 mm), and short ramus height.

2. Low value of SNA (76°) and SNB (65°) may be because of low placement of Sella but retrognathism of both the jaws was further confirmed by McNamara analysis (point A-Np was -5 mm and Pog-Np was 29.5 mm) and COGS analysis. Mandible showed more severe retrognathism than maxilla.
3. There was a skeletal class II pattern as suggested by ANB of 11° and Wits appraisal of -7 mm.

Received: Aug. 1, 2018; Accepted: Aug. 26, 2018

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4. Vertical growth pattern as evidenced by Jarabak ratio of 57%, high SN Go-Gn angle (44°), high mandibular plane angle (FMA 48°), and increased lower gonial angle (80°).

Treatment objectives & general plan of treatment: -

1. Presurgical orthodontics – correction of crowding in both the arches & bringing them in proper position to their respective bases after extraction of maxillary second premolars and mandibular first premolars.
2. Orthognathic Surgery – bilateral sagittal split osteotomy of ramus and augmentation genioplasty.
3. Postsurgical orthodontics – Finishing, proper interdigitation followed by retention to maintain the correction.

PROGRESS OF TREATMENT

Extraction of the maxillary second premolars and mandibular first premolars was done to relieve crowding. A full-fixed preadjusted edgewise (.022" x .028") appliance was placed along with upper and lower holding arch. Multiloop 0.016-inch arch wires were used along with class II elastics to relieve crowding. After correction of crowding .018" followed by .020" plane archwires were used. Canine retraction was started with NiTi closed coil springs along with 0.017" x 0.025" S.S. wires. Incisors were retracted with "T" loop in .017" x .025" S.S. wire. Presurgical treatment ended with alignment and leveling of incisors with overjet of 7 mm and overbite of 0 mm. Finally 0.019" x 0.025" S.S. wires were placed with interdental soldered vertical hooks for engagement of elastics to be used during and after orthognathic surgery. Upper and lower models were prepared for the fabrication of splint. Bite was taken in edge-to-edge relation and acrylic splint was then fabricated after articulating the models with bite on articulator.

Mandibular bilateral sagittal split osteotomy was performed with advancement of mandible by 7 mm. The mandibular third molars were extracted at the time of surgery. Acrylic splint was then fitted between maxillary and mandibular dentition and it was held in position by tight ligature using

interdental soldered hooks. Titanium plates were used for fixation of mandible on both sides. This was followed by 10 mm augmentation genioplasty. Acrylic splint was removed and blue elastics were used in class II pattern. After one month of surgery patient reported with swelling in the region of angle of mandible on left side with draining sinus. Antibiotics were prescribed and it was decided to remove Ti plates on left side. Loose titanium plates were removed and all the granulation tissues were excavated. Thereafter patient was comfortable.



Fig 1: Preoperative photographs.



Fig 2: Post-operative photographs.

Active post-surgical orthodontic treatment was then started after two months of surgery for the settling of the occlusion. After settling fixed appliance was removed, upper and lower Hawley's retainers were delivered.

DISCUSSION

For patients whose orthodontic problems are so severe that neither growth modification nor camouflage offers a solution, surgical realignment of the jaws or repositioning of dentoalveolar segments is the only possible treatment. In the present case, since there was no scope for growth modification as the patient was already of 19 years of age and there was a severe mandibular retrognathism hence it was decided to go for surgical realignment of mandible along with augmentation genioplasty.

In patients who will go for orthognathic surgery, the orthodontic appliance is used not only to move teeth but is also an essential part of stabilization during and immediately following surgery. Appliances that do not allow rigid stabilization in all three planes of space are not well suited for surgical treatment. The edgewise appliance lends itself very well to this purpose. In the edgewise appliance a round or rectangular wire is tied into the bracket slot. A small round wire fits loosely, a rectangular wire quite tightly. As a result the appliance is well adapted for tooth movement and stabilization of teeth. For better stabilization, it would be always preferable to use 0.022" slot than 0.018" slot to get increased rigidity for surgical stabilization.

Treatment objective, extraction pattern, types of mechanics are frequently reverse in presurgical

orthodontics than those used in conventional orthodontics and are often referred to as "**Reverse Orthodontics**". Hence extraction of maxillary second premolar and mandibular first premolar was planned and occlusal ended with overjet of 7 mm and overbite of 0 mm.

Currently, the bilateral sagittal split osteotomy (BSSO) of the mandibular ramus, performed from an intra-oral approach, is the preferred procedure for most patients who need mandibular advancement. The osteotomy design provides a broad interface of medullary bone for rapid healing. The overlapping of the two segments allows easy rigid internal fixation with screws, and problems with postoperative instability are rare.

Maxillary surgery was not performed because soft tissue of upper part of the face was acceptable (nasolabial angle 105°) and by bringing the lower jaw forward alone, there was a great improvement in the profile so it was decided to do orthognathic surgery in mandible alone. COGS analysis also revealed deficient chin (B-Pg 4.5 mm) so it was decided to go for augmentation genioplasty.

The preferred approach to genioplasty is a lower border osteotomy to free a wedge-shaped portion of the symphysis and inferior border that remains pedicled on the genioglossus and geniohyoid muscles. This segment can be advanced to augment chin contour, shifted sideways to correct asymmetry, or down grafted to increase lower face height.

The soft tissue change is 100 % relative to the bone at the pogonion and labiomental fold in cases of

mandibular advancement. In case of antero-posterior movement of incisors soft-tissue changes would be 60 to 70% of incisor movement.

When, isolated mandibular surgery is planned, the patient's maxilla is utilized as the template on which the mandible is repositioned. Because maxillary position remains constant during the operation, use of a semi-adjustable articulator and a face bow transfer are not always required. Maxillary and mandibular casts are held together in the ideal relationship, secured with sticky wax, and then plaster mounted on a simple hinge (non adjustable) articulator in the desired occlusion. Once the mounting plaster has set, the casts are separated, and the single hinge motion of the articulator will allow accurate reproduction of occlusal relationship and mandibular rotation for construction of the surgical template. A final surgical splint is then constructed of acrylic resin. Splint provides clearly visualized goal for the surgeon at the operating table. It aids in positioning bone fragments correctly to aid healing.

In this case class II pull $\frac{3}{4}$ ", 2 oz elastics were used from the lower second to the upper first molar. The elastic was twisted and engaged and the sequence was repeated up to the canine area for the settling of the occlusion.

CONFLICT OF INTEREST

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

REFERENCES

1. Steiner CC. Cephalometrics in clinical practice. Angle Orthod 1959;29:8-29.
2. Salzmann JA; Principles of orthodontics, vol 1. Philadelphia, 1966, J.B. Lippincott Company.
3. Legan HL, Burstone CJ. Soft tissue cephalometric analysis for orthognathic surgery. J Oral Surg 1980; 38:744-51
4. William R. Proffit: contemporary orthodontics 3rd edition; Harcourt India Pvt. Ltd.
5. Peterson, Ellis, Hupp, Tucker: Contemporary Oral and Maxillofacial Surgery; 2nd edition - Harcourt brace and company Aisa PTE Ltd.
6. William R. Proffit and Raymond P White, Jr.: Surgical Orthodontic treatment part I & II
7. Gustav O Kruger: Oral and Maxillofacial Surgery; 6th edition Jaypee brothers
8. Verghese Mani: Orthognathic surgery (Esthetic Surgery of the face); Jaypee brothers 1st edition 1995. Graber Vanarsdall: Orthodontics current principles and technique Mosby 2nd edition 1994.