Orthodontic and Surgical Management of Patient with Class II Division 2 Malocclusion

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ABSTRACT

Adult orthodontics encompasses a wide horizon of treatment modality including orthodontic camouflage and orthognathic surgery. Class II discrepancies with mandibular deficiency are treated surgically by mandibular advancement surgery. Mandibular advancement by bilateral sagittal split osteotomy (BSSO) is found to be a stable procedure. A 16-year-old patient reported to the Department of Orthodontics with chief complaint of irregularly placed upper front teeth. On examination, patient had a retrognathic mandible with class II molar and class II division 2 incisor relation. The treatment plan of combined orthodontics and orthognathic surgery was employed to correct the discrepancy and to obtain an esthetic, harmonious facial profile. Mandibular advancement surgery was done to accomplish treatment objectives.

Keywords: Bilateral sagittal split osteotomy, Class II division 2 malocclusion, Cover bite, Mandibular advancement surgery.

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INTRODUCTION

Skeletal class II malocclusion usually can be treated by three methods: growth modification to reduce the jaw discrepancy, camouflage treatment by moving the tooth relative to the jaws to mask the underlying skeletal discrepancy, and surgical-orthodontic treatment whereby the repositioning of jaws is done to correct the skeletal discrepancy. In children and adolescents, growth modification is employed for correction of skeletal discrepancy. In adults where the growth potential is minimal or growth is over, skeletal discrepancies are treated by either camouflage or surgery.

CASE REPORT

A 16-year-old patient reported to the Department of Orthodontics, Institute of Dental Sciences, Bareilly, Uttar Pradesh, India, with complaint of irregularly placed upper front teeth. Extraoral examination revealed a mesoprosopic face with a convex facial profile and posterior divergence (Fig. 1). On intraoral examination, patient had class II molar relation and class II division 2 incisor relation, crowding in both arches, square-shaped upper and lower arch, scissor bite i.r.t. 24, with an overjet of 2 mm, and 100% overbite (cover bite) (Fig. 1). Cephalometric analysis revealed skeletal class II discrepancy with mandibular retrognathism, average growth pattern, reduced lower anterior facial height, retroclined upper and lower incisors (Table 1). Also, patient’s lateral cephalogram examination revealed completion of growth (cervical vertebrae maturation index stage 6). Patient’s visual treatment objectives were positive.

Treatment objectives in this case were
- To correct the skeletal discrepancy
- To achieve an esthetically harmonious soft tissue profile
- To achieve a class I molar and canine relation, and to obtain a normal overjet and overbite

To achieve these treatment objectives, the patient was presented with option of orthodontic treatment followed by surgical mandibular advancement for which both patient and the parents agreed. The mandibular advancement surgery planned was a BSSO, which is generally considered stable and predictable.

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Treatment was started with banding of maxillary first molar and bonding of only upper central incisors with 0.022 MBT brackets. A $2 \times 2$ protraction utility arch was used to correct overbite and projection of upper central incisors for 3 months. After correction of upper central incisors’ inclination, bonding of rest of upper teeth and lower arch was done. The initial leveling and aligning were done with 0.016 nickel–titanium (NiTi), 0.018 NiTi, 0.016 $\times$ 0.022
NiTi, and 0.019 × 0.025 NiTi. Then, 0.019 × 0.025 stainless steel was ligated in both upper and lower arch and the wire was cinched back. At the end of the presurgical orthodontic phase, patient had a class II molar and canine relation with 8 mm of overjet and 4 mm of overbite. The presurgical extraoral and intraoral records (Fig. 2) were taken.

**Surgical Phase**

Mandibular advancement of 7 mm with bilateral sagittal split osteotomy was performed under general anesthesia. The osteotomy cuts were placed distal to the third molar on the lateral border of ramus. The osteotomy cuts were followed by madibular advancement of 7 mm (Fig. 3). Separated bony segments were stabilized with titanium plates and screws.

Post-surgical extraoral records and intraoral records (Fig. 4) were taken, and the patient was kept on postoperative care for 7 days. After surgery, patient had a super class I molar relation bilaterally and an overjet of 1 mm and overbite of 2 mm. Cephalometric analysis of postsurgical lateral cephalogram revealed increased lower anterior face height and reduced skeletal discrepancy (Table 1).

**Postsurgical Phase**

Lower arch was bonded again as during the surgery brackets were debonded. Upper arch was replaced with a new set of 19 × 25 stainless steel wires, and 0.016 SS was ligated in lower arch. Intermaxillary elastics (3.5 ounces, 5/16") were used for 1 month for fixation, and afterward, class II ¼, 3.5 ounces, elastics were used. After 3 months, finishing and detailing was started. Settling of occlusion was done using intermaxillary settling elastics.

After 5 months of finishing and detailing, the appliance was debonded. The posttreatment extraoral records and intraoral records (Fig. 5) were taken. Maxillary and mandibular Hawleys retainers were given for retention of treatment (Fig. 6).

**DISCUSSION**

In literature, there is general agreement that one of the main reasons for adult class II patients seeking treatment...
Fig. 4: Postsurgical extraoral and intraoral records

Fig. 5: Posttreatment extraoral and intraoral records
is facial esthetics. The more dissatisfied the patients are with their facial appearance, the more likely they will choose a surgical instead of an orthodontic approach.\(^7\)

In adult skeletal class II cases, camouflage can be an alternative to surgery with extractions of maxillary first premolars, but in camouflage orthodontics, only dental problem can be dealt with, whereas basic facial esthetic problem still remains.

According to Proffit et al,\(^8\) there are criteria to decide if class II postadolescent patients can be treated successfully with orthodontics alone. Cases with an overjet greater than 10 mm, a pogonion–nasion perpendicular distance over 18 mm, a gonion–pogonion distance of less than 70 mm are likely to fail the camouflage treatment. This case had a presurgical overjet of 8 mm; however, a pogonion–nasion perpendicular distance of 19 mm and a gonion–pogonion distance of 70 mm indicated that this case cannot be treated by camouflage line of treatment. The criterion regarding the facial height indicates that the unsuccessfully treated patients had a high mandibular plane angle; the present case had a normal mandibular plane angle. So, this patient was planned to be treated by surgical approach.

Surgically, class II malocclusion can be treated by a combination of maxillary and mandibular surgeries, maxillary surgery alone, or mandible surgery solely depending on the underlying skeletal discrepancy. This case was planned for mandibular advancement surgery BSSO as the patient had a normal maxilla and retrognathic mandible. Mandibular advancement by BSSO is a stable procedure.\(^9\)

Mandibular advancement of 7 mm was planned and achieved. There was significant improvement in the soft tissue profile of patient, and dentally class I molar and class I canine relation was attained with ideal overjet and overbite.

Desired results were attained, and as mentioned before mandibular advancement by BSSO is a stable procedure. However, a long-term observation is required in this case to ensure the stability of this procedure.

REFERENCES