Case Report

Surgical–orthodontic treatment of a skeletal class III malocclusion

Radha Katiyar, G. K. Singh, Divya Mehrotra¹, Alka Singh

ABSTRACT

For patients whose orthodontic problems are so severe that neither growth modification nor camouflage offers a solution, surgery to realign the jaws or reposition dentoalveolar segments is the only possible treatment option left. One indication for surgery obviously is a malocclusion too severe for orthodontics alone. It is possible now to be at least semiquantitative about the limits of orthodontic treatment, in the context of producing normal occlusion as the diagrams of the “envelope of discrepancy” indicate. In this case report we present orthognathic treatment plan of an adult female patient with skeletal class III malocclusion. Patient’s malocclusion was decompensated by orthodontic treatment just before the surgery and then normal jaw relationship achieved by bilateral sagittal split osteotomy.

Key words: Class III malocclusion, decompensation, prognathism

INTRODUCTION

Class III malocclusion is considered to be one of the most difficult and complex orthodontic problems to treat. Prevalence of class III malocclusion in Caucasians ranges from 0.8 to 4.0% and rises up to 1213% in Chinese and Japanese populations, while in North Indian population, class III malocclusion is found in up to 3.4% of the population.[1-3]

Individuals with class III malocclusion frequently show combinations of skeletal and dentoalveolar components. Several distinct cephalometric features have been reported in class III patients, such as a short anterior cranial base length, acute cranial base angle, a short and retrusive maxilla, proclined maxillary incisors, retroclined mandibular incisors, an excessive lower anterior face height and obtuse gonial angle.

Skeletal class III malocclusion may either be associated with maxillary retrusions, mandibular protrusion, or a combination of the two.[4,5] These complex cases require careful treatment planning, an integrated approach and patient cooperation.[6] A poor facial appearance is often the patient’s chief complaint, but it may be accompanied by functional problems, temporomandibular disorders, or psychosocial handicaps.[7] In this case report, we present the treatment of an adult girl with skeletal class III malocclusion.

CASE REPORT

A 21-year-old female presented with the chief complaint of an unesthetic facial and dental appearance [Figures 1-4]. Her parents pointed that she was greatly dissatisfied by her appearance. She had a severe class III malocclusion with 2-mm anterior crossbite and 2-mm reverse overbite. The family had no history of skeletal class III malocclusion. When viewed from the front, the patient’s face was oval. Lateral view and oblique view showed pronounced mandibular prognathism and midface deficiency with concave profile. Intraorally, the molar relationship was class III with a complete anterior crossbite [Figures 5–9].

Cephalometric analysis [Table 1] showed maxillary deficiency and mandibular protrusion. The ANB angle was −4°, suggesting a skeletal class III malocclusion.

Departments of Orthodontics and
¹Oral and Maxillofacial Surgery,
FODS, CSMMU, Lucknow, Uttar
Pradesh, India

Access this article online
Quick Response Code:
Website: www.njms.in
DOI: 10.4103/0975-5950.79217
The skeletal problem was due to a combination of maxillary deficiency and mandibular prognathism [Figures 10–12].

**Table 1: Cephalometric findings before and after surgery**

| Angle (degrees) | Mean | Pre | Stage | Post |
|-----------------|------|-----|-------|------|
| SNA             | 82   | 77  | 77    | 78   |
| SNB             | 80   | 81  | 81    | 76   |
| ANB             | 2    | 4   | 4     | 2    |
| SND             | 76   | 79  | 79    | 75   |
| IMPA            | 90   | 79  | 91    | 90   |
| E line (lower lip, in mm) | -2 | 0   | +2    | -2   |

**Treatment**

Bilateral sagittal split osteotomy with presurgical and postsurgical orthodontics was planned to achieve
esthetically acceptable and functionally optimum occlusion with straight facial profile and minimum traumatic surgical exposure to the patient. Presurgical orthodontics in both the arches was done to relieve maxillary and mandibular crowding. Maxillary and mandibular arches were aligned upto 0.019 × 0.022 stainless steel wire with 0.022 slot edgewise appliances. The mandibular incisors were decompensated by proclining them in normal inclination and the archforms were coordinated [Figures 13–17]. Mandibular third molars were extracted one month prior to the orthognathic surgery.
Before orthognathic surgery, the template was prepared using tracing paper. Skeletal profile of maxillae and mandible was traced. Profile tracing was then transferred using a carbon paper to a thin cardboard. This outline was then cut to produce cardboard template. From these templates, trial sections were made until desirable location and amount for osteotomy was found. The cut section of mandible was then fitted back to tracing in desired occlusal relation and the probable postsurgical changes were checked. In this case, 8 mm of mandibular setback brought class I molar relation with an esthetically pleasing profile. Hence, 8 mm setback of mandible was planned for osteotomy.

**Surgical procedure**

Retromolar area was exposed using modified third molar incision. Bilateral sagittal split osteotomy with short lingual split was carried out using surgical saws.\(^9\) Medial pterygoid muscle was detached after performing the split and 8 mm setback was achieved.

Fixation was done using four hole miniplates and screw on both sides. Intermaxillary elastics were placed on braces for 14 days in immediate postoperative
phase. The patient was followed closely after the procedure and was guided to perform opening and lateral movements. Orthodontic treatment was resumed 6 weeks after surgery. One year later, fixed appliances were removed and a retention appliance was delivered [Figures 18–28].

Patient’s cooperation was excellent throughout the treatment. Cephalometric finding show the normal jaw relationship [Table 1, Figure 29].
**DISCUSSION**

This case report describes the treatment of an adolescent girl with dental and skeletal class III relationships. Surgical-orthodontic treatment was the best option for achieving an acceptable occlusion and a good esthetic result in this case. An experienced multidisciplinary team approach ensures a satisfactory outcome. Presurgical orthodontics removes all the dental compensations and suggests the location and extent of the skeletal discrepancy. Normal skeletal base
relationship is achieved by osteotomy and setback of the prognathic mandible, postsurgical orthodontics guides the normal occlusal rehabilitation by correcting any emerging dental discrepancies.

**Acknowledgment**

We would like to thank Dr. Ranjit Singh for his valuable cooperation.

**References**

1. Lew KK, Foong WC. Horizontal skeletal typing in an ethnic Chinese population with true class III malocclusion. Br J Orthod 1993;20:19-23.
2. Kharbanda OP, Sidhu SS, Sundaram KR, Shukla DK. Prevelance of malocclusion and its traits in delhi children. J Indian Orthod Soc 1995;26:98-103.
3. Ishii N, Deguchi T, Hunt N. Craniofacial difference between Japanese and British Caucasian females with a skeletal class III malocclusion. Eur J Orthod 2002;24:493-9.
4. Vig KD, Ellis E 3rd. Diagnosis and treatment planning for the surgical orthodontic patient. Dent Clin North Am 1990;34:361-84.
5. Sinclair PM. Orthodontic considerations in adult surgical orthodontic cases. Dent Clin North Am 1988;32:509-28.
6. Phillips C, Proffit WR. Psychosocial aspects of dentofacial deformity and its treatment. In: Proffit WR, White RP Jr, Sarver DM, editors. Contemporary Treatment of Dentofacial Deformity. St. Louis: Mosby; 2003. p. 69.
7. Bailey LJ, Sarver DM, Turvey TA, Proffit WR. Class III problems. In: Proffit WR, White RP Jr, Sarver DM, editors. Contemporary Treatment of Dentofacial Deformity. St. Louis: Mosby; 2003. p. 507.
8. Epker BN. Modifications in the sagittal osteotomy of the mandible. J Oral Surg 1977;35:157-9.

**Source of Support:** Nil.  
**Conflict of Interest:** None declared.