Orthodontic–Surgical Correction of Class III Malocclusion with Bilateral Maxillary Impacted Canines

Mittal S. K. 1, Sharma R. 2, Singla A. 3, Grover V. 4

Abstract:

Establishment of a treatment plan is based on efficacy and easy application by the clinician, and acceptance by the patient. Treatment of adult patients with Class III malocclusion might requires orthognathic surgery, especially when the deformity is severe, with a significant impact on facial esthetics. Impacted teeth can remarkably influence the treatment plan, which should be precise and concise to allow a reasonably short treatment time with low biologic cost. We report here a case of 16-year-old female who had a skeletal Class III malocclusion and impaction of bilateral maxillary canines, with a chief complaint of forward placement of lower teeth and lower jaw. Treatment included surgical extraction of impacted maxillary canines, presurgical alignment of both the arches and decompensation of malocclusion with 018 slot. Roth preadjusted edgewise appliance therapy followed by mandibular set back by Bilateral Sagittal Split Osteotomy and Post Surgical Orthodontics. This treatment approach allowed correction of the forward placed lower teeth & lower jaw and establishment of good occlusion and optimal esthetics.

Keywords: Class III malocclusion, mandibular prognathism, decompensation, bilateral sagittal split osteotomy.

Introduction:

Class III malocclusion is an anomaly that is difficult to understand. Studies conducted to identify the etiologic features of Class III malocclusion showed that the deformity is not restricted to the jaws but involves the total craniofacial complex1,2. Most subjects with Class III malocclusions have combinations of skeletal and dentoalveolar components3. The factors contributing to the anomaly are complex. They can act synergistically or in isolation, or they might cancel each other.4 Treatment of skeletal Class III malocclusion in an adult requires dentoalveolar compensation or combined orthodontic and surgical procedures, with the aim to achieve normal occlusion and improve facial esthetics4,5,6. The objective of this article is to present the treatment of a 16-year-old female with skeletal Class III malocclusion and impaction of bilateral maxillary canines, with the chief complaints of forwardly placed lower teeth & lower jaw. The orthodontic and surgical treatment was discussed.

Correspondence: Dr. Sushil Kumar Mittal, Reader, Deptt. of Orthodontics, PDM Dental College & Research Institute Bahadurgarh-124507, Haryana, India. Email-docshilu@yahoo.com, Tel. no. +91-9416486808.

1Reader, 2Professor, 3Lecturer, 4Reader Deptt. of Orthodontics, PDM Dental College & Research Institute, Bahadurgarh -124507, Haryana, India.

Journal of Innovative Dentistry, Vol 1, Issue 2, May-August 2011
Diagnosis and etiology (Fig 1):

A 16-year-old female with the chief complaints of forwardly placed lower teeth & lower jaw reported to the department of orthodontics. On examination patient had:

1. Concave Profile
2. Angle’s Class III, Skeletal Class III malocclusion due to combination of maxillary deficiency and mandibular excess.
3. Reverse overjet of 1.5 mm.
4. Bilateral impacted maxillary canines.
5. Tooth size-arch length discrepancy of +7 mm (spacing) and of -2 mm (crowding) in maxillary arch and mandibular arch respectively

Treatment objectives:

It was decided to execute Orthodontic surgical correction in following phases:

- Pre-surgical Orthodontics: Surgical extraction of impacted maxillary canines. Alignment of maxillary arch and mandibular arch followed by space closure in maxillary arch, decompensation of malocclusion and coordination of maxillary and mandibular arch was done.
- Orthognathic surgery: Mandibular set back by Bilateral Sagittal Split Osteotomy (BSSO).
- Post-surgical Orthodontics.
- Retention using upper Begg’s Wraparound Retainer and Lower Lingual Bonded Retainer.

Treatment progress:

A. Pre-surgical Orthodontics
1. Surgical extraction of impacted maxillary canines.
2. The patient was banded and bonded with a 0.018 slot Roth preadjusted edgewise appliance. Bands were placed on all first molars while remaining teeth were bonded with chemical cure no mix adhesive (Rely-a-Bond™). Treatment was started with upper and lower 0.016” nitinol arch wires. Teeth aligned and crowding readily resolved with the nitinol wire.
3. 0.016” Stainless steel premium pulse straightened upper and lower coordinated arch wires were placed.
4. 0.018” Stainless steel premium pulse straightened upper, lower coordinated arch wires were placed, and space was closed in upper arch.
5. Second molars were banded and 0.016 x 0.022” upper and lower nitinol arch wires were placed.
6. 0.016 x 0.022” stainless steel upper and lower arch wires with constriction in the upper arch were placed.
7. Study models were made to check the coordination of the arches.
8. 0.017 x 0.025” coordinated upper and lower stainless steel arch wires were placed.
9. End of pre-surgical phase photographs (Fig 2), study model was taken to check the coordination of the arch, and patient was referred to Dept; of Oral & Maxillofacial Surgery for the needful surgical correction.
B. Orthognathic surgery

10. Surgical splint was prepared before surgery as a part of final surgical planning.

11. The mandible was set backwards by BSSO. To prevent the soft tissues of the affected side from hanging loosely after the operation, the soft tissues of the cheek and lower border of the mandible were pulled upward from the periosteum. All the osteotomies were stabilized with rigid internal fixation.

C. Post-surgical Orthodontics

12. Patient was reviewed six weeks after surgery.

13. Stabilization arch wire were removed and replaced with upper and lower 0.016 x 0.022” braided archwires. Settling elastics were given to seat the occlusion. The appliance was deboned.

D. Retention

14. Upper Begg wraparound and lower lingual bonded retainers were placed.

Result:

As a result of combined orthodontic and orthognathic treatment, the mandibular prognathism was addressed (Fig 3).

Together with the correction of the sagittal relationship of the upper and lower jaws, a straight and esthetic profile was obtained. A skeletal Class I relationship was achieved with acceptable interdigitation and normal incisor relationship. Cephalometric evaluation revealed an improvement of the ANB angle from -6° degrees to -3.5° degrees. WITS appraisal improved from -10 to -6 (Table1).

Discussion:

Orthognathic surgery is usually reserved for dentoskeletal disproportions that are so severe that they cannot be corrected using orthodontic appliances alone. It is generally accepted that the main benefits of orthognathic treatment are likely to be psychosocial in nature and that the majority of patients seek treatment do so because of concerns about their dentofacial esthetics[7]. Johnston et al[8] reported that patients requiring orthognathic surgery were less happy with the appearance of their face, teeth, and profile when compared with controls. This patient was a 16-year-old woman who was deeply concerned about her facial appearance. Growth modification was no longer feasible while camouflage treatment would not be sufficient to address the patient’s esthetic concerns.
The presence of a prognathic mandible with cross bite, along with a relatively normal mid-face, influenced the decision in favor of a single-jaw surgery. Gjørup and Athanasiou[9] in a retrospective cephalometric study of 50 consecutive patients treated with mandibular setback surgery reported straightening of the skeletal and soft-tissue facial profiles and improvement of lip posture. They considered achievement of normal incisal relationship leads to a better lip competence and posture.

Conclusion:

Combined orthodontic and surgical management of skeletal Class III malocclusion in adult patients is a stable and accepted treatment modality that allows the achievement of both profile correction as well as acceptable occlusion. The decision for a one-jaw versus two-jaw surgery should depend on patient’s chief complaint, objective evaluation of the patient’s profile, the extent of the skeletal discrepancy and stability factors.

References: