Case report: surgical correction of a class III malocclusion in an adult

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This case report describes a successful orthodontic treatment of a skeletal Class III malocclusion with mandibular prognathism in an adult individual. The patient with Class III malocclusion, having mandibular excess in sagittal and vertical plane was treated with orthodontics, bilateral sagittal split osteotomy. The surgical-orthodontic combination has resulted in near-normal skeletal, dental and soft tissue relationship, with marked improvement in the facial esthetics in turn, has helped the patient to improve the self-confidence level. The interdisciplinary approach is the treatment of choice in most of the skeletal malocclusions (1).

Keywords: Class III malocclusion, decompensation, Orthognathic Surgery, Bilateral sagittal split osteotomy, prognathism, surgical orthodontic treatment.

Introduction

The Skeletal Class III malocclusion is characterized by mandibular prognathism, maxillary deficiency or both. Clinically, these patients exhibit a concave facial profile, a retrusive nasomaxillary area and a prominent lower third of the face. The lower lip is often protruded relative to the upper lip. The upper arch is usually narrower than the lower, and the overjet and overbite can range from reduced to reverse.

The effect of environmental factors and oral function on the etiological factors of a Class III malocclusion is not completely understood. However, there is a definite familial and racial tendency to mandibular prognathism. For many Class III malocclusions, surgical treatment can be the best alternative. Depending on the amount of skeletal discrepancy, surgical correction may consist of mandibular setback, maxillary advancement or a combination of mandibular and maxillary procedures. After surgical correction of the skeletal discrepancy, the occlusion is usually finished orthodontically to a Class I relationship. However, if surgical treatment is not performed, and the final molar relationship is Class III or Class I, there are challenges specific to the static and functional Class III occlusion that must be considered. Sometimes a Class III relationship is caused by a forward shift of the mandible to avoid incisal interferences. This is a pseudo-Class III malocclusion. In these cases, it is important to establish the inter-occlusal relationship with the teeth in the retruded contact position.

In this paper, the surgical orthodontic treatment of a young adult patient with a Class III malocclusion is illustrated.

Diagnostic and Etiology

The patient was a 28-year-old man who had a Class III facial type and slight crowding with a complete Class III relationship. His chief complaint was an esthetic facial and uneven bite. His medical history showed no contraindication for orthodontic therapy and orthognathic treatment. No one in his direct family had a skeletal Class III features.

Figure 1. Pre-treatment extra-oral

The pretreatment extra-oral photographs showed symmetric facial structures (Fig 1). The patient had a concave profile, a decreased nasolabial angle and a protrusive lower lip. The intra-oral photographs (Fig 2) showed a Class III occlusion on each side with an anterior crossbite and without apparent crowding. Overjet was -2.0 mm, and overbite was -3.5 mm. His maxillary anterior teeth were prognathic, with inadequate display when smiling. The mandibular dental midline was deviated 2.5 mm to the right, although the maxillary dental midline was coincident with the facial midline. There were no signs or symptoms of temporomandibular joint dysfunction. Mandibular movements, such as maximal opening and lateral and anterior displacement were within normal limits. No deviation and pain were discovered during the border movement of the mandible.

A cephalogram and a panoramic radiograph were taken before treatment. The cephalometric analysis and its tracing showed that the mandible protruded relative to the cranial base (SNB angle, 82°; ANB angle -2°). The panoramic radiograph showed no other abnormal signs. After the analysis of the photographs, the casts and radiographs, it was decided to approach his problems as a skeletal Class III malocclusion with an anterior cross bite and a lower deviated midline (2).

Treatment Objectives

The treatment objectives (5) were to obtain a harmonious facial profile by decreasing the protrusion of the mandible, improve the occlusion, including correction of the anterior crossbite, establishment of ideal overjet and overbite, achievement of a functional molar relationship; and place the dental midlines in the middle of the patient’s face. We planned:

• To set back the mandible to correct the prognathism and the midline deviation.
• To relieve the proclined maxillary incisor position and to relieve the dental compensations.
• To relieve the dental compensations by straightening the mandibular incisors to an upright position over basal bone.

Treatment Alternatives

The first alternative was orthodontic treatment with extraction of 4 premolars. Through the retraction of the mandibular anterior teeth, the anterior crossbite and Class III molar relationships would be corrected and the concave facial profile would be camouflaged. Nevertheless, the mandibular incisors were not suitable for much distal movement because of the thin trabecular bone in the mandibular anterior area that could damage the periodontal tissues by gingival recession, fenestration or dehiscence.

The second alternative was combined surgical and orthodontic treatment. The anterior crossbite would be corrected with a single-jaw surgery; a mandibular setback. The concave profile would be improved.
as well. It was decided to extract the upper second premolars to relieve the dental compensations by repositioning the upper incisors.

The third alternative was to correct the class III malocclusion by miniscrew-assisted mandibular dentition distalization. However, we decided that the skeletal problem was too excessive and required orthognathic surgery.

After we discussed the three alternatives with the patient, he chose the second option.

Treatment Progress
The preoperative orthodontic preparation began on December 2011. Before the levelling and alignment procedures (4), the maxillary second premolars were extracted to decompensate the maxillary incisor inclination and to reduce the acute nasolabial angle. Pre-adjusted 0.022-in edgewise brackets were bonded to all teeth. The preoperative orthodontic treatment was achieved in 12 months, ending with 0.018 x 0.025 stainless steel surgical archwires for the maxillary and mandibular arches.

The orthognathic surgery involved a set back of the mandible with a bilateral sagittal split osteotomy. This was performed to improve the mandibular protraction and establish an Angle Class I canine position with ideal overjet and overbite. After the surgery, the patient was placed in intermaxillary fixation for 2 weeks. Two months after surgery, finishing was performed with maxillary and mandibular 0.016 x 0.022-in. titanium-molybdenum alloy archwires. The appliances were removed after 18 months of active treatment. Bonded lingual retainers were fitted to the lingual surfaces of the anterior teeth in both arches. Maxillary and mandibular essix retainers were delivered with instructions to wear them full time for two weeks and then night time.

Treatment Results
The post-treatment photographs (Fig. 5) showed that facial aesthetics were improved, and ideal occlusion was achieved with proper overjet and overbite. The maxillary dental midlines coincided with the facial and mandibular midlines. The occlusion was finished to a therapeutic Class II.

Discussion
The decision for surgical orthodontic treatment for this patient was based on the fact that his primary concern was his facial profile. Before the single-jaw surgery: a mandibular setback, preoperative orthodontic treatment, including decompensation of the malocclusion, is necessary. The dental decompensation we performed was intended to retract the proclined maxillary incisors to a normal axial inclination. Lack of optimal dental decompensation compromises the quality and quantity of an orthognathic correction. The patient’s teeth were decompensated by extracting the upper second premolars and levelling the mandibular arch. This phase was achieved in 12 months.

Conclusion
This case report describes the surgical orthodontic treatment of a young adult man with dental and skeletal class III relationship. The orthognathic treatment was the best option for achieving an acceptable occlusion and a good esthetic result. An experienced multidisciplinary team approach ensures a satisfactory outcome. Presurgical orthodontics removes all the dental compensations and suggests the 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 (2).

References

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