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

By Dr. Fabien Depardieu

This case report describes a successful orthognathic 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 therapy 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, decompen sation, 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 retractive 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 correction 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 unesthetic 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.

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 -3°). 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 compensa-
tions by repositioning the upper incisors.

The third alternative was to cor-
rect the Class III malocclusion by miniscrew-assisted mandibular den-
tition distalization. However we de-
cided that the skeletal problem was too excessive and
required orthognathic surgery.

After we discussed the three al-
ternatives with the patient. He chose the second option.

Treatment Progress
The preoperative orthodontic
preparation began on Decem-
ber 2011. Before the levelling and align-
ment procedures (4), the max-
illary second premolars were
deextracted 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 ortho-
dontic 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 in-
volved a set back of the man-
 dibular with a bilateral sagittal split
osteotomy. This was performed
to improve the mandibular pro-
tusion and establish an Angle
Class I canine position with ideal
midlines.

After the surgery, the patient
was placed in intermaxil-
 lary fixation for 2 weeks. Two
months after surgery, finishing
was performed with maxillary
and mandibular 0.018 x 0.022-
in titanium-molybdenum alloy
archwires. The appliances were
removed after 15 months of active treat-
ment. Bonded lingual retain-
ers were fitted to the lingual
surfaces of the anterior teeth in
both arches. Maxillary and man-
dibular essix retainers were de-
 livered 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 aethet-
ic was improved, and ideal oc-
cclusion was achieved with proper
overjet and overbite. The maxil-
 lary dental midlines coincided
with the facial and mandibular
midlines. The occlusion was finished to a
therapeutic Class II.

Discussion
The decision for surgical ortho-
dontic 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, preop-
terative 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 incli-
nation. Lack of optimal dental
decomposition compromises the
quality and quantity of an
orthognathic correction.

The patient’s teeth were decompen-
sated 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 den-
 tal and skeletal class III relation-
ships. The orthognathic treat-
ment was the best option for
achieving an acceptable occlu-
sion and a good aesthetic result.

An experienced multidiscipli-
nary team approach ensures a
satisfactory outcome.

Presurgical orthodontics re-
moves all the dental compensa-
tions and suggests the extent of
the skeletal discrepancy. Nor-
mal skeletal base relationship
is achieved by osteotomy and
setback of the prognathic man-
dible, postsurgical orthodontics
guides the normal occlusal re-
habilitation by correcting any
emerging dental discrepancies (2).

References
1. Ravi M S, Shetty NK, Prasad
2. Radha Katiyar, G & Singh, Di-
yaa Mehrotra, Alka Singh. Natl
I. Maxillofac Surg. 2010 Jul-Dec;
1 (2): 145-149
3. Yan Jing, Jianglong Han,
Yongwen Guo, Jingyu Li, and
Ding Bai. Am J Orthod Dentofa-
4. Sung-Hwan Choi, Chung-Ju
Hwang. Am J Orthod Dentofa-
cial Orthop 2015; 144:275-46.
5. Contact Information
Dr. Fabien Depardieu
Orthodontist specialist at Dr Roze
& Associates Dental Clinic
fabien@dradubai.com

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