CASE REPORT: COMBINED ORTHODONTIC AND SURGICAL MANAGEMENT OF CLASS III MALOCCLUSION WITH ASYMMETRIC MANDIBULAR PROGNATHISM

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Abstract: This case report deals with the treatment of a young adult female with asymmetric mandibular prognathism using a combined surgical – orthodontic approach. A first phase of orthodontic decompensatory treatment was followed by mandibular setback surgery to address the dental and skeletal defects. Crossbite correction was achieved along with significant improvement in the facial appearance.

Key words: Class III malocclusion, Mandibular prognathism, Decompensation, Bilateral sagittal split osteotomy.

INTRODUCTION:

Class III malocclusion has been defined as a skeletal facial deformity characterized by a forward mandibular position with respect to the cranial base and/or maxilla. This may be as a result of true mandibular prognathism, maxillary retrognathism or a combination of the two. Some Class III malocclusions are also the result of a functional shift.

The correction of Class III skeletal malocclusions has been one of the most difficult problems in orthodontics. In young patients where there is a possibility of influencing growth, strategies such as chin cap and face mask therapy have been used with some success. In adults however, the treatment options are confined to camouflage orthodontic treatment for mild A-P jaw discrepancy, or orthognathic surgery for moderate to severe A-P jaw discrepancy respectively.

Contemporary surgical-orthodontic management of mandibular prognathism involves a first phase of preparatory orthodontic treatment, followed by a surgical setback of the mandible via bilateral sagittal split osteotomy (BSSO) or intra-oral vertical ramus osteotomy (IVRO), depending on the magnitude of correction required. Post-surgically, the fixed orthodontic appliance
allows for final detailing of the occlusion while retaining the jaw correction.

**DIAGNOSIS AND ETIOLOGY**

The patient was a 22 year old woman presenting with the chief complaint of “protruding lower jaw”. No familial history of such a malocclusion was reported. She had previously had her upper left third molar extracted.

Extra oral examination indicated a concave profile with an apparently normal mid face accompanied by mandibular prognathism. The frontal view at rest showed an obvious deviation of the mandibular midline to the left, while maxillary incisor show on smiling appeared sufficient and vertical relations appeared normal (Fig. 1).

**Fig. 1 Pre-treatment extra-oral photographs.**

TMJ examination was not suggestive of any pathology. On intra-oral examination, all teeth except the previously extracted upper left third molar were found to be erupted in the oral cavity. Molar relationships were Angle’s Class III bilaterally, more pronounced on the right side. There was an anterior edge to edge bite with crossbites of 12, 22, 23, 24, 25 and 26. Upper midline diastema of 2 mm was evident, and the mandibular dental midline was deviated 5 mm to the left of the facial midline. The mandibular incisors appeared retroclined and were mildly crowded (Fig. 2. Standard pre-treatment panoramic and lateral cephalogram views were obtained (Fig. 3).

**Fig. 2 Pre-treatment intra-oral photographs.**

The cephalometric examination indicated that she had a skeletal Class III relationship with a normal maxilla and a protrusive mandible. (Table 1)

**TREATMENT OBJECTIVES:**

1. Reduction of mandibular prognathism and improvement of the soft tissue profile.
2. Correction of facial asymmetry.
3. Correction of crossbite and achievement of ideal dental interscuspation with Class I molar and canine relationships.

**TREATMENT PLAN:**

1. Preliminary phase of pre-surgical fixed orthodontic treatment for deccompensation and coordination of the dental arches.
2. Correction of mandibular prognathism and skeletal asymmetry via asymmetric mandibular setback surgery.
3. Post-surgical orthodontic finishing and detailing.

**TREATMENT PROGRESS:**

Following extractions of third molars, pre-adjusted edgewise fixed appliances (0.022” slot, MBT prescription) were placed in the upper and lower dentitions, with all second molars included in the strap-up. The arches were leveled, aligned and coordinated for a period of 8 months, progressing from light 0.016” HANT wires to 0.019” x 0.025” rigid, rectangular steel wires (Fig 4). Expected “worsening” of the malocclusion occurred, with accentuation of the profile concavity as well as mandibular asymmetry (Fig 5).

Following this, model surgery was performed and a surgical splint constructed. The patient was then referred...
TREATMENT RESULT:

As a result of combined orthodontic and orthognathic treatment, the mandibular prognathism was addressed and the asymmetry of the mandibular midline was corrected. (Fig 7). Together with the correction of the sagittal relationship of the upper and lower jaws, a straight and esthetic profile was obtained. A Class I occlusal and skeletal relationship was achieved with acceptable interdigitation and normal incisor relationship. (Figs 8, 9).

Parameters | Pre-treatment | Post treatment |
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**Cranial base** | | |
Ar-PTM (HP) | 35mm | 36mm |
PTM-N (HP) | 52mm | 54mm |
**Horizontal (Skeletal)** | | |
N-A-Pog | -8° | +3° |
N-A (HP) | -4mm | 0mm |
N-B (HP) | -12mm | -2mm |
N-Pog (HP) | -11mm | +2.5mm |
SNA | 86° | 85° |
SNB | 90° | 82° |
**Vertical (Skeletal & Dental)** | | |
N-ANS (HF) | 56mm | 58mm |
ANS-Gn (HF) | 75mm | 74mm |
PNS-N (HF) | 56mm | 56mm |
MP-HP< | 29º | 26º |
1-NF (NF) | 34mm | 31mm |
1-MP (MP) | 43mm | 42mm |
6-NF (NF) | 27mm | 27mm |
6-MP (MP) | 31mm | 33mm |
SN-Go Gn | 29º | 30º |
**Maxillo-mandibular** | | |
PNS-ANS (HF) | 55mm | 55mm |
Ar-Go_ | 55mm | 55mm |
Go-Pg | 89mm | 85mm |
B-Pg (MP) | 10mm | 11mm |
Ar-Go-Gn | 133º | 130º |
**Parameters** | **Pre-treatment** | **Post treatment** |
**Dental** | | |
Occ Plane -HP< | 5º | 9º |
A-B (OP) | +12mm | -5mm |
1-NF< | 117º | 116º |
1-MP< | 82º | 83º |

Treatment Result:
As a result of combined orthodontic and orthognathic treatment, the mandibular prognathism was addressed and the asymmetry of the mandibular midline was corrected. (Fig 7). Together with the correction of the sagittal relationship of the upper and lower jaws, a straight and esthetic profile was obtained. A Class I occlusal and skeletal relationship was achieved with acceptable interdigitation and normal incisor relationship. (Figs 8, 9).
Cephalometric evaluation revealed an improvement of the ANB angle from -3 degrees to +2 degrees. Mandibular length (Go-Pog) was reduced from 89 mm to 85 mm. (Table 1). Cephalometric superimpositions (Fig 10) showed an appreciable reduction in profile concavity, with the soft tissues of the lip and chin moving posteriorly in concert with the setback of the mandible.

**DISCUSSION:**

Orthognathic surgery is usually reserved for dento-skeletal 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 who seek treatment do so because of concerns about their dentofacial esthetics. Johnston et al. 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 22 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 and mid-line deviation, along with a relatively normal mid-face, influenced the decision in favor of a single-jaw surgery.

Gjorup and Athanasiou 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 normal incisal relationship achieved to be influential on the soft tissues overlying both incisors leading 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 objective evaluation of the patient’s profile, the extent of the skeletal discrepancy and stability factors.

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References:


