

Ortho-surgical Management of Severe Vertical Dysplasia: A Case Report

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ABSTRACT

The treatment of skeletal open bite has challenged the general dentist, oral surgeon, and orthodontist for a long time. This deformity produces social and psychological distress as well as functional problems in patients. The establishment of a correct diagnosis and aetiology is very important and may indeed dictate the method and choice of treatment. The present case report demonstrates the orthodontic and surgical treatment of an adult patient with high angle growth pattern and skeletal open bite malocclusion.

Key words: Skeletal open bite, orthognathic surgery, vertical dysplasia.

INTRODUCTION

The diagnosis and treatment planning for patients in which an open bite is superimposed on an anteroposterior malrelationship of the teeth and jaws can be complex and challenging. The open-bite component compounds the deformity, and frequently more extensive intervention is required to ensure a satisfactory result.^{1,2} Much research has also been conducted on the stability of orthognathic surgery for the correction of skeletal open bite. Depending on the magnitude of the open bite and the relative anterior-posterior positions of the jaws, surgery can vary from relatively routine single jaw surgery to complex three-dimensional double jaw surgery.^{3,4}

Proffit & Bell stated that approximately 90% of patients with skeletal type open bite deformities are best treated by the maxillary down fracture technique in combination with adjunctive procedures.⁵ The purpose of this article is to present an adult case of skeletal open bite with a long lower anterior facial height treated by means of double jaw orthognathic surgery.

DIAGNOSIS AND ETIOLOGY

A 24-year-old male patient presented with the complaint that his upper and lower front teeth were not meeting and he was having problem biting food. No relevant medical and dental history was recorded.

Extraoralexaminationrevealeddolicocephalic head, leptoprosopic face, increased facial height with long lower face,

lip incompetence, strain of the mentalis muscle, long lowerface and convex profile (**Figure 1**).

Intraoral examination revealed open bite of 10 mm with Angle's Class III molar relation, constricted maxilla with a high palatal vault, bilateral posterior cross bite, and moderate amount of crowding in the maxillary and mandibular anterior region.

Cephalometric analysis demonstrates the features of skeletal open bite (**Figure 3**). The mandibular plane and gonial angles were large and the mandible exhibited a backward and downward rotation; consequently, the lower anterior facial height was larger than normal. The inclinations of the maxillary and mandibular incisors were within the normal range. From these findings, this case was diagnosed as a skeletal open bite with a long lower anterior facial height.

TREATMENT OBJECTIVES

The objectives of the treatment were to correct the skeletal Class III malocclusion, to reduce the vertical dimension of the face, to achieve adequate overjet and overbite, to eliminate crowding in maxillary and mandibular dentition and to achieve Class I molar relationship on both sides.

TREATMENT PROGRESS

In the management of open bite, various treatment options available i.emolar intrusion with miniplates and mini screws, MEAW (Multiloop Edgewise Archwire) mechanics, ortho-



Figure 1 Pre-treatment Photographs

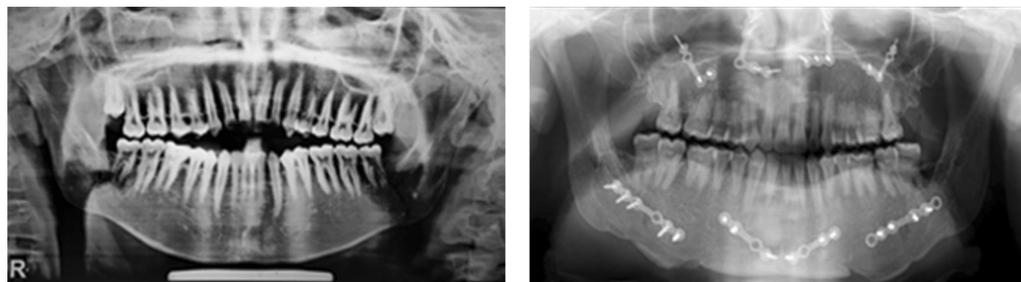


Figure 2 Panoramic Radiographs

dontic camouflage with premolars and molars extraction, chin cup and orthognathic surgery. The clinical and diagnostic findings dictate the treatment option. The cephalometric and clinical findings indicate a severe skeletal vertical dysplasia superimposed on class III bases hence a surgical approach was finalised. The patient and his parents were informed with the treatment outline. After taking informed and written consent, treatment was started. Treatment was carried out in following phases:

1. *Pre-surgical orthodontics*: Before initiating fixed orthodontic treatment, the oral hygiene motivation was given to the

patient and for elimination of the tongue thrust habit, patient was instructed swallowing exercises for tongue positioning during functional movements.

Fixed orthodontic treatment therapy was started with preadjusted edgewise orthodontic fixed appliance (MBT McLaughlin, Bennet & Trevisi Gemini 3M 0.02200 × 0.02800 slot) for alignment and levelling of the teeth. The required dentoalveolar expansion was performed simultaneously with a removable expansion plate. The treatment time for presurgical orthodontics was 10 months (**Figure 4**).

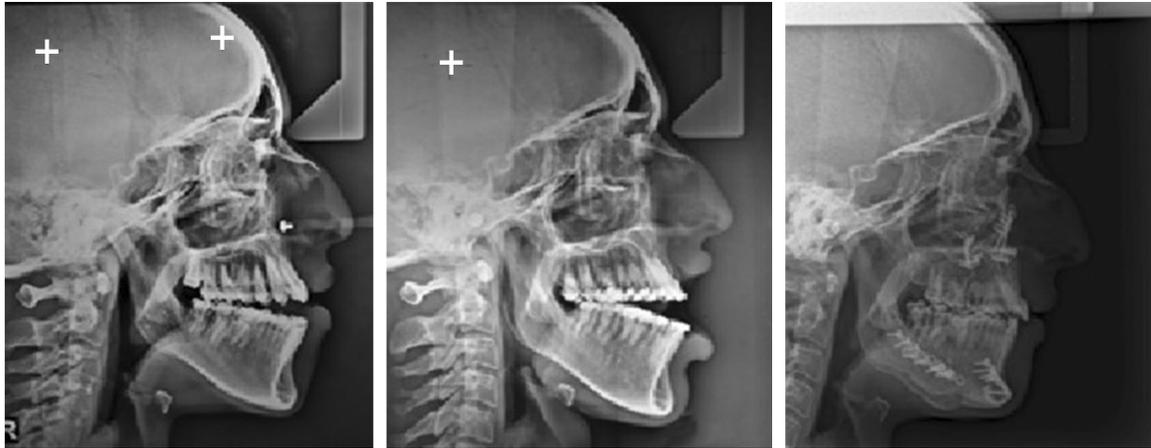


Figure 3 Lateral Cephalograms



Figure 4 Presurgical Photographs

2. *Surgical Treatment:* Both maxillary impaction and BSSO for mandibular set back was performed Superior repositioning of the maxilla, via total or segmental maxillary osteotomies, is often indicated in skeletal open bite patients with excess vertical maxillary growth. In our case a 5 mm maxillary superior impaction was done. Maxillary impaction

results in a forward and upward rotation of the mandible, therefore decreasing the lower face height and eliminating anterior open bite. However, in our case the resultant auto-rotation of mandible would have aggravated the Class III pattern and thus a 7 mm backward and counter clockwise rotation (until 2 mm overbite achieved) of mandible with



Figure 5 Postsurgical Photographs

bilateral sagittal split osteotomy was performed accordingly for a successful outcome (**Figure 5**).

3. Post-surgical orthodontic treatment: Appliances were removed eight months after the surgery and the total treatment time was 18 months. Retention consisted of a fixed lingual and palatal retainer.

TREATMENT RESULTS

Facial photographs show that overall facial balance was improved, and the lips show less tension in lip closure. A bilateral class I molar relationship and good occlusion was established and an ideal 2 mm overbite and overjet was achieved (**Figure 6**). Panoramic radiograph showed no or less root resorption (**Figure 2**).

Post-treatment cephalometric evaluation show a skeletal Class I jaw base relationship and Angle Class I molar relationship on both sides. The lower anterior facial height (ANS-Me) was decreased to 68 mm. The inclinations of the upper and lower central incisors were within the normal range. The occlusion was stable and good intercuspation of teeth was achieved. (**Table 1**).

DISCUSSION

The patient had a complex skeletal malocclusion in both the vertical and sagittal plane manifesting as an open bite and a Class III molar relationship. Although there are many case reports addressing nonsurgical treatment of adults with anterior open bite using skeletal anchorage, however, it is more challenging to use a nonsurgical approach for an open bite with a Class III component.^{6,7} Therefore, orthognathic surgery is considered an essential procedure to correct such complex deformities in adults. The coordination between orthodontics and orthognathic surgery expand the treatment possibilities to provide a better aesthetic improvement in the soft tissues as well as functional well-being.

Treatment was started with non-extraction orthodontic treatment for aligning dental arches. After completion of presurgical orthodontics, two splints were prepared (separately for each jaw) for procedure of double-jaw surgery for ideal placement of individual jaw.

Although acceptable facial balance and occlusion can be frequently achieved with a surgical open-bite approach, another significant impact is long term stability. Earlier, studies



Figure 6 Post-debonded Photographs

have shown that orthodontic-surgical correction of open-bite malocclusion has greater long-term stability compared to orthodontics alone.⁸

In the present case, no apical root resorption was found throughout the treatment period because molar intrusion was not necessary to correct skeletal open bite.

In conclusion, an adult patient with a skeletal open bite and a large lower anterior facial height was treated by means of ortho-surgical approach to achieve stable occlusion with a well-balanced face.

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