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RESEARCH ARTICLE

Correction of a Severe Class III Malocclusion with Orthognathic Surgery:  
A Case Report

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ABSTRACT

The development of surgical correction of class III cases in recent years has made it more interesting for the orthodontist to handle mandibular prognathism. Treatment of patients in this classification is really just coming to the fore, and represents a closer cooperation between two fields of specialization, oral surgery and orthodontics. Setback of the mandible to correct mandibular prognathism is a well known procedure. The 2 most frequently used techniques are the intraoral vertical ramus osteotomy (IVRO) and the sagittal split ramus osteotomy (SSRO). In our patient we successfully used the SSRO procedure to correct mandible prognathism. The duration of treatment is of 10 months, and the prognathic profile had been improved and the anterior cross bite been relieved with finishing the occlusion in the cusp-fossa (class II) relationship.

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INTRODUCTION

Once a patient's growth is complete, a malocclusion caused by skeletal dysplasia of one or both jaws can be treated in one of two ways. The first option is to correct the skeletal deformity with a combination of orthodontics and Orthognathic surgery; the other is to camouflage the malocclusion with orthodontic tooth movement.<sup>1</sup> Approximately 4% of the population has a Dentofacial deformity that requires surgical-orthodontic treatment to correct; the most common indications for surgical treatment are severe Class II, Class III, and vertical skeletal discrepancies in non-growing patients.<sup>2</sup> Class III patients are a large proportion of those seeking surgical-orthodontic treatment. It has been reported that 20% of patients at a surgical orthodontic clinic had mandibular excesses, with 17% having maxillary deficiencies and 10% having both.<sup>3</sup> A subsequent article from the same center reported that patients with Class III problems were more likely to seek clinical evaluation than Class II patients.<sup>4</sup> Most people with Class III malocclusions have dent alveolar and skeletal problems, and mild cases can often be treated with orthodontics only.<sup>5</sup> However, patients with significant Class III skeletal discrepancies are often treated with mandibular, maxillary, or Bimaxillary Orthognathic surgery in conjunction with orthodontic appliance treatment. Studies have reported that patients with ANB angles of less than  $-4^\circ$  and mandibular incisor inclinations of less than  $83^\circ$  were more likely to have surgical-orthodontic treatment than conventional orthodontic treatment.<sup>6</sup> A more recent study concluded that surgical patients could be distinguished from nonsurgical ones on the basis of Wits measurement, maxillary/ mandibular length ratio, gonial angle, and sella-nasion distance.<sup>7</sup> The main objectives of surgical-orthodontic treatment are to normalize the facial profile,

occlusion, and function. Correction of the main dentoskeletal parameters to within the normal range of values is usually regarded as a main aim of treatment. In practice, the choice among the various surgical procedures is based on clinical examination and Cephalometric valuation. Surprisingly, however, little research examines which Cephalometric factors influence treatment planning. This article describes the combined orthodontic-surgical management of patient with skeletal class III malocclusion.

CASE REPORT

An 18-year old female patient presented to the Department of orthodontics and Dento-facial Orthopedics of M. S. Ramaiah Dental College, Bangalore with problems including forward placement of lower jaw and lower anterior teeth .On clinical examination, the patient exhibited leptoproscopic facial form, obtuse nasolabial angle, incompetent lips and slight prognathic lower lip position with concave facial profile and anterior facial divergence with prominent chin position (Fig .1).



Fig. 1. Pre-Treatment Extra – oral Photographs

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Intraoral evaluation revealed angle's class I molar relationship bilaterally with anterior cross bite along with congenitally missing lateral incisors with spacing in the upper anterior region and mild crowding in the lower anterior region .



Fig. 2. Pre-Treatment Intra-Oral Photographs

Cephalometric examination confirmed the diagnosis of patient with skeletal class III malocclusion (ANB of -6) due to prognathic mandible (SNB of 86) with vertical growth pattern (Fig. 3).



Fig.3. Pre-treatment Lateral Cephalogram

**Treatment plan**

A surgical mandibular set back (Bilateral sagittal split body osteotomy) of 7mm bilaterally planned on the basis of prediction tracings and mock set-up (Fig.4).

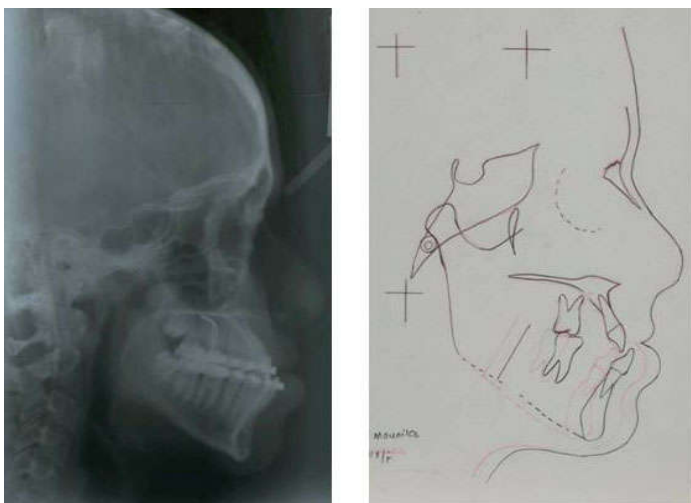


Fig.4. Pre-surgical lateral cephalogram and prediction tracings showing 7mm of BSSO.

In the Pre-surgical phase Brackets were bonded in both arches and leveling and Alignment was carried out with .016" round nickel titanium archwires. The arch form was then developed with .019x.025" stainless steel archwires and all the natural compensation were removed and the both the jaws made ready for the surgery (Fig. 5).



Fig.5.Pre-surgical orthodontic phase arch were developed to .019x.025" S.S archwires

The Bilateral sagittal split body osteotomy of 7mm carried out to set the mandible back, followed in the post-surgical settling elastics were used to settle the occlusion and the maxillary canines were converted to lateral incisors, the premolars to canines.

**Treatment Results**

Post-treatment evaluation showed an improvement in the prognathic profile (Fig.6),



Fig 6. Post-Surgical treatment photographs showing improvement in the prognathic profile

The patient profile we slightly overcorrected for to take care of relapse tendency and anterior cross bite is relieved, a normal over jet and over bite been established (Fig. 7).



Fig 7. Post-Surgical treatment photographs showing improvement in occlusion

Post-treatment Cephalometric analysis corroborated with the post-treatment clinical findings the SNB angle were reduced to 80° and the ANB to +2° (fig.8). The total treatment duration is of 10 months.

**DISCUSSION**

Despite the recent increase in the percentage of Class III patients given maxillary or bimaxillary procedures, isolated mandibular setbacks continue to be the procedure of choice in many cases with true mandibular prognathism.<sup>8</sup> In the studies reviewed,



**Fig. 8. Post-treatment lateral cephalogram**

the mean mandibular setback at surgery for isolated Mandibular procedures (6.59 mm) was greater than that observed in bimaxillary surgery (5.04 mm) as a logical consequence of the entire correction of the skeletal malocclusion with mandibular surgery. Skeletal relapse ranges from 7.1% to 51.4%, with a mean value of 22.6%, emphasize that despite the long experience with this procedure, existing scientific evidence still conflicts regarding its long-term stability. One third of the patients (33%) in the sample of studies in which clinically significant relapse has been reported exhibited relapse of 2 mm or more.<sup>9,10,11</sup> Many authors found that the most important factor accounting for relapse was the magnitude of surgical movement, while others did not find this correlation.<sup>12,13</sup> It has been observed less change in the region of the mandibular angle with BSSO in comparison with transoral vertical ramus osteotomy, but observed a greater amount of relapse at B point. The amount of surgical setback was correlated with relapse in both procedures, but TOVRO had greater stability for mandibular setback of less than 5.0 mm. Kobayashi *et al* 12 found a significant relationship between setback and relapse, particularly when the amount of Setback exceeds 10 mm.<sup>14</sup> Results of BSSO stabilized with rigid fixation, independent of the number of jaws mobilized for correction of skeletal relationships, indicated a mean relapse of 24% of surgical setback, which is even greater than that reported for wire osteosynthesis. Approximately one third of the patients (30.8%) showed clinically significant relapse.<sup>15</sup>

### Conclusion

Surgical intervention in the treatment of Class III malocclusion is indicated in those instances in which the deformity cannot be satisfactorily treated orthodontically and in those instances in which the deformity is the result of an uncontrollable physiologic or external traumatic reaction. It is contraindicated in those patients whose physical status will not allow such a procedure and in the patient who is not extremely interested in necessary correction. In our patient the combined orthodontics and the surgical approach helps in the appreciable changes in the patient profile and occlusion.

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