# Surgical Orthodontic Treatment Of Skeletal Class Iii Facial Asymmetry

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**Citation**

S Yadav, V Dhupar, F Akkara. *Surgical Orthodontic Treatment Of Skeletal Class Iii Facial Asymmetry*. The Internet Journal of Bioengineering. 2010 Volume 5 Number 1.

**Abstract**

Correction of class III facial asymmetries is still a major problem in need of an adequate solution. Prominent abnormalities of the facial structures play an important role in a growing individual's developing identity. Class III skeletal asymmetries are treated with a combination of orthodontic and orthopedic mechanics in growing individuals. In adulthood, correction of the asymmetries usually requires complex surgical procedures. In this case report treatment strategies of class III facial asymmetries are described.

## INTRODUCTION

Facial asymmetry, defined as difference in the size, shape, or relationship of two sides of the face, has high correlation with facial harmony, attractiveness, and beauty.[1, 2] Minor asymmetries of the human skeleton are common in the general population and usually have no esthetic or functional significance.[3] Moderate to severe asymmetries can be easily noticed[3] and these have undesired effects on patient's developing identity[1] and have direct impact on the patient's social life.

Facial asymmetries can be classified into the two basic categories of developmental or acquired asymmetries. Developmental asymmetries include agenesis, hypoplasia, hyperplasia, atrophy, hypertrophy, and malpositions of the facial bony structures. Acquired asymmetries occur as a result of traumas, infections, functional shifts, and tumors.[4]

Deformities of the face are more often congenital. Trauma, burn and any other pathology involving the facial skeleton also results in facial deformity. Various syndromes such as Apert, Crouzon and Treacher Collin's syndrome, cleft lip and palate, and hypertelorism affects the facial structures and cause facial deformities. Deformities that primarily affect the jaws and dentition are fifty to one hundred times as common as the rare syndromes.[5] It is thought that facial structures can show different degrees of asymmetries as a result of lowered genetic control over the formation and development of bilateral structures of the face or environmental influences and accidents during development.[6]

Developmental skeletal Class III facial asymmetry is characterized by three-dimensional enlargement of half of the mandible.[7] The unilateral increase in height of the face on the affected side results rotated facial appearance, whereas the teeth generally remain in occlusion. The maxilla usually follows the mandible and grows downward on the affected side, resulting in occlusal canting.

The aim of this report is to present the orthodontic and surgical treatment of an adult patient having severe skeletal Class III facial asymmetry.

## CASE REPORT

## DIAGNOSIS AND ETIOLOGY

A 22 year old patient with no history of significant medical problems or any family history of hereditary disease reported. His main complaint was the asymmetry of the face. The chin was deviated on the left side. Clinical examination of the temporomandibular joint revealed no restriction of joint movements, pain or clicking.

The cephalometric examination indicated that he had a skeletal Class III relationship with a protrusive mandible. In the radiographic evaluation, the condyle was slightly elongated; the height of the ramus was increased. Dentally, a Class III molar and canine relationship was present. Crowded upper and lower incisors with reverse overjet were present. On the basis of these clinical and radiological findings; we diagnosed this case as skeletal Class III facial

asymmetry (Figure 1).

## TREATMENT OBJECTIVES

In the presurgical orthodontic phase, correct tooth inclinations and angulations, and prepare the teeth and dental arches for surgery by decompensating the dental relationships.

Correction of skeletal class III facial asymmetry in the surgical phase by bilateral sagittal split osteotomy (BSSO) and lateral advancement sliding genioplasty.

Correction of the minor occlusion discripencies in postsurgical orthodontic phase.

## PRESURGICAL ORTHODONTICS

The impacted third molars found in the osteotomy site were extracted. Extractions of upper first premolars and lower second premolars were performed to relieve the crowding and decompensate the malocclusion. 0.022 slot Roth preadjusted edgewise appliance was bonded. Upper and lower 0.016" super elastic NiTi arch wires were placed for teeth alignment. After alignment was achieved, 0.019 x 0.025" upper and lower nitinol archwires were placed to further align and level the arches. In the next appointment after 2 months 0.019 x 0.025" upper and lower stainless steel archwires were placed to do the space closure. Class II elastics were also used for retracting the upper teeth and protracting the lower teeth and, as a result, decompensating the dental relationship. After the incisors were brought to their ideal positions in their alveolar processes, and negative overjet was obtained, 0.021 x 0.025" upper and lower nitinol archwires were placed. Then 0.021 x 0.025" TMA upper and lower coordinated archwires were placed. In the end 0.021 x 0.025" stainless steel upper and lower coordinated archwires were placed as stabilizing arch wires.

Study model was taken to check the coordination of the arch. Surgical splint was prepared before surgery as a part of final surgical planning.

## SURGICAL PHASE

The mandible was moved 6 mm backwards by BSSO. To prevent the soft tissues of the affected side from hanging loosely after the operation, the soft tissues of the cheek and lower border of the mandible were pulled upward from the periosteum. For the lower border asymmetry lateral and advancement sliding genioplasty was performed. All the osteotomies were stabilized with rigid internal fixation (Figure 2).

## POSTSURGICAL ORTHODONTICS

Patient was reviewed after six weeks of surgery. Stabilization arch wire were removed and replaced with upper and lower 0.019 x 0.025" TMA wires. Settling elastics were given to seat the occlusion. The appliance was debonded after 2weeks and upper & lower Begg wraparound retainers were placed.

Post operative lateral cephalogram was taken and super imposed with pre operative lateral cephalogram. Frontal and profile photographs showed remarkable difference in the patient (Figure 1 and 3).

## TREATMENT RESULT

The asymmetry of the mandibular body and face was corrected. Together with the correction of the sagittal relationship of the upper and lower jaws and esthetic profile was obtained. A favorable occlusal result was achieved with acceptable interdigitation and incisor relationship (Figure 4). With the lateral and advancement sliding genioplasty, asymmetry of the chin was also corrected.

### Figure 1

Figure 1: Front and lateral profile photographs of the patient with class III facial asymmetry.

### Figure 2

Figure 2: Intra operative photographs of the surgical cut, with the splint and internal rigid fixation.

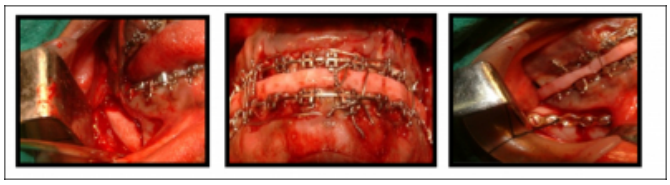

**Figure 3**

Figure 3: Post operative front and lateral profile photographs of the patient.

**Figure 4**

Figure 4: Pre-operative, pre surgical orthodontic phase and post-operative occlusion photographs.

## DISCUSSION

Among all dentofacial abnormalities, skeletal class III asymmetries are one of the most complicated problems in both childhood and adulthood. The asymmetric class III deformities have long been of great mutual interest to the oral surgeon and the orthodontist. The deformity of maxillofacial region is readily expressed as a profile disfigurement, since the soft tissues of the face depend on the jaws for much of their contour. The selection of the proper type and site of osteotomies in orthognathic surgery is based on the extent and the type of dentofacial deformity, the degree of the desirable jaw movement and the anticipated soft tissue changes following surgical intervention.

In a growing child, functional asymmetries often can be corrected by obtaining a proper function and eliminating occlusal interferences. [2, 8]Class III skeletal asymmetries are treated with a combination of orthodontic and orthopedic mechanics in growing individuals.[2, 8, 9] In adulthood, correction of the asymmetries usually requires a complex surgical procedures.[2, 9- 12]

Surgical correction of asymmetric class III deformities can be treated by different surgical techniques, with each having its own advantages and disadvantages.[13- 16] Traditional surgical procedures employed for asymmetric mandibular anterio-posterior hyperplasia include extraoral vertical oblique ramus osteotomy, intraoral vertical oblique ramus osteotomy, bilateral sagittal split osteotomy, anterior segmental osteotomy and body ostectomy with or without genioplasties.

In the treatment of our case, we used the BSSO combined with lateral and advancement sliding genioplasty. This technique was chosen because it was easy to apply, less time consuming, and the risk of neurologic complication was less.

Trauner and Obwegeser (1957),[17] introduced intraoral bilateral sagittal split ramus osteotomy (BSSO), although the first description was published as early as 1942 (Schuchardt).[18] It is a versatile procedure that allowed corrections in all three planes of space without a need for a bone graft. Jensen[14] introduced a combination of a conventional BSSO with a modification of this technique including dissection of the neurovascular bundle from the mandible, horizontal intermediate bone reduction of the proximal fragment, and vertical reduction of the lower border of the distal fragment. Modified and extended BSSO is another alternative method recently reported by Ferguson[12], with its certainly invasive and effective approach. Technique described by Jensen, has some advantages over the other conventional methods for correcting the asymmetric mandibles, but it is time consuming and has high neurologic complication.[12]

In a more severe case, it would be necessary to include some different goals to the treatment objectives which include intrusion of the mandibular posterior teeth, shortening the distance between the tooth roots and the mandibular canal. Therefore, diagnostic setup is necessary at the beginning of the treatment for defining the goals of the pre-surgical orthodontic treatment and the required tooth movements according to the different surgical techniques planned for use.

## CONCLUSIONS

Asymmetric class III deformities can be corrected by using different methods, with each having its own advantages and disadvantages. The structures involved in this abnormality and the patient's expectations must be taken into consideration when choosing the surgical technique for correction of the problem. The surgeon and the orthodontist should take part and be responsible throughout the evaluation process, and there should be always a joint discussion between the surgeon, the orthodontist and the patient, before a definitive surgical treatment plan is made. All major anomalies should be corrected at the initial

operation. A stable occlusal relationship of the jaws is significant for the stability of the fragments post operatively.

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