

Approaches to correction of class iii skeletal malocclusion



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Combined Orthodontic and Surgical Approach in the Correction of Class III Skeletal Malocclusion

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While growth modification and camouflage orthodontic treatment offers a limited solution in treating some skeletal Class III malocclusion depending on the age of the patient, underlying skeletal severity, alignment of the teeth and the vertical facial proportions, a combination of surgical and Orthodontic therapy is the treatment of choice in all severe skeletal Class III malocclusion. In this case report I present a combination of surgical-orthodontic therapy for an adult female patient with skeletal class III malocclusion which resulted in good skeletal, dental and soft tissue relationship, with marked improvement in function and facial esthetics.

Keywords: Class III malocclusion, Orthognathic Surgery, surgical orthodontics

Introduction

Class III malocclusion is considered to be one of the most difficult and complex orthodontic problems to treat. The prevalence of class III malocclusion has been reported to be as low as 3-5% in the Caucasian population, but is higher in the Chinese and Japanese population (4-13%) (Often associated with maxillary retrusion)[i],[ii],[iii].

The etiology of class III is complex and multifactorial. However, there is usually a strong genetic contribution. Genetic factor is one of the etiological factors where one third of children with severe Class III had a parent with the <https://assignbuster.com/approaches-to-correction-of-class-iii-skeletal-malocclusion/>

same problem and one-sixth had an affected sibling[iv]. Racial tendency may play a role as the blacks have shown higher incidence than white's[v].

Environmental factors appear to play an adaptive role in the etiology of Class III malocclusion[vi]. Class III malocclusion can be associated with other factors such as cleft palate[vii].

Individuals with class III malocclusion show combinations of skeletal and dentoalveolar components. Class III malocclusion may occur as a result of protrusive mandible, retrusive maxilla, combination of both[viii]. While the most commonly found Class III malocclusion (30%) showed a combination of mandibular protrusion and maxillary retrusion, Maxillary retrusion alone was found in 19.5% of the sample and Mandibular protrusion alone was found in 19.1% of the sample[ix]. These complex nature of class III require a careful planning, a multidisciplinary approach and patient cooperation[x].

Case Report

A 17-year-old caucasian girl presented for orthodontic treatment because of referral from her dentist with primary complaint of un-esthetic facial and dental appearance. She has a hyper-divergent Class III skeletal and dental relationship. This is characterized by retrognathic maxilla, retroclined lower anterior teeth, with maximum active opening of 47mm with 5mm negative overjet and lateral excursions of 7 mm to both right and left sides.

The patient has an ovoid, relatively asymmetrical face with chin slightly deviated to the left. The lip line at rest displayed approximately 2 mm of upper incisor. At full animation there was 7mm of upper incisal display and 2

mm of lower incisal edge. She has a slightly concave profile, and competent lips[Figure1].

Pretreatment extra oral photos

Intraorally, the oral mucosa was healthy. There were no periodontal pockets present. The gingival tissues were inflamed especially around the prosthetic crowns. There was no bleeding tendency except sometimes with brushing. Free gingival margins were near to the CEJ and attached gingiva was of normal width throughout the mouth. The frenal attachments in both arches were normal. The tongue was normal in size, function and appearance. Teeth # 26, 36 and 46 have been crowned. There was a lingual arch placed one year ago to maintain lower incisors position.

Occlusion analysis, she was in the permanent dentition and the 3rd molars were un-erupted. She has good oral hygiene.

Frontal view: Shows a dental midline discrepancy. The lower dental midline is coincident with the facial midline while the upper midline is not coincident with the facial midline it's off to the left by 2.5mm, the occlusal plane was slightly canted to the left. A negative overjet of 5 mm reported. Right and left Lateral Views Shows the canines and molars in Class III relationships. The upper occlusal view shows a U-shaped arch with well aligned anterior segment. The lower occlusal view reveals a U-shaped arch with crowding of 3.9mm[Figure 2].

TREATMENT OBJECTIVES

Our objective is to address compensated lower incisors by proclining them to the ideal position and inclination followed by increasing the horizontal projection of the maxilla to correct upper jaw retrognathism, concave profile, class III dental relationship and negative overjet. Increased lower facial height and hyper-divergence will be corrected by autorotation of the mandible after the advancement of the maxilla and vertical reduction genioplasty.

Mandibular asymmetry will be corrected by BSSO while maintaining lower incisor position.

TREATMENT PROGRESS

We started Pre-surgical orthodontics using self-ligation bracket system (Roth prescription, 022" slot). Leveling and alignment of maxillary and mandibular arches began with round 0.016 niti arch wires progressing to 0.017×0.025 niti arch wires. Patient was referred to extract all 3rd molars at this stage. Coordinated 0.019×0.025 Stainless steel then used for arch coordination before sending the patient for surgical procedure [Figures 6&7].

All the movement and prediction were planned on pre-surgical lateral cephalometric x-ray using Moorrees mesh as a guide. A sheet of tracing paper over the original tracing and the outline of the mandible was drawn and trimmed making a template, another template for the maxilla was produced and placed in the post-surgical position. The mandibular autorotation then simulated accordingly. The soft tissue contours then drawn using the guidelines in literatures [xi],[xii],[xiii] [Figure 8].

Centric relationship of Upper and lower jaws was recorded and Face bow transfer and articulation of models on a semi-adjustable articulator was

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done. Model surgery then performed using Erickson model block and acrylic inter occlusal wafer splint was produced.

Le fort I osteotomy was performed to advance the maxilla for 7.1 mm and Bilateral sagittal split osteotomy was carried out to correct mandibular asymmetry while maintaining the A-P position of the mandible. Vertical reduction and advancement (4mm each) genioplasty then performed to address the increased lower facial height and achieve esthetically acceptable facial profile. Rigid type of fixations were used in both arches.

The patient was followed closely and the post-surgical Orthodontic was resumed 3 weeks after surgery. 0.019×0.025 stainless steel changed to 0.021" × 0.025" stainless steel to express the torque. Finishing was performed with settling elastics [figures 9-12].

Six months later, fixed appliances were removed and lower fixed retainer 3-3 was cemented along with upper and lower Hawley's retainers [figures 13 & 14].

Cephalometric finding shows a good skeletal, dental and soft tissue relationship and improvement in the function and facial esthetics [Table 2, Figures 15-17].

pre- and post-treatment cephalometric tracings

Discussion

This case report presents a combination of surgical and orthodontic therapy for an adult female patient with skeletal and dental class III malocclusion.

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The magnitude of the problem was so severe and lies outside the envelope of possible correction by orthodontics alone[xiv]. In growing patients, early treatment with maxillary expansion and protraction can result in straightening of profile after 6 months[xv]. It can also promote more favorable psychosocial development and greater compliance[xvi]. Delaying treatment can lead to development of posterior cross bite and the subsequent development of facial asymmetry[xvii]. During adulthood, correction of the Class III malocclusion usually requires complex surgical procedures to achieve a good skeletal, dental and soft tissue relationship and improve the function and facial esthetics[xviii].

In this case, our objective were achieved. Compensated lower incisors were address by proclining them to the ideal position and inclination in pre-surgical orthodontic treatmentwhile in post-surgical orthodontic treatment teeth were brought into settledocclusion.

Normal skeletal relationship was achieved byLe fort I osteotomyto advance the maxilla, Bilateral sagittal split osteotomy to correct mandibular asymmetry while maintaining the A-P position of the mandible and vertical reduction and advancementgenioplasty

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