

Review Article

A Case Study on Orthodontic-Surgical Management of Skeletal Class III Malocclusion in Adults: Clinical Approach and Outcomes

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Abstract: This article presents a case study illustrating the successful management of skeletal Class III malocclusion in an adult through an orthodontic-surgical approach. The clinical case outlines the entire process, from initial assessment to post-treatment outcomes, conducted within our service. Key steps include diagnostic planning using advanced tools such as 3D imaging and virtual surgery simulation. Pre-surgical orthodontic treatment was carefully planned to prepare dental and skeletal structures for surgical correction. Orthognathic surgery was performed precisely according to the established plan, followed by a post-surgical orthodontic phase to finalize occlusion. Short-term and long-term outcomes are evaluated, highlighting significant improvement in facial aesthetics, occlusal function, and post-treatment stability. This case study demonstrates the effectiveness of our integrated approach in managing skeletal Class III malocclusions in adults, underscoring the importance of interdisciplinary collaboration for optimal outcomes.

Keywords: Orthodontics, Maxillofacial surgery, Skeletal Class III, Orthodontist-surgeon collaboration.

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INTRODUCTION

The skeletal Class III malocclusion is characterized by a discrepancy between the maxillary and mandibular skeletal bases. It can manifest as either a mandibular prognathism or, more commonly, a maxillary retrusion, or sometimes both. Cephalometrically, Class III malocclusion corresponds to an ANB angle of less than 0° or an AoBo distance of less than -2 mm.

Within this skeletal pattern, the teeth typically, though not always, align in an Angle Class III dental relationship. Treatment for skeletal Class III malocclusion can be orthopedic, during early growth when the child is still actively growing; orthodontic, involving alveolar-dental compensation for borderline Class III cases that are not severe; or ortho-surgical, in adults who have completed growth for severe Class III cases.

In this article, we present a case of Class III malocclusion in a 26-year-old female who underwent orthodontic-surgical treatment with satisfactory results.

The treatment of Class III malocclusions:

Treatment for Class III malocclusions can be categorized as follows:

1. **Orthopedic:** initiated at an early age when growth is not yet complete; it involves the use of various methods such as the Delaire mask in cases of maxillary deficiency, or a chin sling if dealing with mandibular protrusion.
2. **Orthodontic:** applicable to both young and adult patients to correct skeletal discrepancies through alveolar-dental compensation. Orthodontic therapy is suitable for moderate anteroposterior dysmorphoses and individuals with normal vertical growth.

In such cases, the goal of orthodontic therapy is to achieve dental-alveolar compensation for the sagittal discrepancy and correct intra-arch deficits, as well as inter-arch relationships. Orthodontic intervention is indicated when the skeletal discrepancy is not significant and when the upper and lower incisors do not compensate for the sagittal discrepancy. However, if this is the case, orthodontic treatment options may be limited.

- Orthodontic-surgical:** orthodontic treatment aims to decompensate the Class III malocclusion to prepare the dental arches for orthognathic surgery. Teeth must be retained with large-diameter rectangular wires and hooks to achieve bimaxillary fixation after surgery.

The ultimate goal of treatment is to achieve efficient anterior guidance, properly position the lower incisor within the symphysis, and address intra and inter-arch problems in line with the patient's aesthetic concerns.

Case Study

This case involves a 26-year-old female patient, who presented to the Orthodontic Facial Orthopedics department for both aesthetic and functional reasons.

Diagnosis

Upon Examination:

- Facial analysis revealed parallel horizontal lines, a long face, and the presence of stomion.
- On profile view, there was mid-face deficiency, a concave profile, and an open mandibular angle.
- Intraoral examination showed good hygiene, thin periodontal tissues, and a low tongue position.
- Class III canine relationships were observed bilaterally, as well as Class III molars.
- An overjet of -15 mm was noted.
- In the vertical dimension, there was a 2 mm overbite.

- Transversely, crossbites were present on the right and left sides.
- Functional examination revealed a non-linear path of opening with clicking in the temporomandibular joints.

Dental panoramic radiography revealed the presence of wisdom teeth. The temporomandibular joint (TMJ) images appeared symmetrical in the glenoid cavities.

Lateral cephalometric radiography revealed a Class III malocclusion with an ANB angle of -6° and AoBo of -8 mm. The mandibular growth direction was vertical. Additionally, there was lower proalveolus and procheilus.

Management:

Pre-Surgical Orthodontic Treatment:

Orthodontic treatment involves aligning the teeth using conventional multi-bracket fixed therapy. Decompensation of the Class III malocclusion is crucial to the success of the surgical treatment. The orthodontic treatment is concluded with the use of full-size rigid archwires to stabilize the results, equipped with hooks for bimaxillary fixation after surgery.

Surgical Treatment:

The surgical procedure entails mandibular advancement, maxillary setback, and genioplasty to enhance the profile. Bimaxillary fixation for one-month post-surgery facilitates healing and maintains the achieved results.



Frontal and profile photographs before treatment



Photographs of occlusion before treatment



Frontal and profile photographs after orthodontic-surgical treatment



Frontal and profile photographs after treatment

CONCLUSION

In conclusion, the successful management of skeletal Class III malocclusions requires a comprehensive approach integrating orthodontic and surgical interventions. Through careful diagnosis and treatment planning, combined with interdisciplinary collaboration, aesthetic and functional outcomes can be achieved even in adult patients. This case highlights the importance of individualized treatment strategies tailored to address the specific needs of each patient. With advances in orthodontic and surgical techniques, along with meticulous post-operative care, favorable long-term results can be attained, ultimately improving

the overall quality of life for patients with Class III malocclusions. Continued research and clinical experience will further refine treatment protocols, paving the way for enhanced outcomes in the future.

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