Clinical and radiological evaluation of orthodontic and surgical treatment in a class III high angle patient: a case report

CAMELIA SZUHANEK, EDUARD PARASCHIVESCU, RIHAM NAGIB, DANA CRISTINA BRATU, SILVIU BRAD, DANIEL MALITA

University of Medicine and Pharmacy VICTOR BABES Timisoara
Eftimie Murgu Square no.2, Timisoara, ROMANIA
cameliaszuhanek@umft.ro

Abstract. Treatment of an adult 28 year old female patient with skeletal class III, increased anterior face height and severe maxillary growth deficit is presented. Combined surgical-orthodontic treatment was chosen to correct the skeletal class III. The maxilla was remodeled using only a fixed orthodontic appliance, without any rapid expansion or surgically assisted rapid expansion devices. Both arch length deficiency and the significant transverse anomaly were corrected through dentoalveolar remodeling, leaving the sagittal correction to surgery. Satisfactory dentofacial esthetics were achieved.

Key Words: dentoalveolar, expansion, class III, surgical-orthodontic treatment, high angle.

1 Introduction

Maxillary hypoplasia is a growth deficit affecting the development of the maxilla in all 3 planes: anterior-posterior, transverse and vertical. When associated with a normally developed mandible, there will always be a class III skeletal relation [1].

Early surgery can be indicated if functional, esthetic and psychological factors are severely impacted. Surgical treatment on growing patients does not insure a normal growing pattern after the intervention, and future treatment is a possibility. In adult patients there are two treatment directions that can obtain satisfactory dentofacial esthetics: orthodontic camouflage and orthognathic surgery. Often the facial appearance is a major reason for surgery in many Class III patients, especially women [2].

Orthodontic camouflage traditionally consists in the proclination of upper incisors and the lingual inclination of lower incisors so to minimize the skeletal underlining anomaly[3]. However, excessive incisor inclination does not only affect esthetics, it also takes a toll on periodontal tissue health, through probable traumatic occlusal forces.

Patients who are satisfied with their facial appearance often choose not to correct the underlyining bone deformities [4].

Fear of surgical intervention and higher treatment costs are two other resons
patients with class III malocclusions choose orthodontic camouflage therapy. This treatment requires high patient compliance and has better results when the comprehensive treatment is instituted in the mixed dentition. Orthognathic surgery can obtain good skeletal relations and a correct tooth inclination, leading to more stable and functional outcome, resulting in better facial esthetics and cephalometric values as well [6].

The case presented in this report agreed to double jaw orthognathic surgery intervention but was reluctant to agree to surgical expansion of the maxilla. As a result an orthodontic approach was chosen to decompensate the deficits in the two arches prior to surgical skeletal correction.

Figure 1. Intraoral, face and profile initial photographs.

2 Etiology and Diagnosis

T.M., a 28 year old female, presented herself for an orthodontic consult with the chief complaint of “gummy smile” and unesthetic facial profile with a negative anterior overjet. She added that her psychological state was negatively influenced by her facial appearance. When asked about class III malocclusions in her family she did not confirm such characteristics in other members of the family.

2.1 Clinical examination

The clinical examination revealed an asymmetric face with compromised smile line and excessive gingiva and low incisor view. A concave profile and a high anterior face height were noted. Intraoral observations revealed both mandibular and maxillary growth deficits, with upper right and lower first molar extractions. Oral health and hygiene were satisfactory.
Class III anterior incisor relations with negative overbite were observed. Lateral crossbites indicated poor transverse development of the maxilla. Dental crowding was present in both arches. No active cavities or periodontal disease were detected.

2.2 Radiographic analysis

Cephalometric analysis revealed a retrognathic maxilla with the SNA angle measuring 77.57, SNB was 81.32 leading to a ANB equal to -3.75. The Tweed FMA angle revealed a hyperdivergent pattern of growth. This led to the conclusion that any further clockwise rotation of the mandible would lead to lip incompetence.

3 Treatment

The main objectives in this case were tooth alignment and leveling of the occlusal plane, anterior – posterior correction of skeletal relations, tranverse correction, correct upper and lower incisor inclinations.

The patient was presented with multiple treatment plans, in the end the chosen therapy being orthodontic decompensation of the malocclusion with surgical skeletal correction. Given the maxillary growth deficit a RME device was proposed but the patient declined, so the correction of the transverse maxillary deficit will be corrected through dentoalveolar remodeling.

Upper and lower fixed orthodontic braces were applied. Treatment was undertaken until both arches were leveled and aligned, and there was a good transverse relation between the two jaws. After full decompensation, the patient was directed to the orthognathic surgeon, for final skeletal correction.

Figure 2. Intraoral, face and profile photographs before surgical intervention.
The final facial profile was harmonious and esthetic. Smile esthetics also improved dramatically. The occlusion was stable and tooth inclination was correct.

The appropriate dentoalveolar response in both arches was essential for success in this case.

4 Discussion

The satisfactory occlusal and esthetic results were due to dentoalveolar remodeling and surgical correction of the skeletal anterior posterior discrepancies.

Good dentoalveolar response in this case was essential to obtaining good occlusal relations after orthognathic surgery. The transverse growth deficit and lateral crossbite would have been better corrected with RME devices. Although good results were obtained in the end, dentoalveolar remodeling had its drawbacks throughout the orthodontic treatment. Expansion of the maxilla corrected the lateral crossbite but also proclined the upper bicuspids. Palatal cusp interference was observed and a heightening of the vertical dimension. Mini-implant anchorage in the palate resolved the problem, bicuspid inclination became normal and the patient could undergo surgery.

A slight profile improvement was observed even before the orthognathic surgery, with lower lip retrusion and upper lip protrusion. Smile esthetics were drastically improved in this stage as well.

5 Conclusion

Transverse and arch length deficits were successfully treated with dentoalveolar remodeling, leaving only the anterior-posterior correction to surgical intervention. Proper treatment mechanics, along with sufficient treatment time led to satisfactory, both dental and facial esthetics.

Figure 3. Face, Profile and intraoral photographs after surgical treatment.
References


