



Orthodontics and maxillofacial surgery: an interdisciplinary team. Case Report

Ortodoncia y cirugía maxilofacial: un equipo multidisciplinario. Presentación de un caso clínico

Wendy Gutiérrez Guerrero,* Isaac Guzmán Valdivia[§]

ABSTRACT

Dentofacial anomalies cause disharmony in the maxilla and the mandible with consequences in facial esthetics and masticatory function. As surgeries and osteotomies became more complex the need for cooperation between the orthodontist and the maxillofacial surgeon became more evident. A case report of a 1 year and 8 months treatment time of an 18-year-old patient, with skeletal class III malocclusion, anterior crossbite and posterior unilateral crossbite, upper incisor proclination and lower incisor retroclination, and vertical growth is hereby presented. A treatment plan was set out with surgical-orthodontic treatment which is divided in three phases: First presurgical phase with 0.022 x 0.028 Roth system and arch sequence, second surgical phase performing a triple surgery: Le Fort I for maxillary advancement, with segmental surgery on the left side and vertical osteotomy of the mandibular ramus for mandible repositioning. A good facial harmony and improvement of the skeletal and dental relationship were obtained but most importantly, neuromuscular regulation improvement and stomatognathic function. **Conclusion:** The satisfactory results in combined orthodontic and orthognathic surgery treatments depend on a good diagnosis and treatment plan of the dentofacial deformity, as well as on good knowledge integration between the professionals involved in the case.

Key words: Skeletal class III, orthodontics, maxillofacial surgery, orthognathic surgery.

Palabras clave: Clase III, ortodoncia, cirugía maxilofacial, cirugía ortognática.

RESUMEN

Reporte de caso: Las alteraciones dentomaxilofaciales propician una desarmonía en el maxilar y la mandíbula, distorsionando la estética facial y la función masticatoria. A medida que las intervenciones y osteotomías fueron siendo más complejas se hizo cada vez más evidente la necesidad de la colaboración del ortodoncista con el cirujano maxilofacial. Se presenta en este artículo el diagnóstico y tratamiento durante 1 año 8 meses de un paciente de 18 años con maloclusión esquelética clase III, mordida cruzada anterior y posterior uniteral, proinclinación dental superior y retroinclinación inferior, y crecimiento vertical. Se opta por un tratamiento quirúrgico-ortodóncico, el cual se divide en tres fases: Primera fase prequirúrgica con la colocación de aparatología sistema Roth 0.022 x 0.028 y secuencia de arcos, segunda fase quirúrgica realizando cirugía triple, Le Fort I maxilar de avance, con cirugía segmentaria del lado izquierdo y osteotomía vertical de las ramas mandibulares para reposición de la mandíbula. Se logró conseguir una buena armonía facial gracias a la mejora de la relación esquelética y dental. Pero sobre todo se consiguió mejorar la regulación neuromuscular y la función del sistema estomatognático. **Conclusión:** Los resultados satisfactorios en tratamientos combinados de ortodoncia y cirugía ortognática dependen de un buen diagnóstico, plan de tratamiento de la deformidad dentofacial y de una buena integración de los conocimientos entre los profesionales implicado en el tratamiento.

INTRODUCTION

Anomalies in position, size and shape of the facial bones, especially the maxillary bones, usually appear in childhood and are known as growth disorders. They continue to grow in severity during adolescence until they become stable at the end of the growth period. Although these anomalies have an important genetic basis, they are usually growth problems. There are functional factors that can have an important influence over them such as thumb sucking or prolonged pacifier use, two habits that cause a bad position of the teeth more than skeletal discrepancies.¹ Among

these anomalies, prognathism is the most frequent disturbance, followed by the retrognathism, maxillary

* Graduated from the Orthodontics Department of the Postgraduate Studies and Research Division of the Faculty of Dentistry, National Autonomous University of Mexico.

§ Professor at the Orthodontics Department of the Postgraduate Studies and Research Division of the Faculty of Dentistry, National Autonomous University of Mexico.

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hypoplasia and mandibular asymmetry. All these alterations are conducive to a disharmony between the maxilla and the mandible, distorting facial aesthetics and affecting masticatory function.²

In this type of patients surgery is no substitute for orthodontics, but treatment must be properly coordinated in order to achieve acceptable overall results. The spectacular advances of recent years have made it possible to combine these treatments to correct many serious problems that were untreatable only a few years ago. Orthognathic surgery is an increasingly common practice due to its aesthetic and functional implications. As interventions and osteotomies became more complex the need for collaboration of the orthodontist with the maxillofacial surgeon became increasingly evident.

Surgical treatment of prognathism started at the beginning of this century. Edward Angle, talking about a patient who had been subjected to this kind of treatment, explained how results could have been improved if orthodontic appliances and occlusal splints had been used.³

Orthognathic surgery, as we know it nowadays, was developed in the mid-twentieth century, primarily by the work of the Germanic school, especially by doctors Trauner and Obwegeser. The initial indication for these procedures was the correction of moderate and severe dentofacial anomalies, with the accomplishment of a proper occlusion being the fundamental objective.⁴ The sagittal ramus osteotomy initiated by doctors Trauner and Obwegeser marked the beginning of a new era for orthognathic surgery.⁵ In this technique an intraoral approach was used thus eliminating the need to perform a potentially disfiguring skin incision.

Sagittal osteotomies also represented a biologically appropriate method for elongating or shortening the mandible with the same bone cuts, which allowed treatment for mandibular deficiency or excess. During the sixties, American surgeons began to use and to modify the techniques developed in Europe for maxillary surgery and after a decade of rapid progress in maxillary surgery the development of the LeFort I horizontal fracture technique was accomplished by Bell,⁶ Epker and Wolford,⁷ which allowed maxillary reposition in the three space levels.

In the eighties, advances in oral and maxillo-facial surgery allowed repositioning of one or both jaws, the displacement of the chin in the three planes of space and the surgical relocation of segments according to dentoalveolar needs.⁷ In the nineties patients' discomfort decreased considerably thanks to rigid internal fixation which eliminated the immobilization of the maxillae, and a better knowledge of the typical

patterns of postsurgical changes thus obtaining more stable and predictable surgical results.

Among the latest developments that have revolutionized orthognathic surgery in Spain, the use of miniplates should be noted with the fact that once the bone is cut, it gets back together with a resorbable material thus replacing the old titanium plates that remained in the tissue.^{1,8}

When a patient is selected to receive surgical orthodontic treatment in order to correct a dentofacial disharmony, it is convenient to know that the patient must comply with certain rules to be able to undergo surgery which are:

- a) Ideal oral health.
- b) No dental retentions.
- c) Arch coordination.
- d) Dental alignment.
- e) Respected dental midlines.
- f) Ideal anterior angulation according to basal bone.
- g) Flat curve of Spee.
- h) Occlusal tripodism (presurgical orthodontics 75%).
- i) Heavy archwires four weeks before surgery.
- j) Orthodontic fixed appliances suited for orthognathic surgery (no porcelain brackets, archwire ligated with steel ligature, soldered ball hooks).

METHOD

Male patient of 17 years of age, with an important maxillo-mandibular discrepancy caused by prognathism with unilateral left crossbite as well as a left and right concave profile (*Figure 1*).

Occlusion is completely altered as he presents anterior crossbite, poor anterior guidance, left and right canine Class III and bilateral molar Class III, slight crowding and upper and lower deviated midlines. Cephalometrically, the patient presents a skeletal Class III due to prognathism, proclined axial axis of the anterior teeth and retroclination of the lower teeth, and a vertical growth pattern (*Figure 2*).

On the basis of clinical, facial, dental, and functional characteristics, it was decided that the procedure of choice to achieve ideal goals was a surgical-orthodontic treatment,¹⁰ with use of 0.022 x 0.028 Roth fixed appliances, with bands in first and second upper and lower molars. The data from cephalometric analysis and from study models show that there is no need for extractions to eliminate crowding.¹¹ The surgical-orthodontic treatment is divided into three phases:

Presurgical first phase: AVTO and pre-surgical tracings were performed. Subsequently, fixed appliances were placed to carry out the initial leveling

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