



Surgical-orthodontic treatment of a class III patient with asymmetry due to mandibular deviation. Case report

Tratamiento ortodóntico-quirúrgico. Paciente clase III con asimetría por desviación mandibular. Reporte de un caso

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ABSTRACT

Case report: Craniofacial asymmetries are expressed as differences in size or relationship between two parts of face. Treatment for dental asymmetries is orthodontic, whether through occlusal adjustments, splints or fixed appliances. In skeletal asymmetries surgery is necessary, especially in cases where growth has ceased. The aim of orthodontic-surgical treatment is to achieve cranio-facial harmony. Treatment planning should consider: etiology, severity, disorder's location, age and patient motivation. In this article we present the case report of a 21-year-old patient with skeletal class III malocclusion, molar class III in both sides and left canine class III relationship; canine class on the right side was non-assessable, anterior crossbite, upper incisor retroclination and low incisor proclination; left laterognathia and vertical growth. The treatment was orthodontic-surgical in three phases: orthodontic pre-surgical phase with 0.022" Roth appliances; the surgical phase included mandibular setback with the sagittal ramus osteotomy technique and laterognathia correction and an orthodontic post-surgical phase where dental- skeletal Class I, good facial harmony and a straight profile were obtained. **Conclusion:** Communication between the orthodontist and the oral surgeon is essential to achieve treatment goals as well as the expertise of the professionals involved in the treatment.

RESUMEN

Reporte de un caso: Las asimetrías craneofaciales se expresan como las diferencias en tamaño o relación entre dos partes de la cara. El tratamiento de las asimetrías dentarias es ortodóntico, ya sea por medio de ajustes oclusales, férulas o aparatología fija. En las asimetrías esqueléticas suele ser necesario recurrir a la cirugía, especialmente en casos en donde no hay crecimiento. El objetivo del tratamiento ortodóntico-quirúrgico es conseguir una armonía craneofacial. Para poder planificar un tratamiento se deben considerar: etiología, gravedad, localización de la alteración, edad y motivación del paciente. Se presenta en este artículo el diagnóstico y tratamiento de una paciente de 21 años 1 mes de edad con clase III esquelética, clase III molar bilateral, clase III canina izquierda, clase canina no valorable derecha, mordida cruzada anterior, proinclinación dental inferior, retroinclinación dental superior, desviación mandibular hacia la izquierda y crecimiento vertical. Se decide por un tratamiento ortodóntico-quirúrgico. El plan de tratamiento se realiza ortodóntico-quirúrgico en tres fases: fase ortodóntica prequirúrgica con la colocación de sistema Roth 0.022", en la fase quirúrgica se realiza una retroposición mandibular con técnica de osteotomía sagital de rama ascendente y corrección de laterognasia, y en la fase ortodóntica postquirúrgica se consigue clase I dentoesquelética con una buena armonía facial y perfil recto. **Conclusión:** La comunicación entre el ortodoncista y el cirujano maxilofacial es indispensable para lograr los objetivos del tratamiento y éxito en el mismo, así como de los conocimientos y experiencia de los profesionales implicados en su tratamiento.

Key words: Orthodontic-surgical treatment, skeletal class III, asymmetry, laterognathia.

Palabras clave: Tratamiento ortodóntico-quirúrgico, clase III esquelética, asimetría, laterognasia.

INTRODUCTION

The mandible and the maxilla are bones part of the craniofacial complex, therefore their growth and development aim to provide a state of structural and functional balance between hard and soft tissues.¹ In some cases, these process can be interrupted or modified by different factors such as heredity, trauma, congenital abnormalities, infections, habits, nutritional deficiencies, etcetera.²⁻⁴

As a case in particular we will mention class III, which affects approximately 5% of individuals of the

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American population (Mills, 1966), but is much more frequent in Asian race.²

Within this anomaly we may find prognathism, which is defined as the excessive anterior projection or growth of the mandible, maxillary hypoplasia, a combination of prognathism and maxillary retrusion and finally, mandibular laterognathia which will cause a facial asymmetry.^{5,6}

Proffit et al, reported that among patients with skeletal class III, 20% of them present mandibular excess; 17%, maxillary hypoplasia and 10% present a combination of mandibular excess and maxillary retrusion.³

Treatment of class III malocclusion can be started in early stages with the help of myofunctional appliances, or with surgical-orthodontic therapies in adult patients, who have completed their growth.

An interdisciplinary approach in the treatment of these malocclusions is indispensable for achieving satisfactory and stable results. The orthodontist and the surgeon must interact with each other in order to achieve a good diagnosis and treatment planning.^{3,5,7,8}

BACKGROUND

Treatment for a class III malocclusion in permanent dentition is limited, especially when there is a strong skeletal component. Among the treatments we may find: orthodontic therapy combined with extractions to compensate the malocclusion or a surgical-orthodontic treatment for the correction of discrepancies of the skeletal components.^{2,3,4,8}

Orthognathic surgery was developed in the mid-20th century, mainly by the German school and by the



Figure 1.
Facial photographs.



Figure 2.
Intraoral photographs.



Figure 3. Surgical archwires 0.019" x 0.025" SS.

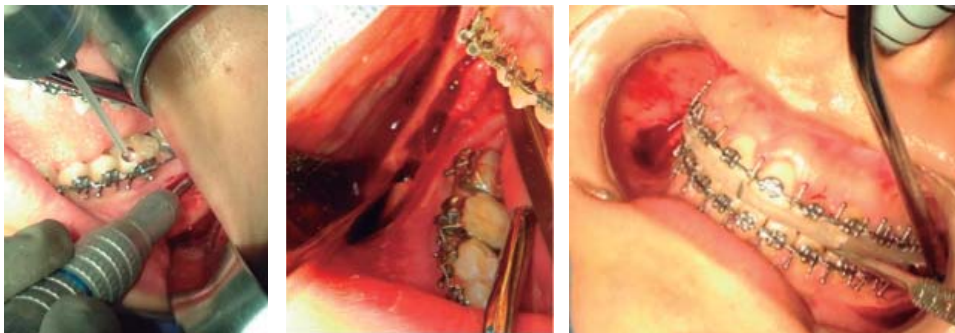


Figure 4.

Sagittal osteotomy fo the ramus.

Table I. Cephalometric comparison.

Area	Norm	Initial	Final
Facial convexity	2 ± 2 mm	0.4	0.6
L1 inclination	90° ± 2°	95°	89.4°
U1 inclination	102° ± 2°	103°	107°
Facial depth	87° ± 3°	84.8°	89.5°
Maxillary depth	90° ± 3°	85.3°	89.6°
SNA	82°	79°	81°
SNB	80°	82°	80°
ANB	2°	-3°	1°

doctors Trauner and Obwegeser. Its main indication was the correction of moderate and severe dento-skeletal anomalies in order to establish a proper occlusion.^{6,8,9}

Since Hugo Obwegeser described the sagittal osteotomy of the mandibular ramus in 1955 there have been many changes for this surgical procedure. In 1961 Gregorio Dal Pont suggested to perform the osteotomy more anteriorly to direct the mandibular body up to the height of the first and second molar, where it will descend vertically to the basilar edge. This modification increases the contact surface and in theory it would improve healing.¹⁰⁻¹²

In 1977 Bruce Epker publishes the most significant modification to the osteotomy, in this technique it is

no longer necessary to reach the posterior border of the mandibular ramus, but only from above and behind the Spix spine, while the lower edge of the body is addressed as perpendicular as possible to guide the fracture through the inferior dental canal, making surgery less traumatic and more versatile.^{8,11,12}

As we have seen, the evolution of the osteotomy of the mandibular ramus has occurred in design, extension and the instruments used. With these modifications, this technique has become a versatile, predictable and biologically acceptable.¹¹⁻¹³

Once it is decided to treat a patient surgical-orthodontically a protocol should be established. It is divided into three stages:

1. Pre-surgical orthodontics phase.
2. Surgical phase.
3. Post-surgical orthodontic phase.

With the diagnosis, the orthodontist begins the preoperative stage where a dental, skeletal, muscular and articular de-compensation is performed in order to position the mandible surgically in an ideal position.^{3-5,7,14-16}

CASE REPORT

A female patient of 21 years of age attended the Orthodontics Clinic of the Latin American University Valle Campus, with the following reason for

consultation: «I want to fix my teeth». The clinical chart did not reveal any pathological data of importance.

The facial analysis revealed a mesofacial biotype, an increased lower third; facial asymmetry with mandibular deviation to the left side, slightly concave profile and upper retrocheilia (*Figure 1*).

Intraorally, the patient presented an anterior crossbite, non-coincident dental midlines, clinical absence of the tooth #13 (retained) left canine class III, non-assessable canine class on the right side; bilateral molar class III, mild crowding in the upper arch, paraboloid arch form, bilateral spacing between canine and lower first premolar; a 2 mm overjet and an overbite of 1 mm (*Figure 2*).

Cephalometrically, the diagnosis was a skeletal class III due to maxillary hypoplasia and prognathism, lower incisor proclination, upper incisor retroclination, vertical growth and laterognathia.

On the basis of the performed analysis (facial, dental, cephalometric and functional) it was decided to perform a surgical-orthodontic treatment using Roth .022 system with bands and tubes in upper and lower second molars. It was determined that it was not necessary to perform extractions.

The treatment objectives were: to achieve skeletal class I, improve the axial inclination of the teeth, achieve molar and canine class I, correct the dental midlines, provide facial harmony, improve the profile and lip position and maintain joint health.

Orthodontic pre-surgical phase

An initial TPQ and VTO were performed. Subsequently fixed appliances were placed; beginning

the phase of leveling and alignment with 0.014" and 0.016" NiTi archwires. Treatment continued with light second and third order movements with 0.016 × 0.016", 0.016 × 0.022" NiTi and 0.016 × 0.022 SS; 0.017 × 0.025 archwires. Retraction of the lower anterior segment was performed with DKL 0.019 × 0.025 SS archwire. Pre-surgical consolidation was performed with 0.019" × 0.025 SS archwires. Finally surgical 0.019 × 0.025 SS archwires with hooks were placed (*Figure 3*) and a pre-surgical occlusal balance, as well as TPQ and surgery of models were performed.

Surgical phase

The surgeon performed an asymmetric mandibular retroposition with sagittal osteotomy of the ramus. At the end of the surgery, a splint was placed to maintain the correct position of the mandible with respect to the maxilla and fixation was performed with osteosynthesis plates (*Figure 4*).^{9,12-14}

Post-surgical orthodontic phase

The intermaxillary splint was maintained for four weeks. After this period both the surgical splint and the surgical archwires were removed. There was no need for a second leveling; 0.019" × 0.025 SS" consolidation and stabilization archwires were placed as well as delta elastics for occlusal settlement. The appliances were removed after three months and an upper circumferential was placed as well as a lower fixed retainer bonded from first premolar to first premolar.



Figure 5. A. Initial intraoral photographs. **B.** Final intraoral photographs.

**Figure 6.**

A. Initial intraoral photographs. B. Final intraoral photographs.

**Figure 7.**

Final facial photographs.

RESULTS

The objectives set at the beginning of treatment were achieved. Skeletal class I reduction in the mandibular body length and correction of mandibular deviation were obtained (*Table I*). A class I molar and canine relationship was achieved as well as coincident dental midlines and a normal overjet and overbite (*Figures 5 and 6*). Facially, we obtained facial harmony, a straight profile and a correct position of the upper lip (*Figures 7 and 8*).

DISCUSSION

The most difficult malocclusion to diagnose and treat is Class III as it almost always shows skeletal-

dental combinations, as well as the interaction of genetic and environmental factors, which will be responsible for the severity of the malformation.

Authors such as Proffit, Gregoret and Kimura agree that there are three main treatment options for a skeletal class III malocclusion: 1) growth modification (orthopaedics), 2) orthodontics, and 3) the combination of orthodontic treatment with orthognathic surgery.^{3,6,7} But when the malocclusion is present in an adult patient where growth has completed the viable option is by means of a surgical-orthodontic treatment since in most cases, there are major dental and skeletal disharmonies.

Quevedo et al. reported that the technique with greater change throughout history has been the sagittal osteotomy of the mandibular ramus since it is

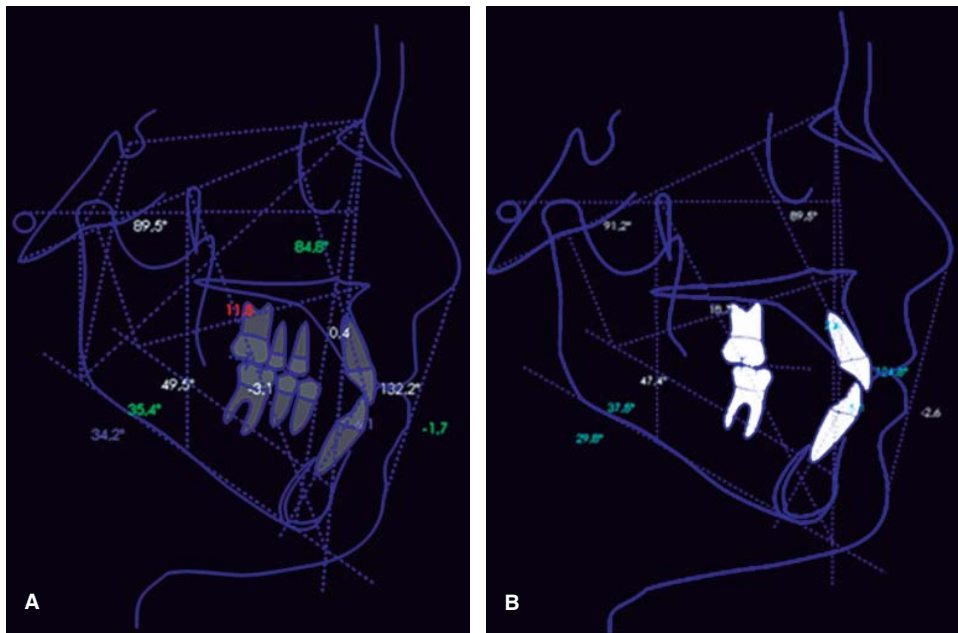


Figure 8.

A. Initial lateral headfilm. **B.** Final lateral headfilm.

the most widely used technique for the correction of mandibular deformities. This procedure has provided the surgeons more control in sagittal vertical and horizontal bone cuts, providing better post-surgical results.¹⁰⁻¹³

CONCLUSIONS

To know how to diagnose the presence of a skeletal anomaly is the basis for a good treatment.

Satisfactory results in surgical-orthodontic treatments not only depend on a good diagnosis and treatment plan, but also of the knowledge and experience of the professionals involved.

Communication between the orthodontist and the maxillofacial surgeon is indispensable for successfully achieving treatment objectives.

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