

Clinical case

Surgery First Treatment of a Skeletal Class II Patient: A Case Report

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ABSTRACT

Introduction: *Surgery First* can be an orthognathic surgery protocol performed previous to the beginning of an orthodontic treatment, achieving the previously established facial goals in a shorter time thus reducing treatment term. **Objective:** To present the clinical case of a class II patient treated surgically with the *Surgery First* technique. **Case presentation:** A 16-year-old female with a cephalometric diagnosis of combined skeletal class II and neutral growth; dental diagnosis of bilateral class II molar and cuspid, mild crowding, overjet of 10 mm, and overbite of 5 mm, non-coincident dental midlines. Presence of painful joint symptoms; facially convex profile and obtuse nasolabial angle. The proposed treatment is the use of a deprogramming splint to resolve

the TMJ symptomatology, and then performing a Surgery First protocol, followed by postoperative orthodontics and ending with retention. In the surgical phase, a mandibular advancement was made with a bilateral sagittal osteotomy and advancement mentoplasty. The orthodontic stage was finished in twelve months and the retention was bimaxillary. **Conclusions:** The results were favorable for the improvement of the profile and facial harmony, as well as for the occlusion. Bilateral molar and canine class I were achieved, as well as coincident dental midlines and a normal overjet and overbite.

Keywords: *Surgery First*, skeletal class II malocclusion, sagittal osteotomy of the mandible, mentoplasty.

INTRODUCTION

Skeletal class II is an anomaly of the jaws in which the jaws are not in sagittal harmony. It may be caused by three variants: maxillary protrusion, retrognathism, or a combination of both. It is characterized by an increased ANB and a convex profile. One of the best treatment options for severe cases is the orthodontic-surgical approach¹.

Conventional orthognathic surgery is used for the correction of dentofacial deformities, improving the functional aspects and appearance of the patient. It has three phases: pre-surgical orthodontics, surgical phase, and post-surgical orthodontics². This conventional treatment is considered stable and predictable; however, it has some drawbacks such as a longer treatment time and a decompensation stage where the patient's facial appearance can be affected².

In 1959, Skaggs³ suggested that surgery could be performed before orthodontic treatment, provided that satisfactory results could be obtained in the interarch relationship during surgery⁴. In 1978, Epker, Fish and Paulus⁵ recommended performing bone tissue repositioning before orthodontic treatment in orthognathic surgery patients⁶. Bherman and Bherman⁷ noted that when surgical correction of the mandible is performed, the adjacent soft tissues become normal, facilitating subsequent orthodontic movements and reducing orthodontic treatment time⁴.

In 1991, Brachvogel Berten and Hausamen⁸ proposed the concept of *Surgery First*, while describing the advantages of this procedure, suggesting that orthodontic treatment after surgery would be similar to the treatment of a class I patient⁹. Nagasaka *et al.* in 2009 reported several successful cases of *Surgery First*¹⁰. In 2011, Dr. William Bell held a symposium on the subject of *Surgery First*, in which he proposed eliminating the pre-surgical orthodontic stage due to the long time it takes¹¹.

The *Surgery First* protocol is indicated in those patients who require uni- or bimaxillary orthognathic surgery and require little previous dental decompensation, presenting little crowding, mild curve of Spee, and, in general, a correct inclination of the maxillary incisors. It has been proven that malocclusions that include some type of facial disharmony may lead to social disadvantages and affect the patient's life¹², therefore, the *Surgery First* protocol presents advantages soon after starting treatment, favoring the patient's self-esteem. Consequently, patient cooperation is promoted, which is fundamental for achieving the treatment objectives and obtaining satisfactory dental, facial, and psychological results¹².

CLINICAL CASE PRESENTATION

A 16-year-old female patient who attended the Orthodontics clinic of the Division of Post-Graduate Studies and Research of the Faculty of Dentistry, UNAM; was referred from the Pediatric Dentistry Clinic, with the following reason for consultation: *"I don't like my bite, my chin is placed backwards"*.

Extraoral clinical examination showed mild facial asymmetry, an oval face, a mesofacial pattern, and competent, thick lips. Positive smile, 90% exposure of the upper teeth, and facial midline coincident with the upper dental midline. She presented a convex profile, obtuse nasolabial angle, and decreased mentocervical distance (Figure 1). The intraoral examination revealed bilateral molar and canine class II, mild crowding, non-coincident dental midlines, a 10-millimeter overjet, and an overbite of 5 millimeters (Figure 2). She reported TMJ pain on opening. The orthopantomography showed 31 permanent teeth, anodontia of tooth 48; the other third molars in different stages of formation, good crown-root ratio, adequate level of bone crests, and slight asymmetry of the mandibular ramus (Figure 3A).



Figure 1. Initial extraoral photographs: A. Frontal. B. Smile. C. Three-quarter profile. D. Profile.



Figure 2. Pre-treatment intraoral photographs: A. Frontal. B. Upper occlusal. C. Lower occlusal. D. Lateral right. E. Lateral left. F. Overjet. G. Overbite.

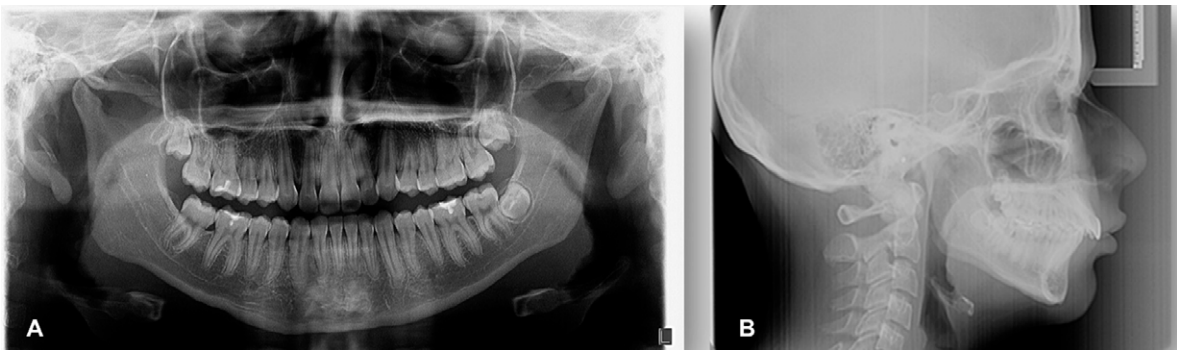


Figure 3. Initial radiographs. A. Initial orthopantomography. B. Initial lateral head film.

In the cephalometry performed on the lateral head film (Figure 3B) a diagnosis of combined skeletal class II (mild maxillary protrusion and micrognathism), mild dental biproclination, dental biprotrusion, and neutral growth pattern was obtained (Table 1). Articulator set-up was also performed.

Treatment objectives were to reduce skeletal class II, improve facial features, achieve bilateral canine and molar class I, and restore TMJ health.

Once the treatment objectives were established, an interconsultation with the Department of Oral and Maxillofacial Surgery of the Hospital Juárez de México was performed. The possibility of performing the *Surgery First* protocol, mandibular advancement with bilateral sagittal ramus osteotomy, and possible chin advancement was suggested.

Tabla 1.
Valores cefalométricos pretratamiento

Datos	Norma	Paciente pretratamiento
SNA	80° ± 5°	86°
SNB	78° ± 5°	77°
ANB	2°	9°
Maxillary Depth	90° ± 3°	96°
Facial Axis	90° ± 3.5°	87°
Facial Cone	68° ± 3.5°	66°
Mandibular plane	26° ± 4.5°	27°
Facial depth	87° ± 3°	88°
Goniac Angle	119° ± 7°	129°
Palatal Plane	1° ± 3.5°	1°
Maxillary Height	53° ± 3°	57°
1/ SN	102° ± 2°	105°
1 /FH	110° ± 2°	112°
1/ Go-Gn	90° ± 2°	94°
Interincisal angle	135° ± 5°	124°
S-Ar-Go	396°	396°
Growth direction	63-64%	63%
Mandibular length	71mm ± 3mm	63 mm
Anterior cranial base	71mm ± 3mm	66 mm

The treatment plan was explained to the patient. For economic reasons, she was absent for a period of eight months, during which the extraction of third molars was performed. When the patient returned, it was decided to follow the *Surgery First* protocol; previously a deprogramming splint was placed. She used the splint for three months, attending monthly appointments for the adjustment of the splint. Fixed upper and lower MBT slot 0.022" appliances were placed without an archwire, and that same month she was admitted to the operating room for surgery.

The surgery was performed in the Department of Oral and Maxillofacial Surgery of the Hospital Juarez de Mexico; a 5-millimeter mandibular advancement was made through a bilateral sagittal mandibular osteotomy. A splint was used to fix the mandible in the correct position and then a 10-millimeter advancement mentoplasty was performed, in which rigid fixation with titanium plates was used (Figure 4). One month after the surgery, orthodontic treatment was initiated by placing upper and lower 0.014" NiTi archwires and bilateral class II elastics. A sequence of 0.016 x 0.022" NiTi, 0.017 x 0.025" NiTi, 0.019 x 0.025" NiTi and 0.019 x 0.025" SS archwires was followed, always using class II elastics. An orthopantomography was taken for bracket repositioning; 0.019 x 0.025" braided archwires and elastics were placed to improve occlusion. After twelve months of treatment, the fixed appliances were removed and a bimaxillary retainer was placed.

Final orthopantomography (Figure 5A) and lateral headfilm (Figure 5B) were taken; cephalometric changes were evaluated with superimpositions (Figure 6).

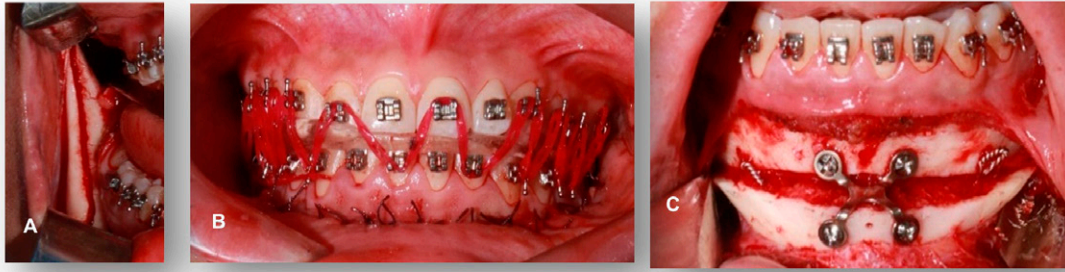


Figure 4. Surgical procedure. A. Sagittal ramus osteotomy. B. Interpositional splint fixation. C. Rigid mentoplasty fixation.

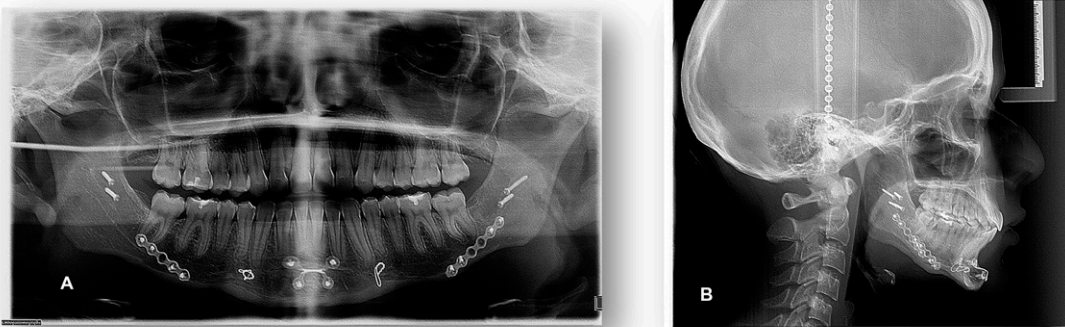


Figure 5. Final radiographs: A. Orthopantomography. B. Final lateral head film.

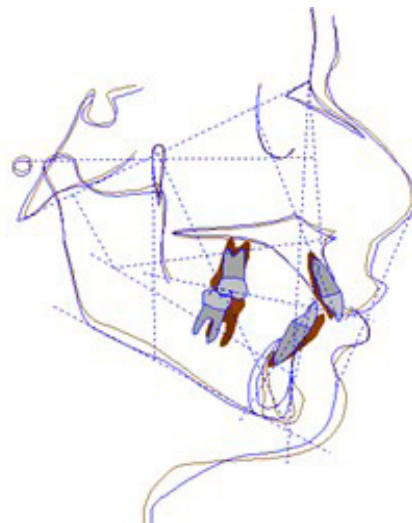


Figure 6. Cephalometric superimposition. The initial tracing is shown in blue. Final tracing in brown.

The patient's profile was significantly improved (Figure 7), bilateral molar and canine class I were achieved. Adequate overjet and overbite were obtained as well as coincident dental midlines and a good occlusal settling (Figure 8). The patient no longer reported TMJ symptoms and declared to be happy and satisfied with the results.



Figure 7. Final extraoral photographs: A. Frontal. B. Smile. C. Three-quarter profile. D. Profile.

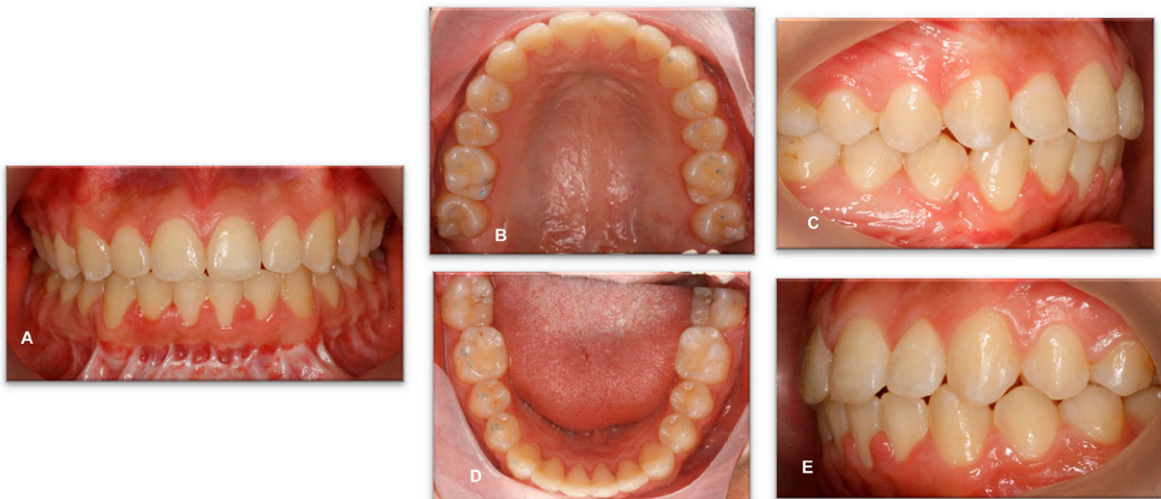


Figure 8. Final intraoral photographs: A. Frontal. B. Upper occlusal. C. Lateral right. D. Lower occlusal. E. Lateral left.

DISCUSSION

The *Surgery First* treatment protocol provides greater efficiency in the total treatment, increased patient's cooperation, eventually achieving an evident change in the patient's quality of life^{2,4,12}. The patient feels more motivated from the start since the changes are attained sooner and he or she does not have to go through a stage where the problem becomes more evident⁴. In the clinical case hereby presented, after performing the surgery the patient felt better about her physical appearance and was satisfied with the esthetic results obtained. The total treatment time in this case was fifteen months, equivalent to that in the article by Peiro-Guijarro *et al.*, in which they mention that the average for *Surgery First* treatments is 14.2 months. This time is much shorter in comparison with conventional orthognathic surgery treatments^{4,11}. The same article states that the average time for fixed appliance placement before surgery is one to six weeks, and also describes that the time for archwire placement can be variable, from one day before surgery or even entering surgery without an archwire⁴. In our patient, fixed appliances were placed three weeks before surgery and no archwire was placed before the surgical procedure.

It is difficult to predict the outcome of dental positions and occlusion after surgery^{5,9,11}, so a meticulous and detailed treatment plan is necessary, as well as great experience from the surgeon. Success in surgical orthodontic cases is given by the close relationship that should exist between the surgeon and the orthodontist from the beginning, from the diagnostic and treatment planning stage. In this case, rigid fixation was used for the surgical procedure, since many times the occlusion at the end of the surgery is not very stable; therefore, to avoid a possible post-surgical relapse, this type of fixation is used with titanium plates⁶.

Most of the publications on *Surgery First* protocols are about patients with a skeletal diagnosis of class III and only 6.4% are about class II patients^{4,6}, so this case report was considered relevant.

CONCLUSIONS

The *Surgery First* protocol should be performed in specific cases. There must be a close relationship between the surgeon and the orthodontist since the beginning of treatment.

In the case hereby presented, the proposed benefits of the *Surgery First* protocol were obtained: shorter treatment time, greater tooth movement due to the regional acceleration phenomenon, and facial changes from early stages motivating the patient's cooperation.

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