

Orthopedic-orthodontic treatment of a class II malocclusion. Case report.

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Abstract:

Background: Class II malocclusion is caused by mandibular deficiency, maxillary overgrowth, or a combination of both. Prompt treatment of a class II malocclusion can eliminate the option of orthognathic surgery or, in more severe cases, reduce the complications of surgery.

Maxillary extension and expansion are often used in orthopedic treatments and removable appliances, to guide development during the early growth stages of patients.

Case Report: This clinical case addresses the treatment of a 9-year-old patient with skeletal class II with maxillary prognathism. The treatment was carried out in two stages. The first stage with functional orthopedics, Hyrax maxillary expansion screw with occlusal tracks and Bimbler Type A; and a second stage with fixed appliances and extractions.

Results: Skeletal class I, class I canine relations, lip competence, facial harmony, and patient satisfaction.

Conclusion: The early diagnosis and treatment of class II malocclusions are a determining factor to obtain better results and avoid surgery, taking advantage of the growth potential.

Key Word: Class II, malocclusion, orthopedic, prognathism, orthodontics, Bimler.

Date of Submission: 26-08-2022

Date of Acceptance: 09-09-2022

I. Introduction

The goal of early orthodontic treatment is to correct existing problems and intercept developing problems and prevent them from getting worse. Treatment of class II malocclusion often aims to correct the skeletal discrepancy. [1] Multiple functional devices are currently used for its correction with the aim of improving skeletal imbalances. With them, it is expected to achieve an alteration in maxillary growth, a possible improvement in mandibular growth and positioning, as well as a change in dental and muscular relationships. [2, 3]

The rapid maxillary expansion has been in common use by orthodontists for several decades. Although expansion was initially used to correct posterior crossbites and gain arch perimeter, other possible indications for this technique have been proposed. McNamara defended the use of expansion in many class II early mixed dentition patients with mild mandibular retrusion and maxillary constriction. [1, 3, 4]

One of the functional appliances used is the Bimler Elastic Modeler, which is based on the modification of a certain muscle group during the resting position of the mandible, leading to an increase in its physiological activity. The Bimler A appliance reduces malocclusion by mandibular repositioning and large compensatory tooth movement, similar to other functional appliances.

Patients with class II division 1 malocclusion are characterized by proclined incisors and an increased overbite. Among the treatment options for this situation, the most frequent is the extraction of the four first premolars, because the problem is in the anterior segments of the dental arches, which allows direct access for the correction of crowding, severe dentoalveolar protrusions and achieve canine class I, which is one of the main objectives in orthodontics. [5]

II. Case Report

A 9-year-old female patient attended at UniversidadAutonoma de Baja California, in the city of Tijuana, Baja California. She presents a dolichofacial biotype, with apparent facial asymmetry and lip incompetence (Fig. 1). She skeletally class II pattern, vertical growth, proclined upper incisors. Dentally, she presents right and left class II molar relationship; Left and right canine relationship not assessable due to mixed dentition, a 9mm overbite, a 40% overbite, and mismatched midlines (Fig. 2).

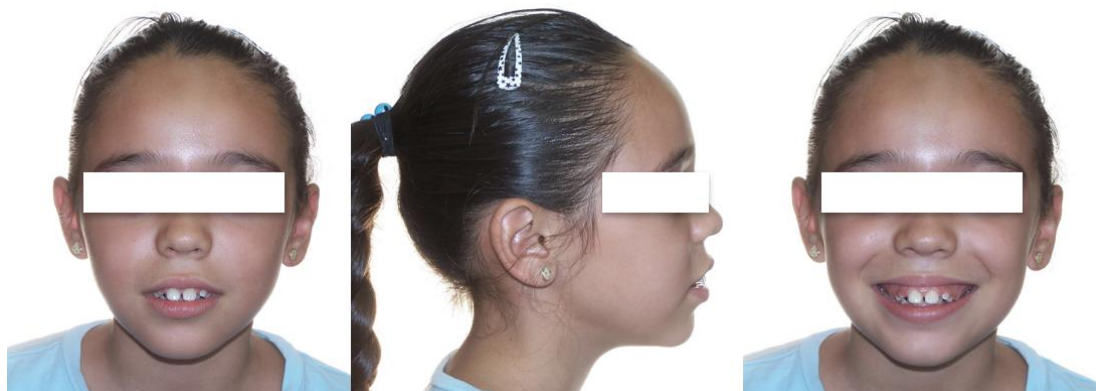
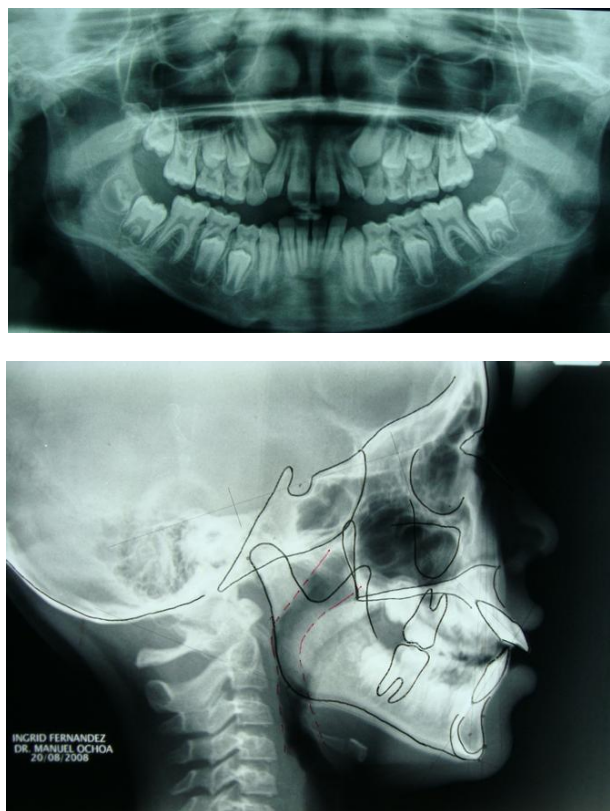


Figure 1.Facial photographs.



Figure 2.Intraoral photographs.



	Norm	Patient
SNA	82	77
SNB	80	71
ANB	2	6
SND	76	70
Segm SL	51mm	32mm
Segm SE	22mm	21mm
Ang Go-Gn / SN	32	40
Plano ocl / SN	14	26
Áng 1s / NA	22	42
Dist 1s / NA	4mm	10mm
1s / ENA-ENP	113	125
Áng 1s / SN	103	119
Áng Ii / NB	25	32
Dist Ii / NB	4mm	7mm
Ii / Go-Gn	90	92
Ángulo interincisal	131	80

Figure 3. Panoramic and lateral radiographic studies of the skull. Cephalometric values.

Treatment plan

It was planned so that the treatment was carried out in two stages. First stage: Hyrax maxillary expansion screw placement with occlusal tracks, Bimler Type A functional appliance placement. Second stage: Edgewise 0.022" fixed appliances, leveling and alignment, upper first premolar extractions, upper dentoalveolar retraction, arch coordination, detailing and finished.

Objectives

Correct skeletal class II, achieve right and left canine class I, obtain functional class II molar relationship, harmonize arches, correct overbite and overbite, and improve the profile.

Evolution of the case

We started the orthopedic stage with a maxillary expander with 3 mm occlusal tracks, activating the maxillary expander a ¼ turn per day for two weeks until the goal was achieved (Fig. 4A). After four weeks of maxillary expansion, it was held in retention with metal ligature on the expansion screw for six months (Fig. 4B).

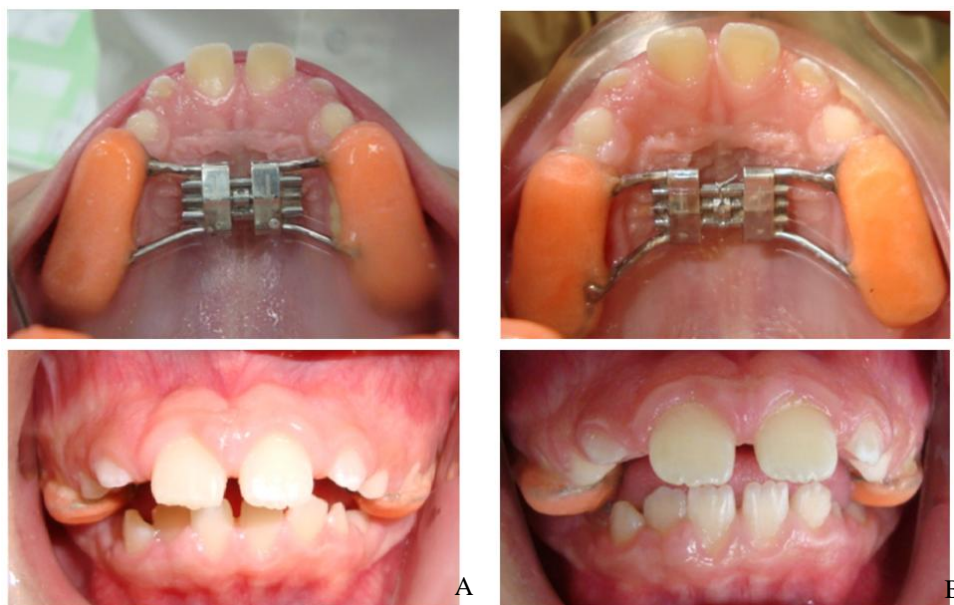


Figure 4.(A) Placement of expander device.(B) 1 month activation.

The placement of the Bimler Type A elastic modeling orthopedic appliance continued to promote mandibular projection, seeking a better overbite, and avoiding proclination of the upper incisors. It was indicated that it be used as long as possible during the day and all night, for 8 months, taking advantage of the therapeutic dynamics of the device that stimulates muscle activity, and appointments were made once a month to check bone redirection (Fig. 5).



Figure 5.Bimler Type A.

After obtaining the desired results, the second stage was continued, the placement of the fixed appliances of the 0.018" Edgewise prescription, starting with 2x4 in the upper arch, bands on the molars, starting with a 0.014" NiTi archwire (Fig. 6).



Figure 6. Fixed appliances 2x4. Upper arch NiTi 0.014”.

As the treatment progressed, the sequence of archwires applied was as follows: 0.014” NiTi - 0.016” NiTi - 0.016 x 0.016” NiTi - 0.016 x 0.022” SS (Fig. 7).



Figure 7. Upper arch 0.016 x 0.022” SS and lower arch 0.016” NiTi.

At the end of the alignment and leveling phase, the soft tissue profile was assessed and extraction of the upper first premolars was chosen, using upper anchorage with a transpalatal arch. Space closure was performed in a 0.016 x 0.022” SS archwire, retraction was generated with an elastomeric chain (Fig. 8).

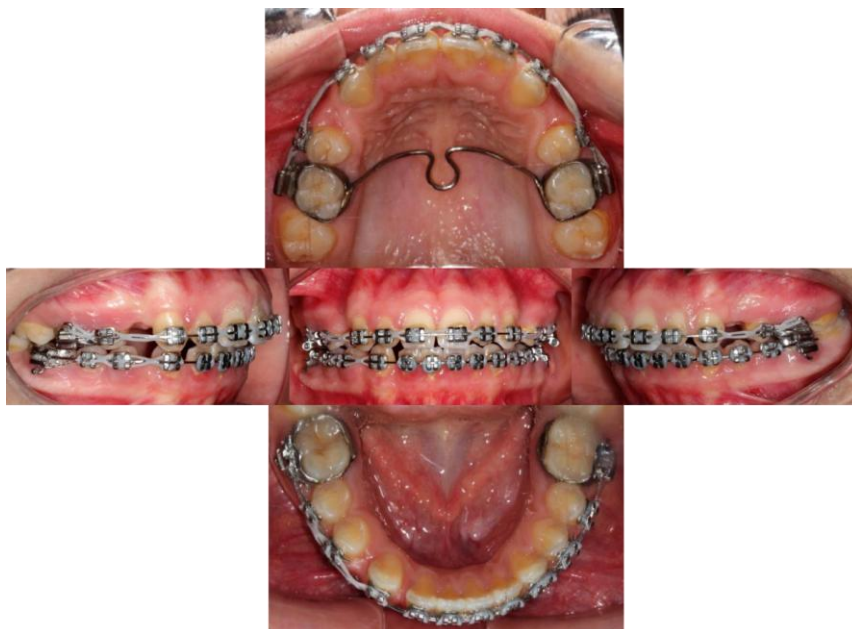


Figure 8.Upper first premolar extractions. Retraction with elastomeric chain.

III. Result

At the end of the orthodontic treatment, teeth #12 and 22 were restored with resin due to the size discrepancy for a favorable aesthetic appearance. The established objectives were achieved: class I right and left canine relationship, functional molar class II, 2.5 mm overjet and 20% overbite. The patient reports great satisfaction at the end of the treatment with the results obtained (Fig. 9).



Figure 9. Final intraoral photographs.

A final panoramic radiograph was taken and extractions of the lower right and left third molars were indicated. Root parallelism could be observed, evidence that the patient established a correct occlusal function and good retention, maintaining the facial aesthetics that was obtained with the orthopedic and orthodontic treatment (Fig. 10).



Figure 10.Final panoramic radiograph.

IV. Discussion

The use of a rapid maxillary expansion protocol with acrylic tracks favors transverse development and mandibular repositioning by intruding the posterior dental sector, as Guest et al. in their research suggest that the described protocol, which includes treatment with a rapid maxillary expander, used in early mixed dentition in class II division 1 patients can help improve class II malocclusion as a secondary effect, both skeletal and dental. [6] The expander had its greatest effects at the occlusal level, specifically producing significant improvements in class II molar relationship and decreased overjet. The application of the Bimler Type A elastic modeler stabilized the results obtained and managed to contain and prevent the proclination of the upper incisors, granting a correct transition to fixed orthodontic treatment. The studies carried out, based on this clinical case, show that the use of Bimler Type A in pediatric patients with class II division 1 malocclusion is an ideal treatment to correct this type of malocclusion. The studies showed that there are positive changes, avoiding invasive treatment, including surgical treatments in the future. YuritziSilahua et al. in his presentation of a clinical case he shows us a pediatric patient with class II division 1 according to the standard values of the Ricketts analysis in cephalometric tracing, it was possible to correct more than 50% of the deviations, the reduction of the proclination of the incisors was achieved as well as the enlargement of both jaws, giving spaces to the upper canines, achieving the correction of the canine relationship for its correct eruption and alignment, and correction of the posterior crossbite. [7]

The results obtained in the cited clinical case coincide with the results obtained with the presented clinical case.

V. Conclusion

Treating a class II malocclusion on time with the correct diagnosis and good selection of treatment can achieve the established objectives of function and aesthetics; In our clinical case, observing the patient's growth stage, thanks to the intervention of an initial orthodontic approach and then an orthodontic approach, we obtained correct occlusal function and facial aesthetics. The importance of early care in patients with class II malocclusion lies in the participation and interference in development, before irreversible changes occur in bones and soft tissues, optimizing occlusal function and in many cases avoiding the need for a orthognathic surgery. The follow-up of these patients before and after finishing treatment determines their prognosis.

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Cristian Correa Choy, et. al. "Orthopedic-orthodontic treatment of a class II malocclusion. Case report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(09), 2022, pp. 12-19.