



ORIGINAL RESEARCH PAPER

Dental Science

ORTHODONTIC MANAGEMENT IN A PATIENT WITH CLEFT LIP AND PALATE AND SEVERE PREMAXILA EXTRUSION: CASE REPORT.

KEY WORDS: Orthodontics; Premaxilla; Cleft lip and palate.

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ABSTRACT

The cleft lip and palate are one of the most common craniofacial malformations, and the type of treatment required depends on the severity of its condition. This report posits the case of a male adult patient diagnosed with a complete bilateral cleft lip and palate, which have been left untreated, with a severe extrusive premaxilla. Using orthodontics and surgery, it was possible to treat him, improving aesthetics and missing functions.

INTRODUCTION

Cleft lip and palate is one of the most common craniofacial malformations. According to a study conducted in 2010 in Chilean hospitals, it has a prevalence of 1.4 per thousand births.¹ The incidence of oral clefts is higher in Amerindian and Asian population, with a rate of 1 per 500 births.^{2,3} Regarding gender, cleft lip and palate is frequent in males, and cleft palate in females.^{3,4}

One of the great difficulties of its treatment is to return the aesthetic and complete function of the structures, and to achieve this goal, it starts in the first months of life and continues through childhood, adolescence and in some cases until adulthood.

Different alterations can be distinguished in relation to the maxilla of patients with cleft lip and palate. At birth, the profile of the patients is convex due to the projection of the premaxilla.⁵ In turn, at this stage, the maxilla presents a protruding form.⁶ During craniofacial development, patients experience an inhibition of maxilla growth after the first surgery,⁷ due to the fact that the scar tension caused by early cheiloplasty restricts previous growth. This restrictive effect can cause a skeletal class III pattern, since the lack of correct development, consequently resulting in an inverted bite.⁸ Another feature, which can be found in these patients, is the protrusion of the premaxilla, on account of the lack of function of the orbicularis oculi muscle, which causes abnormalities in the position of the latter. The rotated segment can be observed, resulting in functional and aesthetic disorders.⁹ In the vertical plane, excessive vertical growth has been described, which is induced by the overgrowth of the suture between the premaxilla and the vomer. This condition, unlike excessive sagittal growth, is not reduced spontaneously.¹⁰ Finally, in the transversal plane, cases of reduced transverse dimensions can be observed, generating mild, moderate and even severe crossbites, due to the closure of the middle palatine suture, and the increased effect generated by an early palatoplasty.⁸

To correct the anatomical alterations generated by a malformation such as the complete cleft palate, a transdisciplinary team becomes necessary, allowing reconstruction of the divided structures and successful rehabilitation of the patient.

The objective of this report is to present the treatment of an adult patient, whose reason for consultation was "to improve [his] face", admitted in 2007 to the Maxillofacial Malformations Unit of the University of Chile, which presented sequelae of surgical

interventions performed in his first years to repair a complete, bilateral cleft lip and palate, which generated a strong alteration in his aesthetics and phonation.

Patient Information

Male, 24 years old, diagnosed at birth with a bilateral and complete cleft lip and palate. In his first years of life, surgery was performed on the lip, alveolar ridge, hard and soft palate, veloplasty, columella reconstruction and pharyngoplasty. There was no record dating these interventions, nor was there follow-up and rehabilitation. Also, there was no chance to ask the mother, who had died at the time. He presented complex phonetic and aesthetic alterations, which were his main concern. There was no family history of oral clefts, or other malformations in his family.

Clinical findings

A cephalometric study was performed (Table 1), using a Profile Telerradiography (Figure 1). The patient presented a skeletal class III pattern, retrognathia of the maxilla, negative overjet, and retrusion of the maxilla. The panoramic and retroalveolar study (Figure 2) show a complete bilateral cleft lip and palate, supernumerary tooth, multiple obturations, severely extruded premaxilla, and superior incisors were found uneven and outside the line of occlusion (Figure 2-3).

Table 1. Cephalometric analysis of Ricketts

Variables	Value	Normal Value	Class
Convexity	-6.9	-0.4 2.0	Clase III
Lower facial height	55	47 4	Dolico-facial
Facial depth	92	91 3	Mesofacial
Facial axis	84	90 3	Dolico-facial
Inclination IS	14	28 4	Linguo versión
Protrusión IS	3.3	3.5 2.3	Normal
Inclination II	30	22 4	Lip
Protrusion II	12.3	1.0 2.3	Protrusion
Overjet	-8.2	2.5 2.5	Negative
Overbite	3.8	1.3 2.0	Normal
Flat Inclination oclusal plane	18	28 4	Rotation Anti-clock
Labial protrusion	0.5	-4.4 2.0	Protrusion
Upper lip length	33.8	27.6 2.0	Increased
Labial trial to occlusal plane	-5.1	-2.3 2.0	Supraposition
Maxillary depth	85	90 3	Retrognathia
Location Porion	-36.2	-43.8 2.2	Increased
Location mandibular body	71.5	84.2 2.7	Diminished

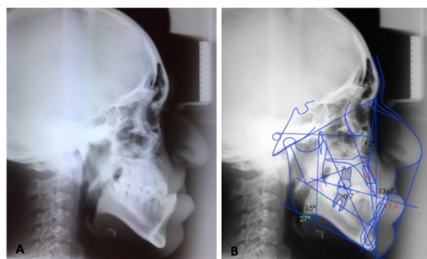


Figure 1. A, Initial profile telerradiography. B, Cephalometric study.

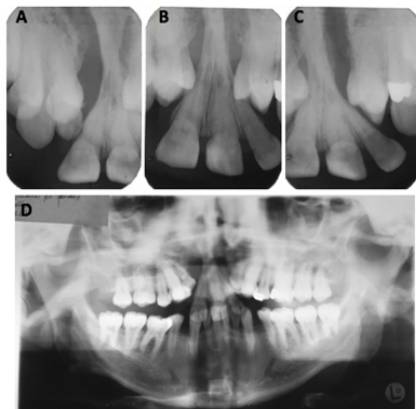


Figure 2. A, B and C, Initial retroalveolar radiography, the extent of the fissures is observed. D, Initial orthopantomography, a supernumerary piece is observed.

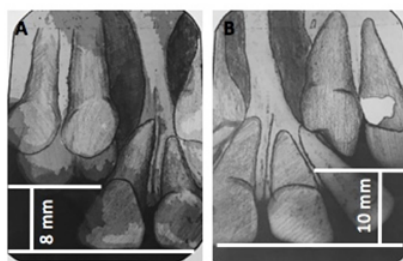


Figure 3. Premaxilla descriptive scheme. A, distance between incisal edge and right canine. B, distance between incisal edge and left canine.

In the intraoral examination, an upper lip with a severely retractable scar can be observed, due to corrective surgery, upper vestibule with insufficient height and absent upper labial frenum. The occlusal relationship in the sagittal plane presents a mesio-occlusion, negative overjet of 8 mm, overbite of 3.8 mm (Figure 3-4). In an upright direction, an overbite, and in the transverse plane, a bilateral vis a vis relation.



Figure 4. Intraoral examination. A, retractable scar in the upper lip. B, Frontal view of the occlusion. C and D, Lateral views of the occlusion.

The purpose of this treatment was to align, level both arches, close spaces in the lower arch, and intrude the anterior superior segment.

Orthodontic Intervention

It starts with the installation of multi-brackets in both arches, performing monthly controls, and activating according to its evolution.

Premaxilla leveling was performed with fixed orthodontic appliances, starting with 0.012 Nitinol, 0.014 Nitinol, 0.016 Nitinol, preventing that the premaxilla was not lateralized, keeping the incisors without rotations, then using an arch of .017 x .025 Nitinol prior to the alveolar bone graft, which in turn allowed to give greater stability to the graft area. As the leveling was achieved only with arches and orthodontic therapy, surgical solution was not necessary in this case. In Figure 5, levelled premaxilla can be observed.

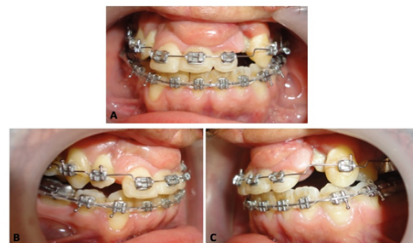


Figure 5. Bone pre-graft period, orthodontic treatment. Greater step is observed, and second order bends in steel arch .016". A, Frontal view of the occlusion. B and C lateral views.

Concurrently, periodontal treatment was applied, to improve oral hygiene due to poor control of the patient's bacterial plaque, whenever necessary.

In a second stage, surgical treatment was indicated, alveolar bone graft was performed on both fissures, in two surgical acts, with heavy arches of 0.017 x 0.025 Nitinol. Figure 6 shows the comparison of the bilateral clefts before and after the surgeries.

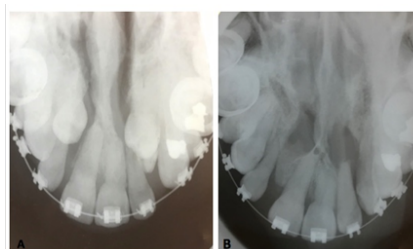


Figure 6. A, Initial occlusal radiography, bone pre-graft, complete fissure extension is observed. B Occlusal x-ray bone graft.

After the bone graft, the supernumerary tooth medial to the left superior canine begins to pull and is included in the arch, in order to close the area of the left cleft (Figure 7).



Figure 7. Post-bone graft period, upper and lower arches aligned. Mesial supernumerary piece to 2.3 is incorporated into the arch, filling the space. A, Front view occlusion. B and C lateral views.

An assessment was made with a phono audiologist, obtaining an evaluation of IVF 9, and a slightly deviated septum. Therefore, a pharyngoplasty was performed, substantially improving his IVF, in addition to his aesthetics. This is how, during re-evaluation, it obtained value 1.

After the removal of orthodontic appliances (Figure 8), upper and lower acrylic restraints were done (Figure 9). Monthly controls were maintained over 2 years. In Figures 10 and 11, 3 years of treatment follow-up is shown.



Figure 8. Removal of fixed appliances. A, Front view occlusion. B and C lateral views.



Figure 9. Removal of fixed appliances control after 3 years, the use of removable restraints is maintained, on a nightly use. A, Right side occlusion. B, Frontal view occlusion. C, Left side occlusion.



Figure 10. Removal of fixed appliances control after 3 years. It remains without recurrences. A, Right side occlusion. B, frontal vision occlusion. C, Left side occlusion. D and E upper and lower arches.



Figure 11. Removal of fixed appliances control after 3 years. A, Front face photography. B Profile photography. C, Front face photography, smiling.

DISCUSSION

The bilateral cleft lip and palate presents a great challenge regarding treatment, on account that it needs to provide an aesthetic and functional solution for the patient.

There are different techniques that allow the intrusion of a severely extruded premaxilla. In a bibliographic review,⁹ the periods of time where the protrusive premaxilla related to different techniques can

be corrected are exposed.^{9,11} In general, treatments are carried out in the infancy period. There are non-surgical procedures that can be performed in the early years like the nasaloalveolar molding devices. And even in some other cases, it still needs a surgical solution. According to a study by Meazzini,¹⁰ in cases with prominent premaxilla, orthodontic intrusion is better done in mixed dentition. In the case of a complete permanent dentition, surgical intrusion is suggested.

But there are several risks associated to osteotomy, such as dehiscence, recurrent fistulas, loss of bone by resorption, and necrosis.

Although the text displays different procedures that are performed in cases where the premaxilla is in an abnormal position, the case in question not only had a severely extruded premaxilla, and little maxillary development, it also presented phonetic and aesthetic alterations strongly affecting the patient at a psychosocial level.

The age of the patient, and the absence of corrective interventions at an appropriate age, not only generated great difficulties for their treatment, but also great limitations. Without performing osteotomy, the arches could be aligned by performing orthodontics prior to alveolar bone graft and maintaining the orthodontic treatment until the completion of the treatment, without obtaining unwanted effects such as root resorptions or increased mobility in teeth.

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