



April - June 2025
Vol. 5, no. 2 / pp. 59-64

Zygomatic implants and hybrid prosthesis in a patient with cleft lip and palate

Implantes cigomáticos y prótesis híbrida en un paciente con labio leporino y paladar hendido

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Keywords:

zygomatic implants, hybrid prosthesis, cleft lip and palate, maxillary atrophy, prosthetic rehabilitation, implant-supported prosthesis, oral and maxillofacial surgery.

Palabras clave:

implantes cigomáticos, prótesis híbrida, labio fisurado y paladar hendido, atrofia maxilar, rehabilitación protésica, prótesis soportada por implantes, cirugía oral y maxilofacial.

ABSTRACT

Prosthetic rehabilitation treatment in patients with cleft lip and palate (CLP) represents a challenge for the professionals involved; it is necessary to individualize each particular case to determine the best therapeutic option. The objective of this case report is to describe the step by step of clinical decision making for a patient with CLP treated at IPS CES Sabaneta by the maxillofacial surgery and oral rehabilitation postgraduate courses, discuss the scientific evidence and the results obtained.

RESUMEN

El tratamiento de rehabilitación protésica en pacientes con labio fisurado y paladar hendido (CLP, por sus siglas en inglés) representa un reto para los profesionales involucrados; es necesario individualizar cada caso para determinar la mejor opción terapéutica. El objetivo de este informe de caso es describir paso a paso la toma de decisiones clínicas para un paciente con CLP tratado en el IPS CES Sabaneta por los cursos de postgrado de cirugía maxilofacial y rehabilitación oral, discutir la evidencia científica y los resultados obtenidos.

INTRODUCTION

Throughout history, prosthetic rehabilitation of maxillary areas with severe bone resorption has been a topic of discussion and a field of multiple interventions to achieve the final goals both in aesthetics and in function.¹ The most widely used solution for this problem is based on in tissue-supported dental prostheses, which are generally associated with different manifestations of prosthetic morbidity (stomatitis, traumatic ulcers, and irritation-induced hyperplasia), psychological disturbances (depression), and social problems (reduced social interactions, educational opportunities, and job opportunities).²

Rehabilitation with conventional dental implants has been presented as a treatment option for the installation of fixed or removable supported implant prostheses, with the consequent need for bone augmentation to achieve acceptable dimensions in the vertical and horizontal plane for their placement.³

Faced with this biological challenge for the management of the atrophic maxilla, a portfolio of options has been developed to generate the best possible result. The use of angled implants in the parasinus region,⁴ implants in the pterygoid process,⁵ elevation of the maxillary sinus floor⁶ has been described,^{6,7} short implants,⁸ wide implants⁹ and zygomatic implants (CI),¹⁰⁻¹⁵ the latter have been used for multiple purposes, such as the correction of sequelae from trauma, maxillary neoplastic processes, severe maxillary atrophy, and patients with cleft lip and palate.¹⁶⁻¹⁸ a technique described by Branemark in 1997, a procedure that has shown favorable success rates (up to 97% at 10 years) for the management of complex cases, in which the alveolar bone requirement exceeds the probable limits of regeneration with local techniques and allows fixation in bone of excellent quality and biomechanical performance, such as the zygomatic bone.¹⁹⁻²¹

The purpose of this case report is to provide an implant-supported oral rehabilitation option

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Received: 09/06/2025

Accepted: 11/08/2025

doi: 10.35366/121110

How to cite: Ortiz G, Domínguez J, Ospina N, Agudelo L. Zygomatic implants and hybrid prosthesis in a patient with cleft lip and palate. Lat Am J Oral Maxillofac Surg. 2025; 5 (2): 59-64. <https://dx.doi.org/10.35366/121110>



for a patient with cleft lip and palate, based on literature data consistent with the result obtained after six months of follow-up. The data used to support the findings of this study are included within the article. This research was financed with resources from the patient and commercial discounts from the Neodent commercial company.

CLINICAL CASE

A 62-year-old female patient with a history of cleft lip and palate, without associated systemic comorbidities, a domestic worker, attended the IPS CES in Sabaneta to perform an upper total prosthesis with a postgraduate course in oral rehabilitation. The patient gave explicit written consent to publish her clinical details and photographs.

On clinical examination, loss of vertical dimension was observed with measurements of the upper third 70 mm, middle 60 mm and lower 45 mm, concave profile and asymmetric upper lip (*Figure 1*). Totally edentulous upper and lower intraorally, Veau's class III cleft palate, atrophic maxillary ridge (Cawood and Howell's class IV) and lower bone loss with knife-edge rim (*Figure 2*).

She underwent cheilorrhaphy at four years of age to improve her aesthetic condition, palatorrhaphy was never performed due to economic factors, at 20 years of age she

underwent multiple extractions, she refers to never having gone to a specialist for rehabilitation, or receiving any other type of treatment for the closure of his congenital malformation.

As the first treatment option, a conventional palatal obturator and lower total prosthesis are proposed, to restore facial support and vertical dimension; during the process of making the prosthesis, it is difficult to obtain adequate retention of the palatal obturator due to the size of the defect in the posterior sector that prevents achieving a palatal seal, (*Figure 3*) therefore, together with the maxillofacial surgery service, it is decided to provide a solution implant-supported fixed.

For the preoperative evaluation, panoramic X-rays and cone beam computed tomography of the maxilla and zygomatic were requested as diagnostic aids, in which the low remaining bone availability was confirmed due to severe atrophy of the maxilla with advanced loss of height and vestibule-palatine thickness, reason for which surgery is chosen for the placement of zygomatic implants, instead of subjecting the patient to multiple interventions with ridge reconstruction by means of large bone grafts.

Under general anesthesia and nasotracheal intubation, four Zygoma GMTM Neodent implants with a diameter of 4.0 mm with Grand Morse connection were placed, the Slot technique was used according to the milling protocol of the commercial house, at the level of 16, 13 and 26, implants of

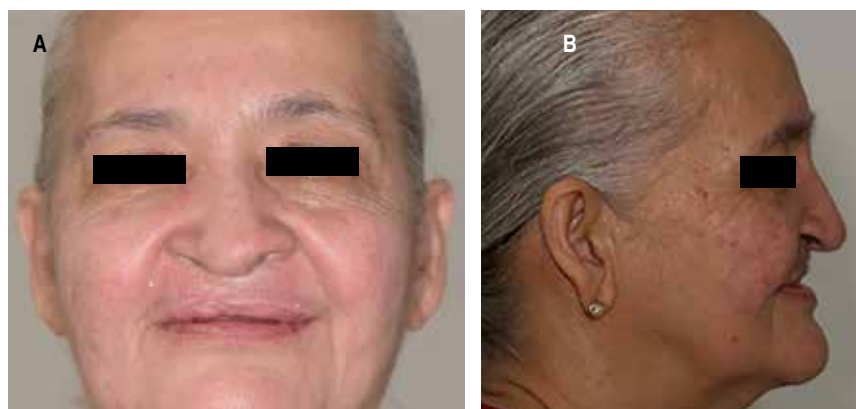


Figure 1:

A) Initial front face photo. B) Initial profile face photo.

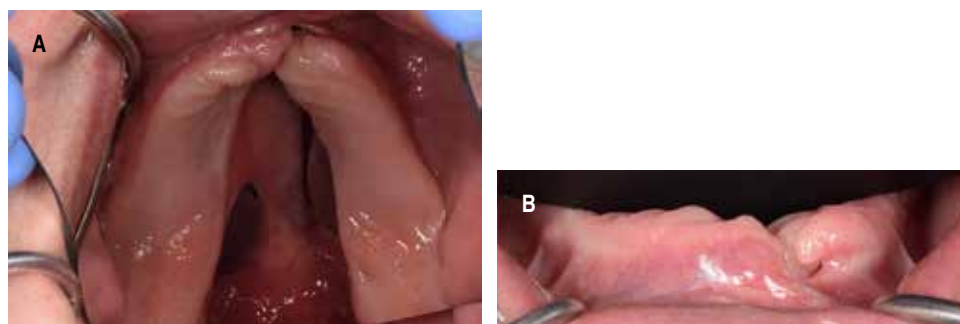


Figure 2:

A) Initial intraoral clinical condition, occlusal view. B) Initial intraoral clinical condition, frontal view.

Figure 3:

A-B) Definitive impression in which the large size of the palatine defect is appreciated, which made it difficult to properly seal with the prosthetic shutter.

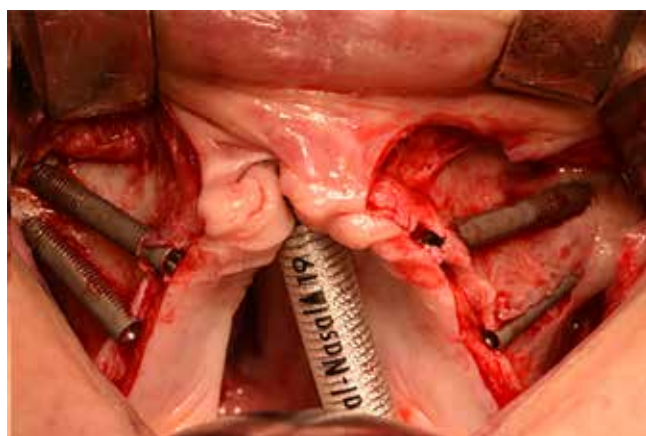
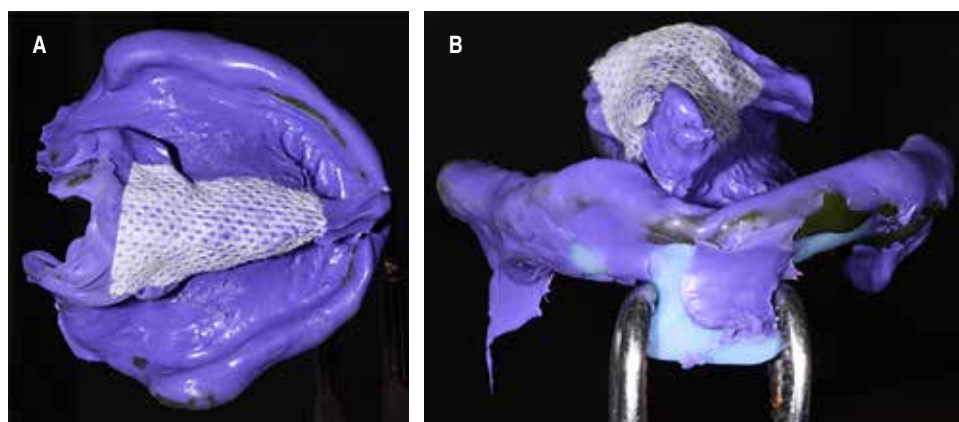


Figure 4: Intraoperative image in which the four zygomatic implants are seen in position, note emergency site by alveolar rim and parallelism between the platforms.

40 mm long and at the level of 23 a 45 mm long implant; all with adequate primary stability (insertion torque greater than 45 Nw/Cm during placement of all implants) (Figure 4). Finally, the respective covers were installed. Bichat ball implants were covered bilaterally and closure was performed by first intention with 3/0 Vicryl suture.

Four months after the first intervention, the second phase surgery was performed at the IPS CES in Sabaneta-Antioquia, with a local anesthetic technique. On this occasion, angled conical mini-pillars were installed as follows: $45^\circ \times 1.5$ mm in the area of 16, $45^\circ \times 2.5$ mm in area of 13, $45^\circ \times 1.5$ mm in area of 23 and $45^\circ \times 1.5$ mm in area of 26. Parallelism was verified and they were covered with respective protection cylinders from the Neodent commercial house.

The following week the final impression process begins with a personalized acrylic tray, transfers are joined to an open tray for impression on Neodent mini abutments using self-pouring acrylic resin, they are segmented extraorally with



Figure 5: Mini-pillars in position, adequate parallelism is appreciated.

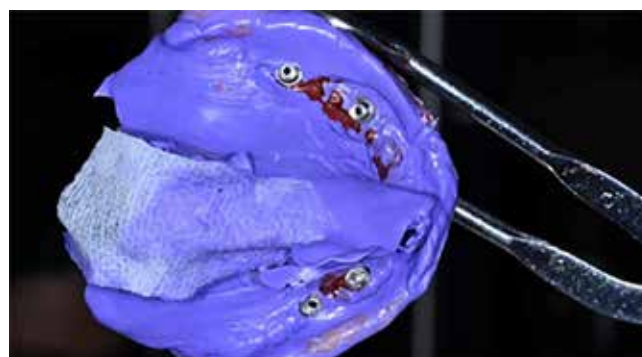


Figure 6: Definitive impression with exact transfer of the position of the implants.

a diamond disc and joined again before take the impression (Figure 5).

The tray is tried in the mouth ensuring adequate visibility of the screw, a layer of adhesive is applied and waited for five minutes. A sterile gauze pad is positioned in the depth of the palatal defect to avoid excessive displacement of the material and an impression is taken with silicone of regular consistency. Finally, a master model is obtained with the exact position of the implants (Figure 6) and a Hader bar is manufactured in

titanium, taking as reference the previously made tooth filing for the temporary prosthetic obturator (Figure 7).

Settlement tests of the intraoral bar are carried out, the passivity of the structure is verified clinically and radiographically, the final torque of the structure is given with a Dynamometric Ratchet wrench at 20 N.cm. (Figure 8). In the final appointments, Duratone color A2 teeth are tried on and finally an upper prosthetic obturator with Hader retention abutments and a conventional lower total prosthesis are installed (Figures 9 y 10). At the time of installation, the patient reports temporary discomfort because she had not used any type of prosthesis and she undergoes an adaptive process until she finds the desired comfort.

The patient was followed up at 15, 30, 90 days and six months, without any complications and with a functional prosthesis. In addition, the patient expressed her satisfaction with the aesthetic and functional result obtained. The patient gave the researchers a signed consent for the publication of this case.

DISCUSSION

According to the results obtained in this case report, the effectiveness of zygomatic implants was confirmed as an good option for upper arch prosthetic rehabilitation in a patient with cleft lip and palate; additionally, an adequate closure of the oronasal communication was achieved with the help of the associated prosthetic obturator, with an adequate success rate for six months of follow-up.

Cleft lip and palate is a common congenital malformation (with an incidence of HL cleft lip with or without cleft palate of 1:1,000, and PHA isolated cleft palate is 1:2,500). Children are more frequently affected in HL (2:1), with an inverse male/female ratio observed in PHA of 0.5:1) that affects the individual's head and neck and may be associated with congenital heart defects, hydrocephalus, or urinary tract defects. There is a strong genetic component in the development of these defects, multiple environmental factors have also been associated such as cigarette smoking, pre- or gestational diabetes, alcohol abuse, anticonvulsants, and nutritional factors such as a lack of vitamin B6 and B12.²²

From the fourth week of embryo development, the 5 facial prominences are formed by the migration of neural crest

cells; in the fifth week the lateral and medial nasal processes develop by ectodermal thickening of the lower part of the frontonasal prominence. At the end of week six, the medial nasal processes fuse and later join the maxillary processes, forming the philtrum, upper lip, and primary palate²³ that will house the four upper incisors and the hard palate anterior to the incisal foramen; likewise, the palatal processes (which occur due to the growth of the maxillary prominences) extend medially to form the secondary palate that will go posterior to the incisal foramen up to the uvula.²²

A common classification of this type of defect is that formulated by Veau, in which class I consists of an incomplete cleft that involves only the soft palate, class II involves the hard and soft palate and is limited to the secondary palate, class III is a unilateral complete cleft of the primary and secondary palates and class IV is a complete bilateral cleft.²³

Cleft lip can be classified as microform, incomplete or complete and can be unilateral or bilateral.²² Not treating these defects in childhood leads to challenges in the treatment of the adult patient, having two options for rehabilitation: a palatal obturator or transfer. of autologous tissue which may involve non-vascularized grafts, local flaps, regional flaps or free tissue transfer. Palatal obturators are removable prostheses that are used to close the maxillary defect, it can be retained conventionally or with implants, it is a fast and low-cost prosthetic option but in some cases, it can be uncomfortable for patients; while with free flaps, despite taking more time, money, number of surgical interventions and greater risk of graft failure, it results in a better and faster adaptation of the patient. The clinical decision is multidisciplinary and the



Figure 8: Hader-type titanium bar with adequate intraoral settlement.



Figure 7:

A-B) Hader-type bar in titanium.

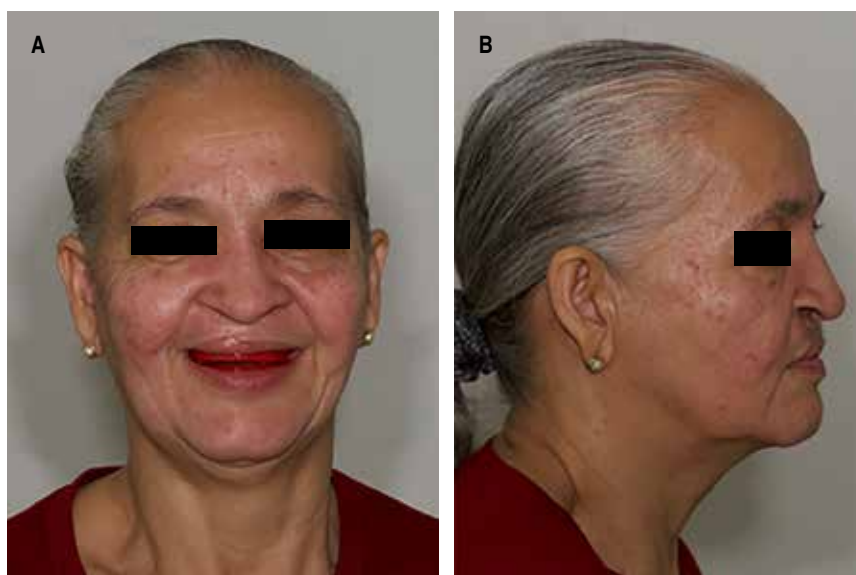


Figure 9:

A-B) Rodent test, front and sagittal view.



Figure 10: Maxillary implant supported and conventional mandibular prosthesis installed.

patient's comorbidities, economic factors, motor difficulties and mouth opening must be taken into account.²⁴

When having this type of defects, there is a direct communication between the oral cavity, the maxillary sinuses, the nasal cavity and the nasopharynx; compromising speech, swallowing and chewing, so the objective of the palatal obturator is to close this communication to prevent

the passage of liquids and food between cavities, avoid hypernasal speech, generate patient comfort, replace missing

teeth, gain support or retention at the site of the defect and, if necessary, restore the lost facial support.²⁴

In the vast majority of cases, it is difficult to obtain obturator retention, which is why the use of implants becomes necessary, especially in edentulous patients, in whom the limitations regarding bone availability increase.²⁴

CONCLUSION

This case report demonstrated that the use of zygomatics with an upper overdenture associated with a palatal obturator is a good treatment option for a patient with cleft lip and palate, providing both a good oronasal seal and adequate functional support for an atrophic maxilla. with good clinical results after six months of follow-up.

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