

## Clinical Strategies in Prosthetic Rehabilitation and Candidiasis Management in a Cleft Lip/Palate Patient: A Case-Report

Nicolas Pinto-Pardo<sup>1\*</sup>, Matias Junge<sup>2</sup>, Javier Montecinos<sup>3</sup>

1. Dentistry, School of Health Sciences, Universidad Viña del Mar, Viña del Mar, Chile.

2. Faculty of Dentistry, Universidad Andrés Bello, Santiago, Chile.

3. Faculty of Dentistry and Rehabilitation Sciences, Universidad San Sebastián, Santiago, Chile.

### Abstract

This study explored a multidisciplinary approach for managing a Cleft Lip and Palate (CLP) patient with concurrent oral candidiasis. Prosthetic rehabilitation in a 74-year-old woman with CLP is a common congenital deformity.

This case highlights the challenges and considerations in providing prosthetic treatment for patients with bone and tooth loss due to CLP, including the necessity of accounting for maxillary deformation and residual palatal defects. Interestingly, during the treatment process, a lesion was found in the rhinopharyngeal area, which was diagnosed as candidiasis caused by *Candida albicans*. The patient was successfully treated with nystatin, a mouthwash administered four times a day over a 14-day period. This case underscores the importance of comprehensive oral examinations in patients with CLP and the need for innovative clinical approaches to manage associated conditions such as candidiasis.

This detailed case report highlights the nuanced treatment pathway for patients with CLP, emphasizing the importance of tailored prosthodontic strategies, interdisciplinary collaboration, and careful clinical observation.

Review (J Int Dent Med Res 2023; 16(4): 1819-1823)

**Keywords:** Cleft lip and palate, Candidiasis treatment, Dental removable prosthesis, Functional impression.

**Received date:** 09 August 2023

**Accept date:** 05 September 2023

### Introduction

Clefts of the lip and/or palate (CLP) is a congenital disorder that is characterized by the incomplete formation of the lip and/or roof of the mouth, with a prevalence of 15.3 per 10,000 newborns globally.<sup>1</sup> This condition is one of the most common birth defects globally and can cause numerous complications, ranging from feeding difficulties in infants to speech and dental issues in older children and adults, creating a significant public health challenge.<sup>1,2</sup>

CLP malformations occur during the embryonic phase of intrauterine life, with multifactorial etiology, including genetic factors, environmental triggers, and teratogenic causes,

such as fetal alcohol syndrome. The exact causes of CLP remain a subject of extensive study, with both genetic and non-genetic factors believed to play a role.<sup>2</sup> The consequences of CLP include not only cosmetic concerns but functional and emotional disorders that can hinder social integration.<sup>3,4</sup>

Syndromic etiologies include single-gene transmission such as trisomies or teratogenic causes such as fetal alcohol syndrome.<sup>5,6</sup> Non-syndromic CLP is a diagnosis by exclusion and is considered to be a multifactorial inheritance condition.<sup>7</sup> Environmental causes include infections (rubella, toxoplasmosis), growth hormone deficiency, drugs (corticosteroids, benzodiazepines, and anticonvulsants), amniotic band syndrome, maternal diabetes mellitus, malnutrition and irradiation during pregnancy, psychic stress, teratogenic agents, maternal smoking may be modified by genes involved in biotransformation of toxic compounds derived from tobacco.<sup>8,9</sup> The role of folic acid, or folates, in the prevention of orofacial clefts is still debated although its efficacy has been demonstrated for

#### \*Corresponding author:

Nicolas Pinto-Pardo  
Department of Implantology, Dentistry, School of Health Sciences, Universidad Viña del Mar, Aguasanta 7055, Viña del Mar. 2520000, Chile.  
E-mail: [nicolas.pinto@uvm.cl](mailto:nicolas.pinto@uvm.cl)

the prevention of neural tube defects.<sup>10</sup>

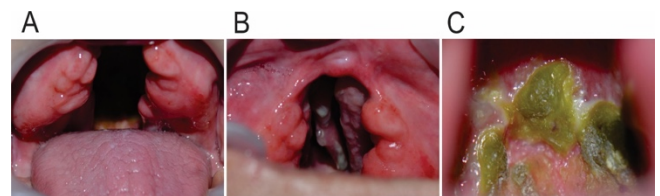
Treatment for CLP is available, but varies according to the severity of the condition. From infancy to adulthood, individuals with CLP face various challenges such as feeding difficulties, speech impairments, esthetic disturbances, and compromised chewing ability.<sup>11,12</sup> The fundamental objective of any approach to cleft lip, alveolus, and palate repair, whether unilateral or bilateral, is to restore normal anatomy.<sup>13</sup> Addressing these problematical necessitates a multidisciplinary approach, requiring a team of experts with highly trained specialists from medical and dental disciplines are engaged in the habilitation process, which is initiated in early infancy and continues until the late teens or early adulthood to facilitate case for these individuals.<sup>14</sup>

A critical aspect of CLP treatment is the use of removable prosthodontics, which can sometimes lead to secondary complications such as candidiasis.<sup>15</sup> This fungal infection, often exacerbated by the warm and moist environment under the prosthetic device, presents another layer of complexity in the management of CLP.<sup>15</sup> Candidiasis is a fungal infection caused by the *Candida* species, primarily *Candida albicans*. This yeast-like fungus is part of the normal flora in the oral cavity, but can overgrow under certain conditions, leading to infection.<sup>16</sup> The relationship between candidiasis and CLP in individuals using removable prosthodontics adds a new dimension to understanding and managing this condition.<sup>17</sup> Candidiasis may present as red, yellowish-white plaques or nodules, swollen areas under the prosthesis, or white patches on oral tissues. Pain, burning sensations, and altered taste may also occur.<sup>18</sup> Diagnosis typically involves clinical examination, patient history, and laboratory tests such as cultures or microscopic evaluation.

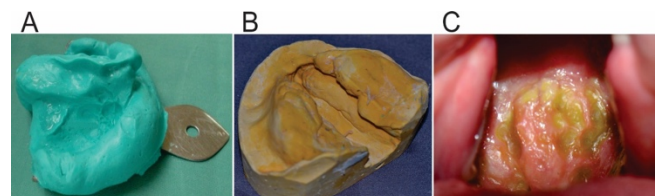
In maxillofacial prosthesis re-establishment, palatopharyngeal integrity and providing the potential for acceptable speech are challenging for clinicians, considering that palatal lift prostheses may not function adequately in edentulous patients because of the lack of retention and/or stability. The overall treatment goal in the habilitation of persons with CLP is to enable the individual to function in society as equally as possible to subjects without clefts.

## Case Report

A 74-year-old woman with CLP was referred to the Oral Rehabilitation Department at the Hospital del Salvador's Dental Service in Santiago, Chile. She sought full prosthetic rehabilitation of her upper jaw. A born with a left unilateral complete CLP underwent cleft lip surgery during her childhood. The patient lost superior teeth due to periodontal disease and was reported to have lost the complete superior removable prosthesis. Clinical examination revealed a left cleft lip and central cleft palate (1.3 cm of diameter). During the examination, a lesion was found in the rhinopharyngeal area, with a greenish appearance and irregular surface (Figure 1).



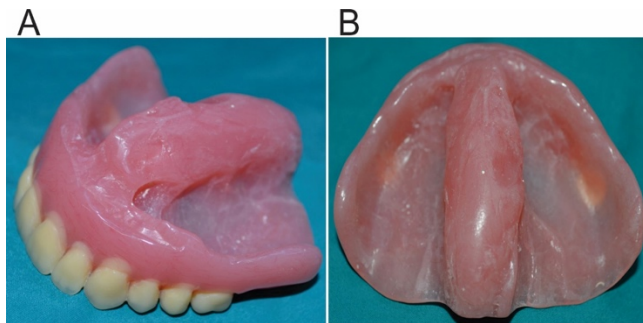
**Figure 1.** Intraoral examination of CLP patient. A. Central cleft palate malformation. B. Intra oral view of nasal structures. C. Clinical manifestations of Candidiasis.



**Figure 2.** Primary impression and Candidiasis treatment results. A. Alginate primary impression. B. Work model to fabricate individual tray. C. Clinical results after 7 days of Candidiasis treatment.

The primary impression of creating an individual tray with alginate was performed. After the removal of the first impression, a re-impression with a new layer of alginate was performed to cover the nasal structures that were not registered with the first impression. Subsequently, 2 ml of nystatin treatment (mouthwash, 1.000.000 International Units [IU]) was prescribed four times a day for 14 days. The suspension should be swished around the mouth and rhinopharyngeal area for several minutes and then swallowed. Nystatin was continued for 48 h after symptoms were cleared to ensure that

the infection was fully treated (Figure 2).



**Figure 3.** Definitive removable complete prosthesis. A. Lateral view of removable complete prosthesis with central obturator. B. Central view of removable complete prosthesis with central obturator.

Subsequently, an individual acrylic tray was crafted that featured a central elevation to account for the bone defect from the cleft palate. This tray was then trimmed to match the anatomical line and further individualized using a modeling compound to cover any neutral space. Zinquenolic paste was used for the functional impression. To prevent the impression material from entering the nasal cavity due to the existing oronasal communication, a thin plastic sheet was placed over the tray before taking the impression (Figure 3).



**Figure 4.** Clinical results after treatment.

After the final impression, aesthetic parameters and the correct OVD for the patient were established based on the initial evaluations. Cosmetic and functional dental articulation tests were performed before the final fitting of the complete maxillary prosthesis. Once aligned with the patient's OVD and aesthetic requirements, the prosthesis was fixed to ensure patient comfort (Figure 4).

### Discussion

In the context of treating patients with CLP, one cannot overlook the importance of managing co-existing conditions, such as oral fungal infections, particularly candidiasis, as well as the need for well-crafted trays, excellent dental impressions, and a keen focus on aesthetic considerations. These aspects are integral to effective treatment and contribute significantly to the overall patient experience and post-treatment quality of life.<sup>19</sup>

Patients with CLP often face a multitude of oral health challenges, with one of the most common being oral candidiasis. This opportunistic fungal infection can complicate the treatment process and cause significant discomfort to patients. Managing candidiasis in patients with CLP is critical, as the infection can affect both natural and prosthetic surfaces, potentially compromising the effectiveness of the prosthesis. Patients with CLP may have a higher susceptibility to oral candidiasis owing to a variety of factors, such as anatomical irregularities, poor oral hygiene, and the presence of prosthetic appliances.<sup>16</sup> As an opportunistic infection, Candidiasis can proliferate on both natural tissues and prosthetic surfaces, potentially causing discomfort and interfering with the prosthetic's function.<sup>15</sup>

Treatment typically involves a multipronged approach. Topical antifungal agents such as nystatin and clotrimazole are commonly prescribed to manage infections. Oral hygiene instructions are reinforced to maintain a clean oral environment and prevent infection recurrence. Prosthetic appliances must be meticulously cleaned and disinfected, with possible adjustments or replacements if they contribute to fungal proliferation.<sup>20</sup>

Regarding the technical process of creating removable prosthetics, attention to details is paramount. The fabrication of well-fitted

trays and capture of precise dental impressions are pivotal in this regard. Tray customization is crucial because it ensures that the prosthetic fits perfectly in the patient's mouth, thus enhancing comfort, improving functionality, and reducing the potential for complications. Customized trays that are designed based on the patient's specific anatomy help provide optimal support and retention for the prosthesis.<sup>21</sup>

Accurate impressions form the backbone of successful prosthetic treatments. They provide a faithful reproduction of a patient's oral structures, thereby guiding the design and fabrication of a prosthesis that accurately fits the patient's unique needs.<sup>22</sup> Likewise, accurate impressions are paramount in the design and fabrication of the prosthesis. Likewise, accurate impressions are of paramount importance in the design and fabrication of prostheses. They represent a detailed three-dimensional map of the patient's oral structures, guiding the precise crafting of the prosthetic device. Technological advancements, such as digital impressions, can enhance the accuracy and efficiency of this process.<sup>22</sup>

While the primary objective of CLP prosthetic treatment is functional rehabilitation, aesthetic considerations are of considerable importance. A prosthesis that mimics the natural oral structures in appearance can significantly enhance a patient's self-esteem and social interactions.<sup>23</sup> Prosthetic treatment of CLP is a complex process that extends beyond merely correcting cleft defects. It calls for a comprehensive approach that addresses potential complications, ensures technical precision, and considers aesthetic outcomes, thereby improving both the functional and psychosocial aspects of a patient's life.<sup>24</sup>

By integrating these elements into the overall treatment plan, professionals can offer a comprehensive treatment strategy that maximizes both functional and aesthetic outcomes, significantly improving patients' quality of life. Furthermore, this discussion expands upon the information provided in the provided document, emphasizing the need for a multifaceted approach to prosthetic treatment of patients with CLP.

## Conclusions

Patients with CLP demonstrate a multifaceted approach in oral rehabilitation, with emphasis on managing oral candidiasis and precision in prosthetic implementation. The attention paid to detail in creating well-fitted trays, taking accurate impressions, and considering aesthetics illustrates a comprehensive treatment strategy. Effective collaboration between managing fungal infection and precise prosthesis installation showcases a treatment plan that goes beyond functional rehabilitation, enhancing both the patient's physical comfort and psychological well-being. This case underscores the importance of a thorough and tailored approach to managing complex CLP cases, highlighting the integration of medical, prosthetic, and aesthetic considerations.

## Declaration of Interest

The authors report no conflict of interest.

## References

1. Salari N, Darvishi N, Heydari M, Bokae S, Darvishi F, Mohammadi M. Global prevalence of cleft palate, cleft lip and cleft palate and lip: A comprehensive systematic review and meta-analysis. *Journal of stomatology, oral and maxillofacial surgery*. 2022; 123(2): 110-120. doi:10.1016/j.jormas.2021.05.008
2. Nasreddine G, El Hajj J, Ghassibe-Sabbagh M. Orofacial clefts embryology, classification, epidemiology, and genetics. *Mutation research Reviews in mutation research*. 2021; 787: 108373. doi:10.1016/j.mrrev.2021.108373
3. Costa B, Ardouin K, Stock NM. Factors Associated With Psychological Adjustment in Adults With Cleft Lip and/or Palate: Findings From a National Survey in the United Kingdom. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2022; 59(4\_suppl2): S7-s17. doi:10.1177/10556656211028494
4. Sosiawan A, Kurniati M, Dewi Iskandar RP, et al. An Analysis of the MTHFR Gene and Clinical Phenotypes in Familial Non-Syndromic Cleft Palate. *J Int Dent Med Res*. 2020; 13(3): 1160-1164.
5. Bangun K, Halim J, Tania V. Repair of Protruding Bilateral Cleft Lip and Palate With Staged Premaxilla Setback Osteotomy, Cheiloplasty, and Palatoplasty in Trisomy 17p Patient: A Review of Syndromic Clinical Characteristic. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2023; 60(5): 621-626. doi:10.1177/10556656211069820
6. Reis de Souza Schacher H, Mariana Lemos Rinaldi M, Azeredo F, Deon Rizzato SM, Sasso Stuan MB, Macedo de Menezes L. The Ph Salivary Biomarker – is There a Difference Between Cleft and Non-Cleft Orthodontic Patients? *J Int Dent Med Res*. 2021; 14(3): 1014-1020.
7. Coletta RD, Sunavala-Dossabhoy G. Orofacial clefts: A compendium on non-syndromic cleft lip-cleft palate. *Oral diseases*. 2022; 28(5): 1301-1304. doi:10.1111/odi.14238
8. Ahmed Sakran K, Mutahar Abotaleb B, Khaled Al-Rokhami R, et al. Analysis of Environmental Exposures for Nonsyndromic

- Cleft Lip and/or Palate: A Case-Control Study. *Iranian journal of public health*. 2022; 51(3): 578-586. doi:10.18502/ijph.v51i3.8934
9. Hong Y, Xu X, Lian F, Chen R. Environmental Risk Factors for Nonsyndromic Cleft Lip and/or Cleft Palate in Xinjiang Province, China: A Multiethnic Study. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2021; 58(4): 489-496. doi:10.1177/1055665620956869
10. Liu C, Wang D, Jin L, et al. The relationship between maternal periconceptional micronutrient supplementation and non-syndromic cleft lip/palate in offspring. *Birth defects research*. 2023; 115(5): 545-554. doi:10.1002/bdr2.2146
11. Madhoun LL, Crerand CE, O'Brien M, Baylis AL. Feeding and Growth in Infants With Cleft Lip and/or Palate: Relationships With Maternal Distress. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2021; 58(4): 470-478. doi:10.1177/1055665620956873
12. Penny C, McGuire C, Bezuhly M. A Systematic Review of Feeding Interventions for Infants with Cleft Palate. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2022; 59(12): 1527-1536. doi:10.1177/10556656211051216
13. Silveira D, Martelli DRB, Dias VO, Silveira M, Almeida ILF, Martelli Júnior H. Surgical rehabilitation of cleft lip and/or palate: evaluation of the Brazilian public health system. *Brazilian journal of otorhinolaryngology*. 2022; 88 Suppl 5(Suppl 5): S126-s132. doi:10.1016/j.bjorl.2022.05.008
14. Frederick R, Hogan AC, Seabolt N, Stocks RMS. An Ideal Multidisciplinary Cleft Lip and Cleft Palate Care Team. *Oral diseases*. 2022; 28(5): 1412-1417. doi:10.1111/odi.14213
15. Gershater E, Liu Y, Xue B, et al. Characterizing the microbiota of cleft lip and palate patients: a comprehensive review. *Frontiers in cellular and infection microbiology*. 2023; 13: 1159455. doi:10.3389/fcimb.2023.1159455
16. Cocco JF, Antonetti JW, Burns JL, Heggors JP, Blackwell SJ. Characterization of the nasal, sublingual, and oropharyngeal mucosa microbiota in cleft lip and palate individuals before and after surgical repair. *The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association*. 2010; 47(2): 151-155. doi:10.1597/08-187\_1
17. Moraes GS, Albach T, Sugio CY, de Oliveira FB, Neppelenbroek KH, Urban VM. Experimental animal models for denture stomatitis: A methodological review. *Laboratory animals*. 2022; 56(4): 331-343. doi:10.1177/00236772211069249
18. Jerônimo LS, Esteves Lima RP, Suzuki TYU, Discacciati JAC, Bhering CLB. Oral Candidiasis and COVID-19 in Users of Removable Dentures: Is Special Oral Care Needed? *Gerontology*. 2022; 68(1): 80-85. doi:10.1159/000515214
19. Lirio J, Giraldo PC, Amaral RL, Sarmento ACA, Costa APF, Gonçalves AK. Antifungal (oral and vaginal) therapy for recurrent vulvovaginal candidiasis: a systematic review protocol. *BMJ open*. 2019; 9(5): e027489. doi:10.1136/bmjopen-2018-027489
20. Krezel JD, Friel T, Waia S, Clark P, Taylor PD. Prosthetic Rehabilitation of a Repaired Cleft Palate with Use of a Two-Part Hinged Magnet Retained Removable Prosthesis. *Journal of prosthodontics : official journal of the American College of Prosthodontists*. 2021; 30(5): 454-457. doi:10.1111/jopr.13353
21. Inoue S, Kawara M, Iida T, Iwasaki M, Komiyama O. Influences of differences in tray design and impression material on impression pressure at edentulous mandible. *Journal of oral science*. 2017; 59(4): 505-510. doi:10.2334/josnusd.16-0731
22. Kihara H, Sugawara S, Yokota J, et al. Applications of three-dimensional printers in prosthetic dentistry. *Journal of oral science*. 2021; 63(3): 212-216. doi:10.2334/josnusd.21-0072
23. Mericske-Stern R. Prosthetic considerations. *Australian dental journal*. 2008; 53 Suppl 1: S49-s59. doi:10.1111/j.1834-7819.2008.00042.x
24. Huraib WM, Al-Ghalib TA, Niyazi AAT, Bamigdad MS. Assessment of Nutritional and Psychosocial Status of Elderly Patients Wearing Removable Dental Prosthetics. *Journal of pharmacy & bioallied sciences*. 2022; 14(Suppl 1): S429-s432. doi:10.4103/jpbs.jpbs\_840\_21