

## Conventional prosthetic rehabilitation of cleft lip and palate patients: our experience

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### Abstract

**Background:** The ideal prosthetic treatment for patients with cleft lip and palate begins with closure of the cleft area via bone graft followed by an orthodontic treatment. When this is not possible, there are many prosthetic options, which can be implemented on a case-by-case basis. Conventional prosthetic treatment includes both removable partial dentures (RPDs) and fixed partial dentures (FPDs). The aim of this study is to present our experience in managing cleft lip and palate patients with conventional prosthetic treatments.

**Materials and Methods:** Thirty-eight patients were enrolled in this study, 22 female (57,89%) and 16 male (42,11%) with a mean age of  $32,93 \pm 7,04$  years (age range 22-55), they were all treated for cleft lip and palate and rehabilitated with conventional prostheses. The dental prostheses used, were realized in an interval of time between 2007 and 2013. Removable partial dentures (RPDs) were provided to 10 subjects, while twenty-eight received fixed partial dentures (FPDs) with dental bridges.

**Results:** The Prosthetic rehabilitation of cleft lip and palate patients is directly related to the dysfunctions and alterations determined by their malformation. Re-establishing aesthetics, phonetics and function are the primary goals of oral rehabilitation. Different prosthetic options, depending on dental, periodontal and bone condition can be used to achieve a proper restoration. Removable partial dentures (RPDs) are usually recommended over fixed or implant-supported dentures in patients presenting tissue deficiency, soft palate dysfunction, numerous palatal fistulas and high risk of hypernasal speech.

Fixed partial dentures (FPDs) represent a good option for prosthetic rehabilitation, especially when alveolar bone grafts fail and implant placement is not possible.

**Conclusions:** according to our experience, nowadays, dental implant placement is the gold standard for prosthetic treatment of cleft lip and palate patients. However, when implant treatment is not feasible, conventional prosthetic rehabilitation represents still a valuable option and leads to a proper restoration.

**Keywords:** Cleft lip and palate, Prosthetic rehabilitation, Removable partial dentures, Fixed partial dentures, congenital malformation.

### Introduction

Cleft lip and palate is the most common congenital craniofacial abnormality, occurring in 1 in 500 to 1,000 live births. Multiple genetic and environmental factors have been associated with cleft lip and/or cleft palate formation [1].

Cleft palate (palatoschisis) is a malformation which presents as a fissure present in the hard structure of the upper palate, that can be either of small or large dimensions. When the malformation affects also the lip, it may be referred to as cleft lip (cheiloschisis) and/or cleft lip and palate. The cleft lip and/or palate can be either unilateral or bilateral [1-3].

Cleft lip and/or palate occurs in the setting of multiple genetic and environmental events. There are over 400 genes that are linked to cleft lip and palate formation.

30% of cases are related to one of 400 syndromes and therefore associated to other physical abnormalities, while in the remaining 70% of cases of cleft lip and palate are not associated to other syndromes [3,4].

Two thirds of all clefts include cleft lip, with or without cleft palate, and the remaining third are isolated cleft palates [3,4].

The American Cleft Palate Association guidelines suggest to have a team of specialists that include experts in anaesthesiology, audiology, radiology, genetics/dysmorphology, neurosurgery, nursing, ophthalmology, oral and maxillofacial surgery, orthodontics, otolaryngology-head and neck surgery, paediatrics, paediatric dentistry, physical anthropology, plastic surgery, prosthodontics, psychiatry, psychology, social work, and speech-language pathology [4-6].

The most common complications associated to cleft lip and palate patients consist of rinolalia, the lack of bone in the cleft area, aesthetic and psychological problems, especially concerning interpersonal relationships [5-6].

The primary goal of all cleft surgeons is to restore the normal form and function of lips, nose, and palate while trying to minimize the amount of morbidity, psychosocial impact, and number of surgical procedures necessary as much as possible [5-7].

The surgical protocols vary depending on the type of malformation: different approaches are performed for cleft lip and cleft lip and palate.

In case of unilateral cleft lip a primary cheiloplasty is usually performed during the third – sixth month of life: lip repair is associated also to corrections of nasal defects.

Following this first procedure, a secondary rhinoplasty and revision of the cleft lip can be performed, together with a proper orthodontic treatment.

In cleft palate patients palate repair can be performed with two surgical protocols: the first technique is a two-stage protocol that consists of two separate operations for soft and hard palate repair. Primary closure of the soft palate is realized at 6 months and then hard palate repair can be delayed until the third year of life.

In the second option early soft and hard palate repair is completed together between 6-12 months of age.

Also for cleft lip and palate patients two procedures can be delineated: the two stage repair and the “all in one” technique.

The first option consists in a primary lip, soft palate and rhinoplasty repair at 4-6 months of life, followed by a secondary hard palate repair and gengivoperiosteoplasty (GPP) at 18-36 months .

The second procedure instead consists of the simultaneous hard and soft palate and lip repair [5-7].

To create bone continuity of the alveolar arch in the cleft area a gengivoperiosteoplasty (GPP) is usually performed.

With GPP the surgeon seeks for the alignment and stabilization of the anterior maxilla; the creation of a good alar base support with nasal symmetry; the elimination of oronasal fistulae and mucosal recesses; the spontaneous eruption and maintenance of permanent dentition into and adjacent to the cleft alveolus, preventing the need for secondary alveolar bone grafting [5-6].

Unfortunately despite this technique, dental anomalies in the cleft area may occur as a result of an insufficient bone matrix necessary for the permanent dentition.

In case of GPP failure Secondary Alveoplasty with alveolar bone graft needs to be performed at 8-9 years old, in order to allow a proper restoration of missing teeth.

Indeed, the incidence of dental anomalies in cleft lip and palate patients is between 30% and 50% [8]: upper lateral agenesis, microdontia, dental inclusion of the upper canine and insufficient arch development [8] are the most common.

**Table 1. Inclusion and Exclusion Criteria.**

	Male or female at least 18 years of age
	Cleft and lip palate clinical diagnosis
<b>Inclusion</b>	Agenesis of the upper lateral incisor
	Refuse to consider implant therapy
	Failure of alveolar bone graft
	Mental disorders
<b>Exclusion</b>	Uncontrolled systemic disease
	Untreated oral pathologies
	Pregnancy

The ideal prosthetic treatment of patients with cleft lip and palate begins with closure of the cleft area via bone graft, followed by orthodontic treatment. When this is not possible, there are many prosthetic options, which can be implemented on a case-by-case basis [8].

Conventional prosthetic treatment includes both removable partial dentures (RPDs) and fixed partial dentures (FPDs) [8].

The aim of this study is to present our experience in management of cleft lip and palate patients with conventional prosthetic treatment.

## Materials and Methods

This study was conducted at the Department of Oral and Maxillofacial Sciences, “Sapienza” University of Rome.

The study was open to all patients who met specific inclusion and exclusion criteria (Tab. 1) and signed

informed consent according to the World Medical Association's Declaration of Helsinki.

Thirty-eight patients were enrolled in this study, 22 female (57,89%) and 16 male (42,11%) with a mean age of  $32,93 \pm 7,04$  years (age range 22-55), they were all treated for cleft lip and palate and rehabilitated with conventional prostheses.

Unilateral cleft lip and palate was diagnosed in thirty-two (84,21%) subjects, while six (15,78%) patients had a bilateral cleft lip.

**Figure 1-2. Removable partial denture performed in a 17 years-old woman before definitive implant treatment.**



Dental prostheses were realized in an interval of time between 2007 and 2013, and the mean follow-up was  $36 \pm 8,54$  months (range 24-96 months).

Removable partial dentures (RPDs) were provided to 10 subjects, while twenty-eight received fixed partial dentures (FPDs) with dental bridges.

Patients were all treated surgically prior to receive prosthetic treatment, however, due to personal reasons, 28 patients (73,68%) refused to receive dental implants.

Ten patients (26,32%) were unsuccessfully treated with alveolar bone grafts from the iliac crest.

After failure of secondary alveoloplasty subjects decided to receive a conventional prosthetic treatment.

## Discussion

The Prosthetic rehabilitation of cleft lip and palate patients is directly related to the dysfunctions and alterations determined by the malformation. Re-establishing function, phonetics and aesthetics are the primary goals of oral rehabilitation [8]. Different prosthetic options, depending on dental, periodontal and bone condition can be used to achieve a proper restoration: removable dentures or tooth/implant supported prostheses [8-10]. Prosthodontists experience many adverse conditions in cleft lip and palate patients: lack of occlusal stability, alteration in vertical dimension, absence of keratinized mucosa due to frequent gingival recession and a difficult oral hygiene [10-11]. When carrying out prosthetic treatments, an important consideration to take into account is the presence of palatal fistulas, which connect the oral and nasal cavities

and may cause problems during impression taking. It is important that fistulas are closed temporarily, with lubricated gauze for example, without altering in any way the structure of the tissues to be replicated [10-11]. Nowadays, dental implants placement has become the gold standard for prosthetic rehabilitation of cleft lip and palate patients [12]. According to a recent systematic review authored by Wermker et al. mean dental implant survival rate is 88,6% after five years of functional loading, and implant placement is generally recommended within 4 to 6 months after bone grafting [12]. However, implant treatment is not always accepted for psychological reasons by patients: they are worried about undergoing new surgeries and scared by the possible implant failure [11-13].

Furthermore, implant placement is not feasible in all patients: resorption of the grafted area may occur in 10 to 20% of subjects, leading to failure of alveolar bone grafts. In those cases, a conventional prosthetic rehabilitation is the only available option [11-14].

**Figure 3-4. Fixed partial denture: a six-unit dental bridge was performed in a 34 years-old man, who refused implant surgery.**



Removable partial dentures (RPDs) are usually recommended over fixed or implant-supported dentures in patients presenting tissue deficiency, soft palate dysfunction, numerous palatal fistulas and high risk of hypernasal speech [11-14] (Fig. 1-2). They have a number of benefits such as labial support and avoidance of hygiene problems, and can result in a positive aesthetic appearance [11-14].

Nevertheless, patient satisfaction is often found to be reduced due to the fact that the removable structure accentuates its artificial nature. Fixed partial dentures (FPDs) represent a good option for prosthetic rehabilitation of cleft lip and palate patients, especially when alveolar bone grafts are failed and implant placement is not possible [11-14] (Fig. 3-4).

A three-unit/ six unit dental bridge is performed, preparing as abutments the central incisor and the canine; in case of dental anomalies of teeth adjacent to the cleft the extension of the bridge may be necessary, involving other teeth to ensure a proper relationship root/crown.

## Conclusion

According to our experience, dental implant placement is the gold standard for prosthetic treatment of

cleft lip and palate patients.

However, when implant treatment is not feasible, conventional prosthetic rehabilitation still represents a valuable option and leads to a proper restoration.

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