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# PROSTHETIC MANAGEMENT OF PATIENTS WITH ORO-MAXILLO-FACIAL DEFECTS: A LONG-TERM FOLLOW-UP RETROSPECTIVE STUDY

G. GASTALDI, L. PALUMBO, C. MORESCHI, E.F. GHERLONE, P. CAPPARÉ

*Dental School, Vita-Salute University, Milan, Italy (Dean: Prof. Enrico Felice Gherlone)*

**SUMMARY**

*Introduction*. The aim of this study is to determine the outcome of maxillofacial prosthetic rehabilitation after oncological resections, including both intra- and extra-oral prosthetic devices.

*Methods*. In this study were included 72 patients, who have undergone an intra or extra-oral maxillofacial prosthetic rehabilitation after an oncologic resection.

Tumors on the head and neck were analyzed and the defects of these resections have been divided in two different groups: intra and extra-oral defects.

*Results*. 72 participants were treated with maxillofacial prosthesis, 3 of which with post-traumatic wounds and 69 with resections of tumors on the head and neck. Of the 69 treated for neoplastic disease, 43 received an intraoral prosthesis (palatal obturator) and 29 with an extraoral epithesis (18 with nasal prostheses, 8 with orbital implants and 3 with ear implants).The group included patients with different types of tumors. All the patients were evaluated in terms of aesthetic appearance after the construction of the prostheses and the results were satisfactory.

*Conclusion*. Within the limitations of this study, after the use of maxillofacial protheses patients feel more confident and self-assured. Maxillofacial protheses are a good solution in order to improve the life's quality in patients with tumors resections: prostheses are easy to handle and provide a satisfying social interaction for the patients.

**Key words:** maxillofacial, cancer, defect, prosthodontics.

## Introduction

In the last years, an increase of oral-pharynx cancer has been registered. Tumors of oral-cranial-facial area, with 6% of prevalence, are placed at 6th position of malignant tumors ranking. The survival rate of a localized tumor at 5 years is around 82% (1, 2).

Males are more affected than women, 2:1. The therapy, based on the onset place and stage, can be divided in surgery, chemiotherapy, radiotherapy or a combination of these actions (3-5). The resections of these tumors can produce defects of the oral and nasal cavities, nasopharynx, oropharynx and extra-oral defects.

The defects can be divided in two different groups: intra and extra-oral results. The most frequent intra-oral defects are related to the loss of palatal portion.

Optimal aesthetical and functional reconstruction in the head and neck area is important for the social integration and the quality of life of patients (6).

Extended craniofacial defects can led to wide functional and psychosocial impairment in patients. Functional limitations can affect vision, speech, mastication and swallowing (7).

The postsurgical defects are critical in many ways, leading to these patients retracting from their fam-

ily and society and living a life of esclusion and depression (7).
After the surgical resection, a rehabilitation is needed. Reconstruction of the resulting defects can be achieved by means of reconstructive plastic surgery and/or maxillofacial prostheses.
The restoration of defects (8) can be traditionally achieved with the aid of the conventional surgery; disadvantage, however, is the necessity for multiple procedures (9, 10). In addition, surgical reconstruction may be limited by general medical condition, insufficient residual tissue, vascular compromise subsequent to radiation, age, inadequacy of the donor sites, or patient preference. It is not always possible to reconstruct the defect with a surgical approach (11).
In these cases, prosthetic rehabilitation become the first choice treatment (12). The rehabilitation with maxillofacial prothesis aims to restore an effective division between oral, nasal or orbital cavities and gives faster reconstructive possibilities, simplifying the post-surgery period and trying to recover an adequate patient lifestyle.
A collaboration between surgeon, prosthodontist and technician is required to realize an obturator prothesis immediately after surgery, in order to improve the wound healing and the integration with the patient tissue (13).
Nevertheless, more protocols are needed in order to improve the predictability of results and guidelines are necessary.
The aim of this study is to determine the successful of maxillofacial prosthetic rehabilitations after oncological resections or post traumatic results, including both intra- and extra-oral devices.

## Materials and methods

In this retrospective study were included 72 patients, who have undergone an intra or extra-oral maxillofacial prosthetic rehabilitation after an oncological resection or post traumatics results, treated within the San Donato Hospital Group, Italy.
Tumors on the head and neck were analyzed and the defects of these resections can be divided in two different groups: intra and extra-oral.
Patients with extra-oral lesions have been treated immediately after the end of the healing process with an epithesis: an impression in alginate (Hydrogum 5, Zhermack, Rovigo, Italy) was performed, using a wet gauze to prevent material from infiltrating into the cavities. In many cases, it was considered necessary to ensure completion of a temporary prosthesis; despite the aesthetic limitations, this solution could be helpful in improving the patient's psychological aspect.
Even for the intra-oral restorations, the palatal obturator has been realized after an alginate (Hydrogum 5, Zhermack Rovigo, Italy) impression for the realization of temporary prosthesis: the palatal obturator has been made of an acrylic resin on the patient casts; it was later refined with methyl methacrylate (Ivocron, Ivoclar Vivadent, Bolzano, Italy) and refined with soft materials directly in the oral cavity in order to adapt the prosthesis to the defect. Patients were included in a very detailed follow-up program (every 7 days) for 30-45 days. When the healing process was complete, more accurate impressions were taken with polysulfide using the palatal obturator as a guide; the final restoration can also contain the teeth.

## Results

Seventy-two participants were treated with maxillofacial prosthesis, 3 of which with post-traumatic wounds and 69 with resections of tumors on the head and neck.
Of the 69 treated for neoplastic disease, 43 received an intraoral prosthesis (palatal obturator) and 29 with an extraoral epithesis (18 with nasal prostheses, 8 with orbital implants and 3 with ear implants).
The group included patients with different types of tumors (Chart 1, Table 1), respectively:
- 36% squamous cancer
- 20% basal cell carcinoma
- 16% adenoid cystic carcinoma

- 11% mucoepidermoid carcinoma
- 17% others.

In total 30 patients were treated with radiotherapy, 4 with radio- and chemotherapy, 10 were not treated with radiation and 28 are not available for the series.

The radiation dose was calculated around 12-70 Gy.

No case of osteoradionecrosis was documented in our study group; no complications like oral lesions, sensibility impairment, or wound infections were observed at medium-term follow-up.

Any implant failure or soft tissue reactions have been observed in our study group.

All the patients were evaluated in terms of aesthetic appearance after the construction of the prostheses and the results were satisfactory (Figures 1-5).

The patients had to receive a new epithesis 1-2 years after anchorage of the initial epithesis, especially due to deterioration of the colour and quality.

The follow-up ranged from 2.5 to 7.8 years (mean 5.6 years ± 2.8).

The patient survival rate was 93.06% (5 patients died).

**Figure 1**
Frontal view of the patient after surgical resection.

## Discussion

In this study 72 patients were treated, 3 of them with post-traumatic results and 69 with resections of head and neck tumors. According to the literature, studies have shown that an unrepaired maxillary defect can result in high incidence of hypernasality (14, 15) and low speech intelligi-

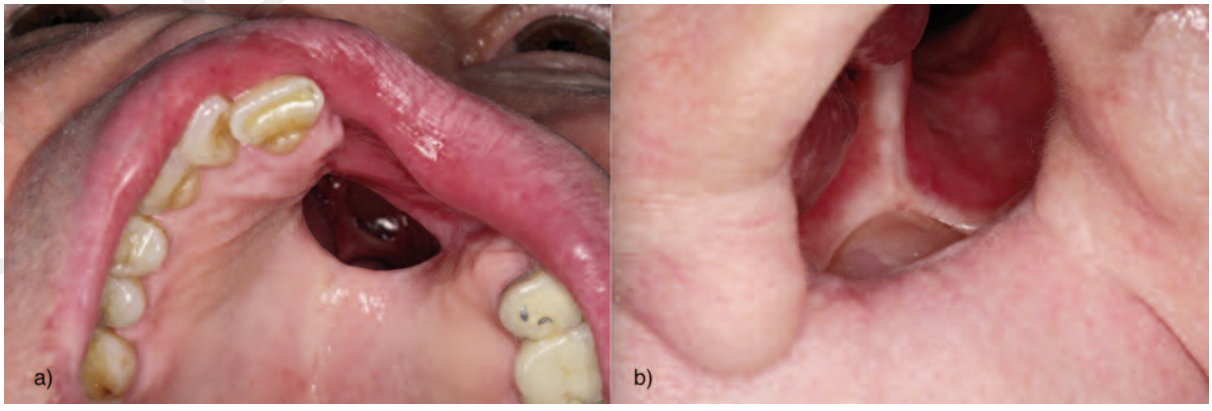


**Figure 2**
Detail of defects: a) intraoral view of oro-nasal defect; b) frontal view of nasal defect.

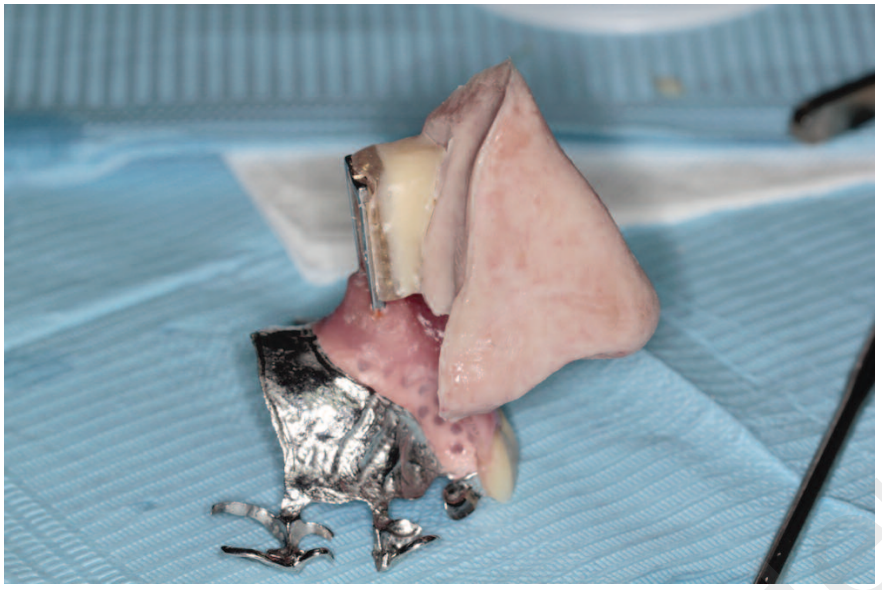

**Figure 3**
A lateral view of palatal obturator prosthesis with extension for epithesis attachment.

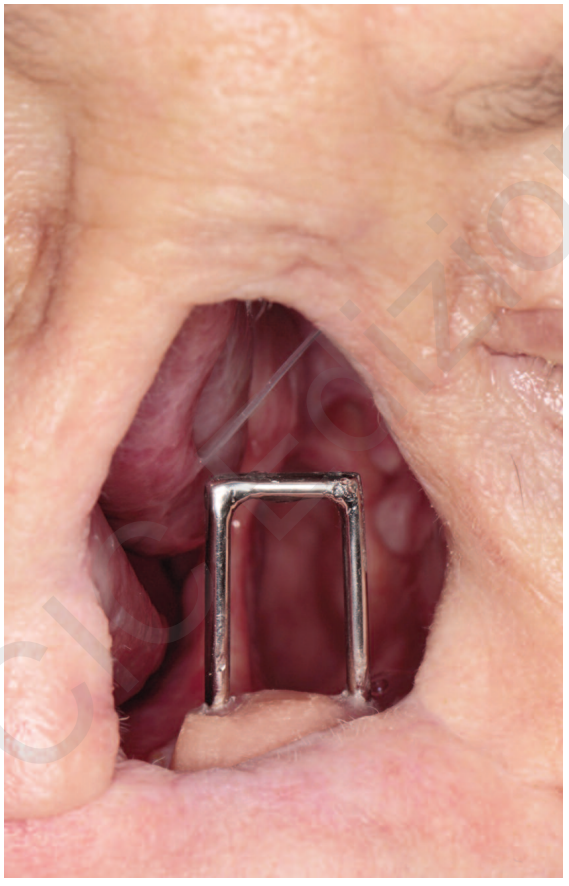

**Figure 4**
The epithesis allows both prompt inspection of the resection site and makes daily care easier.

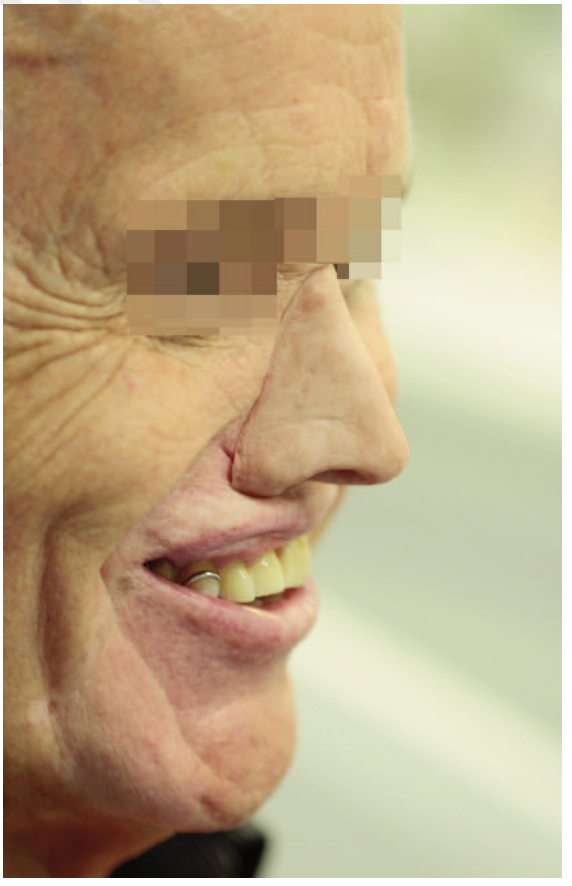

**Figure 5**
Frontal view of the patient after superior intraoral prosthesis and nasal epithesis delivery.

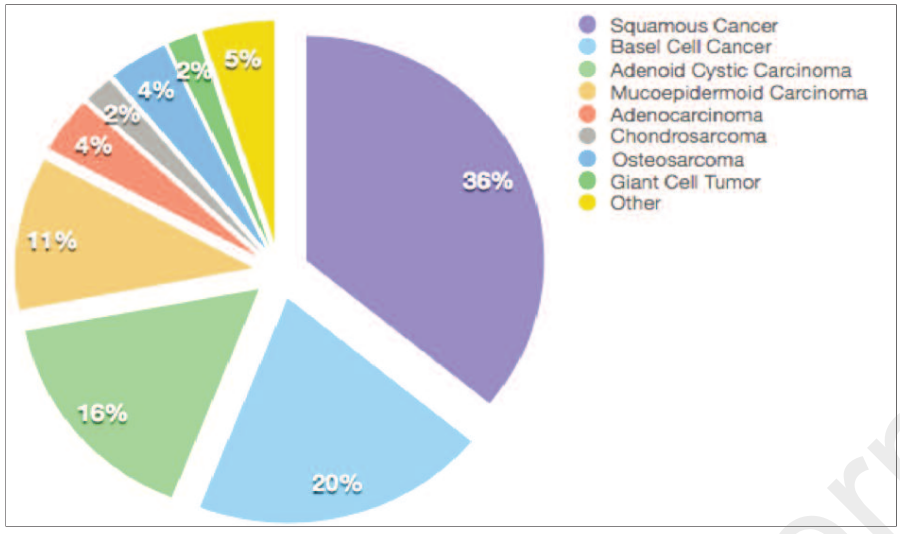


**Chart 1.**
Distribution of tumors

**Table 1** - The percentage of cancer's type.

| | |
|---|---|
| Squamous Cancer | 36 |
| Basel Cell Cancer | 20 |
| Adenoid Cystic Carcinoma | 16 |
| Mucoepidermoid Carcinoma | 11 |
| Adenocarcinoma | 4 |
| Chondrosarcoma | 2 |
| Osteosarcoma | 4 |
| Giant Cell Tumor | 2 |
| Other | 5 |

bility (14, 16). This is due to inadequate separation of the oral and nasal cavities. After prosthetic treatment, speech were improved. However, maxillary obturators have been cited as being uncomfortable to wear and some patients find them inconvenient to remove and clean (17, 18). The success of a prosthesis is related to the extent on the size and location of the maxillary defect, as well as the presence of remaining dentition (10). These factors can affect the stability of the prosthesis influencing its effectiveness. Maxillary obturators require that a maxillofacial prosthodontist be available for construction and maintenance of the prosthesis (15, 18).
With regard to functional and aesthetic aspects, combination of dentures linked to extraoral facial prostheses, enabled optimal orofacial rehabilitation. Oral functions such as chewing, swallowing and speaking were facilitated by the dentures which at the same time worked as a stabilisation element for the prostheses.
The facial prostheses were individually adapted in order to resemble the familiar preoperative appearance of the patient.
The available ways of prostheses anchorage are four (19, 20): the anatomical (to already existing structures), the mechanical (to spectacle frames), the chemical (using adhesive) and the surgical anchorage (by osseointegrated titanium implants with magnets).
The use of fixed facial prostheses is based on a close cooperation between prosthodontic and surgeon to provide the optimal aesthetic and functional outcome.
Maxillofacial prostheses is appropriate (21) in the cases of large midfacial defect after a disfiguring cancer surgery, since it is very difficult if not impossible to reconstruct these defects by the grafting techniques using autogenous tissue and to achieve satisfactory results.
Orofacial rehabilitation of patients with maxillofacial defects using obturator prostheses is an appropriate treatment modality. To improve the situation of patients prior to and after maxillectomy sufficient information about the treatment, adequate psychological care and speech therapy should be

provided.
With the use of obturator protheses and/or epithesis, patients regain self-confidence and assurance. The patients recounted a high level of satisfaction and a positive impact on daily life. According to Sullivan et al., Wondergem et al. and Rieger et al., the goal of any intervention, whether surgical or prosthetic, is to limit the impact of the oncologic treatment on these aspects of patients' lives.
One of the main pros reported by patients is the fact that they are submit to surgery only-once reaching the same result as the surgery. On the other hand, disadvantages and limitations of these prostheses include discoloration (as regards epithesis) and prostheses deterioration and skin reactions (19, 20).
According to our experience, an intra- or extra oral prostheses rehabilitation should be favored over a plastic reconstruction in the cases of the previous multiple necessary plastic operations, due to prior huge surgical resection which makes the surgical reconstruction technically impossible, or in cases, the patients prefer the prosthetic solution.
Nevertheless, further studies are needed in order to draft new guidelines. It is expected that future improvements in techniques of implantation and virtual technique for optical 3d acquisition (22, 23) will further improve the overall satisfaction and wellbeing of the patients, but this requires a well-considered approach and close collaboration between the surgeon and the prosthodontics (15).

## Conclusion

The clinical use of fixed facial prostheses is based on a close cooperation between surgeon and prosthodontist to provide the optimal aesthetic and functional outcome.
Within the limitations of this study, after the use of maxillofacial protheses patients feel more confident and self-assured. Maxillofacial protheses are a good solution in order to improve the life's quality in patients with tumors resections: prostheses are easy to handle and provide a satisfying social interaction for the patients.

## Authors' contributions

Giorgio Gastaldi: clinical procedures, conception and design, drafting the article.
Luca Palumbo: drafting the article, data analysis.
Chiara Moreschi: data acquisition and analysis.
Enrico F. Gherlone: critical revision, final approval.
Paolo Capparé: drafting the article, critical revision, clinical procedures.

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*Correspondence to:*
Dr. Paolo Capparé
Department of Dentistry
IRCCS San Raffaele Hospital
Via Olgettina 48
20132 Milan, Italy
Phone: 0039 0226433619; fax 0039 0226432953;
E-mail: cappare.paolo@hsr.it