CASE REPORT

MAXILLOFACIAL PROSTHESES IN THE AESTHETIC-FUNCTIONAL REHABILITATION OF CANCER PATIENTS

PRÓTESES BUCOMAXILOFACIAIS NA REABILITAÇÃO ESTÉTICO-FUNCIONAL DE PACIENTES ONCOLÓGICOS

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ABSTRACT

Introduction: Maxillofacial prostheses are a therapeutic option for the repair of affected structures in the facial and/or intraoral region of cancer patients undergoing surgery. **Objective:** To report the use of oral and maxillofacial prostheses in the aesthetic and functional rehabilitation of cancer patients. **Case reports:** The first two cases illustrate extraoral rehabilitations using silicone adhesive prostheses, both in female patients. The first one is an 83-year-old patient, diagnosed with basal cell carcinoma in the right nasal wing, submitted to surgical resection and rehabilitated with nasal prosthesis 7 months ago. The second case is a 51-year-old patient diagnosed with multiple sclerodermiform basal cell carcinomas, treated with surgery and rehabilitated with a facial prosthesis. The third case addresses the rehabilitation of a 58-year-old female patient, diagnosed with squamous cell carcinoma on the hard palate, treated with surgery and radiotherapy, rehabilitated with a palatal obturator prosthesis made of polymethylmethacrylate. **Conclusion:** The presented cases show oral maxillofacial prostheses as essential tools for reestablishing aesthetics and function in cancer patients, as well as their contribution to psychological issues, to the process of reinsertion into social life, and to improving the quality of life of these individuals. Furthermore, they confirm the importance of inserting the dentist in the multidisciplinary oncology team, with an emphasis on postoperative rehabilitation through maxillofacial prostheses.

Keywords: Maxillofacial Prosthesis; Oncology; Patient Care Team; Surgical Oncology; Dental Care for the Chronically Ill

RESUMO

Introdução: As próteses bucomaxilofaciais são uma opção terapêutica para o reparo de estruturas afetadas na região facial e/ou intraoral do paciente oncológico submetido à cirurgia. **Objetivo:** Relatar a utilização de próteses bucomaxilofaciais na reabilitação estético-funcional de pacientes oncológicos. **Relato dos casos:** Os dois primeiros casos ilustram reabilitações extraorais por próteses adesivas de silicone, ambos em pacientes do sexo feminino. O primeiro trata-se de uma paciente de 83 anos, com diagnóstico de carcinoma basocelular em asa nasal direita, submetida a ressecção cirúrgica e reabilitada por prótese nasal há 7 meses. O segundo, de uma paciente de 51 anos, diagnosticada com múltiplos carcinomas basocelulares esclerodermiformes, tratada com cirurgia e reabilitada há 8 meses com prótese facial. O terceiro caso aborda a reabilitação de uma paciente do sexo feminino, 58 anos, diagnosticada com carcinoma de células escamosas em palato duro, tratada com cirurgia e radioterapia, reabilitada há 1 ano e 6 meses com prótese obturadora de palato feita de polimetilmetacrilato. **Conclusão:** Os casos apresentados evidenciam as próteses bucomaxilofaciais como ferramentas essenciais no reestabelecimento da estética e função dos pacientes oncológicos, bem como a sua contribuição nas questões psicológicas, no processo de reinserção no convívio social e na melhora da qualidade de vida destes indivíduos. Além disso, ratificam a importância da inserção do cirurgião-dentista na equipe multiprofissional em oncologia, com ênfase na reabilitação pós-operatória através das próteses bucomaxilofaciais.

Palavras-chave: Prótese Maxilofacial; Oncologia; Equipe de Assistência ao Paciente; Oncologia Cirúrgica; Assistência Odontológica para Doentes Crônicos

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INTRODUCTION

Malignant neoplasms involving the head and neck region are a heterogeneous group (1,2) and can encompass an extensive variety of anatomical sites, such as skin, oral cavity, nasopharynx, hypopharynx, larynx, paranasal sinuses, and salivary glands (1-5). According to data released by GLOBOCAN, 19.3 million new cases of cancer were estimated in 2020; for 2040, the projection is 28.4 million new cases (6). For Brazil, it is estimated that 625,000 new cases will occur each year in the triennium 2020-2022 (7).

The treatment for these neoplasms can involve surgery, radiotherapy or chemotherapy, isolated or combined, according to the type, location and staging of the tumor (1,3,5). Surgical resection is the standard treatment when considering oral cavity tumors, and it can be associated with adjuvant chemotherapy and/or radiotherapy (1). In other sites, surgery is usually reserved for resectable primary tumors that have surgical access and allow free and wide margins (1,3,5). Despite its relevance, surgery often results in mutilations with considerable aesthetic and functional implications (8).

In this context, maxillofacial prostheses (MFP) are made to repair the affected structures in the facial and/or intraoral region of the patient. Thus, they contribute to the reestablishment of aesthetics, mimicking the removed structures and, in some cases, to the rehabilitation of essential functions such as speech, chewing and swallowing, also protecting the exposed tissues (9,10). The type and material of the MFP vary according to the site of the tumor, and may be of the palatal, nasal, facial, ocular, orbital, auricular or pharyngeal type (9,10) being made of glass, acrylic resin (polymethacrylate) and/or silicone (11). Therefore, MFP play a key role in the nutrition, systemic condition and quality of life of these individuals (12). Thus, the aim of this study was to report the use of oral and maxillofacial prostheses in the aesthetic-functional rehabilitation of cancer patients, treated at the Section of Stomatology-Dentistry and Prosthesis of the Hospital do Câncer I, Instituto Nacional de Câncer José Alencar Gomes de Almeida, Brazil.

CASE REPORTS

This is a descriptive, retrospective study of case series in which MFP (nasal, facial and obturator) were used for the esthetic-functional rehabilitation of oncologic patients, treated at the Section of Stomatology-Dentistry and Prosthesis of the Hospital do Câncer I, Instituto Nacional de Câncer José Alencar Gomes de Almeida, Brazil. This study was approved by the Ethics Committee (CAAE: 48142721.1.0000.5274, opinion no. 4.938.705), and the patients read and signed the informed consent form.

Case 1

An 83-year-old female patient diagnosed with basal cell carcinoma in the right nasal wing (T1N0M0), who underwent surgical resection (exeresis of the left malar region and the tip of the nose). One year after surgery an acrylic nasal prosthesis was made; however, the patient did not adapt to it, interrupting the use. For this reason, an adhesive silicone prosthesis was made, which was well accepted by the patient, presenting good adaptation of the margins and good aesthetic results. After 1 year, it was necessary to replace the prosthesis due to deterioration of the margins and fungal colonization. Figure 1 shows the current nasal prosthesis, which is the second adhesive silicone prosthesis, with 7 months of use, also showing good aesthetic results and good adaptation.

Case 2

Female patient, 51 years old, diagnosed with multiple sclerodermiform basal cell carcinomas, treated with surgery (extended exenteration of left orbit). After 6 years, she underwent plastic reconstruction of the surgical wound. She was rehabilitated with a facial prosthesis on the left side (orbital, nose wing and malar region), adhesive silicone, which has been in use for 8 months, with good adaptation, acceptance and aesthetics, using it mainly for social interaction (Figure 2).

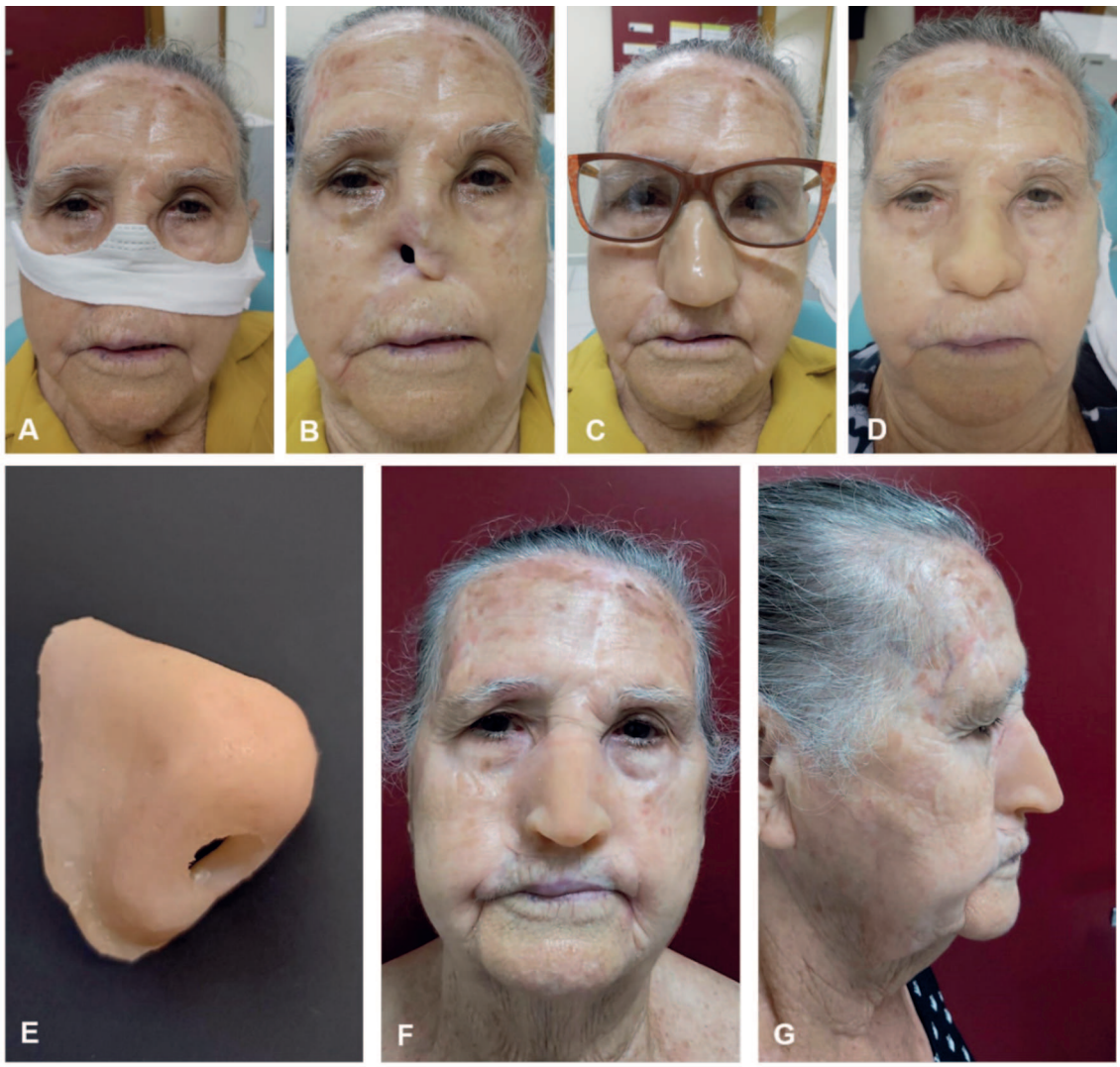

Figure 1: *Case 1, rehabilitation with nasal prosthesis.* **A**- *Front facial photograph without prosthesis, with wound dressing;* **B**- *Frontal photograph of face without the prosthesis;* **C**- *Frontal photograph of the face with initial acrylic prosthesis supported on glasses;* **D**- *Frontal photograph of face with the first silicone adhesive prosthesis;* **E**- *Photograph of the first silicone adhesive prosthesis;* **F**- *Frontal photograph of face with the second silicone adhesive prosthesis;* **G**- *Right profile photograph of face with second silicone adhesive prosthesis.*

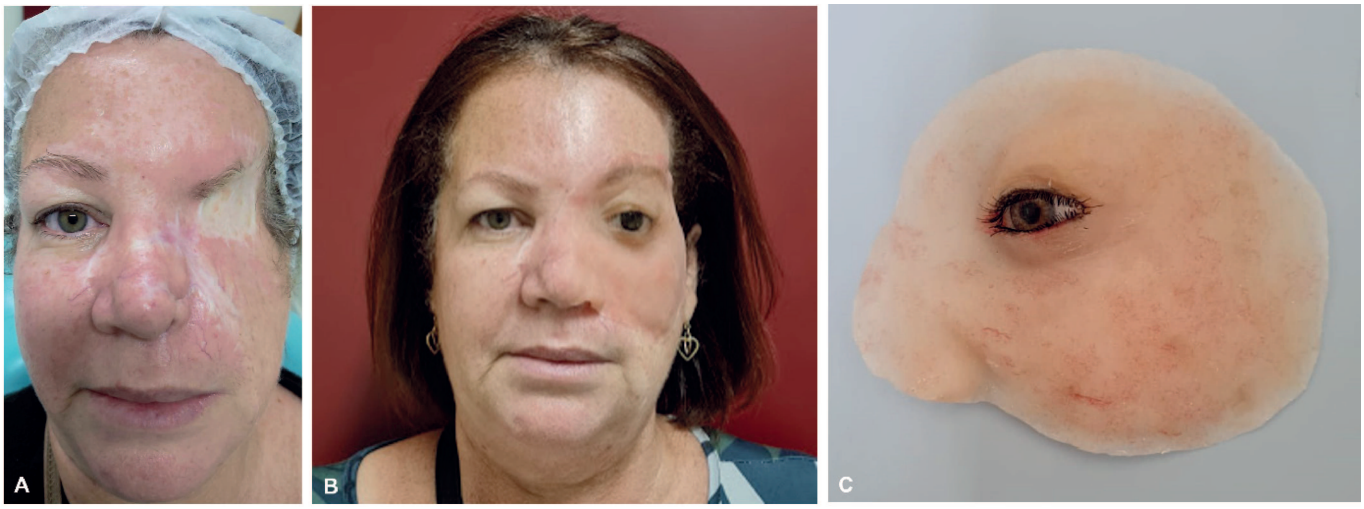

Figure 2: *Case 2, rehabilitation with facial prosthesis.* **A**- *Front facial photograph without the prosthesis;* **B**- *Front facial photograph with the prosthesis;* **C**- *Photograph of the silicone adhesive prosthesis.*

Case 3

A 58-year-old female patient was diagnosed with squamous cell carcinoma of the hard palate (T2N0M0). The treatment used consisted of surgery (bilateral infrastructure maxillarectomy) and adjuvant radiotherapy (66 Gy in 33 fractions). During the surgical procedure a surgical plate was installed and used for 4 months. After completion of radiotherapy, because the patient was edentulous, a removable upper obturator and lower conventional prosthesis were fitted. The patient had regular follow-up to control the prostheses, and currently, after 1 year and 6 months, she has well-fitting prostheses, with good retention, no complaints of pain, good chewing performance, good aesthetics and phonation (Figure 3)

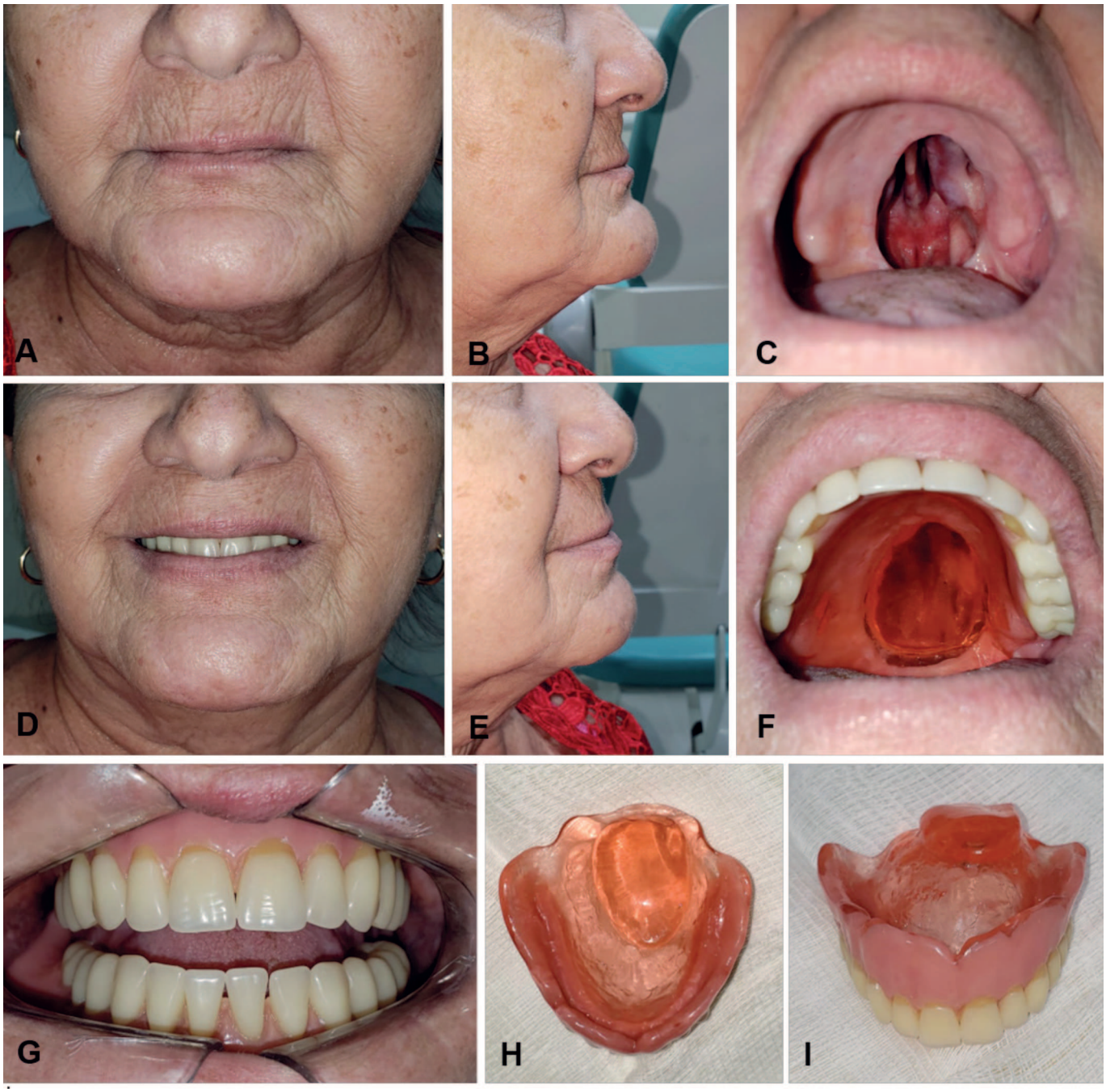

Figure 3: *Case 3, rehabilitation with removable total prosthesis, obturator for the upper jaw and conventional for the lower.* **A**- *Frontal extraoral photograph without prosthesis;* **B-** *Right profile extraoral photograph without prosthesis;* **C**- *Intraoral photograph of the palate, showing bucosinusal communication;* **D**- *Frontal extraoral photograph with prosthesis;* **E**: *Right profile photograph with prosthesis;* **F**: *Intraoral photograph of the palate with upper obturator prosthesis;* **G**: *Frontal intraoral photograph with removable total prosthesis;* **H**: *Upper view of the obturator prosthesis;* **I**: *Frontal view of the obturator prosthesis.*

DESCRIPTION OF TECHNIQUES

Nasal prosthesis

1. Patient image registration, with Frontal and profile photographs;
2. Modification and try-in of the prefabricated metal perforated tray (Tecnodent) (Figure 4.A);
3. Molding the area that will be reconstructed by the prosthesis and of adjacent structures that will serve as aesthetic reference (as for example the eyes and eyebrows) with alginate type II (Avagel, Dentsply Sirona) (Figure 4.B);
4. Disinfection of the mold with sodium hypochlorite and version in plaster type 4 (Dent-mix, Asfer) for making the model of the patient's face;
5. Markings the lines and reference points on the model for waxing the prosthesis: midline, labial commissure, bipupillary line, among others, according to the type of facial prosthesis;
6. Wax up of the amputated area with red wax 7 (Clássico), using the photographs as reference;
7. Wax up trial and adjustment on the patient's face (Figure 4.C and 4.D);
8. Choice of material for making the prosthesis: acrylic resin or silicone;

Acrylic resin (Thermopolymerizable acrylic resin no. 1, Clássico):

9. Choice of the color for intrinsic pigmentation through the personalized colorimetric scale (Figure 4.E). Intrinsic pigmentation must be carried out with Policôr dye or Lentaflex skin color base (Clássico);
10. Inclusion of the model and the wax up in a muffle with common plaster, removal of the wax and acrylization of the prosthesis (Figure 4.H);
11. Finishing by removing excesses with burs and sandpaper, followed by polishing with fiber sponge and detergent;
12. Try-in of the prosthesis on the patient's face and adjustments, if necessary;
13. Fixation with self-curing acrylic resin (Clássico) of the prosthesis in the patient's glasses and delivery of the prosthesis.

Silicone (silicone elastomer Dragon Skin 10, Polisil):

9. Choice of color for intrinsic pigmentation through the custom colorimetric scale (Figure 4.F and 4.G). The intrinsic pigmentation should be done with make-up base and Siq floc chamois powder (Siquiplás) red and gold until reaching the desired color;
10. Inclusion of the model and the wax-up in a muffle with common plaster, removal of the wax and vulcanization of the prosthesis (Figure 4.H);
11. Try-in of the prosthesis on the patient's face with adjustments if necessary;
12. Extrinsic pigmentation with make-up, finished by spraying a mixture (1:1) of transparent acetic silicone (Tekbond) with self-curing acrylic liquid (Clássico);
13. Application of the glue for Ultra Hold hair prosthesis (Walker Tape) on the internal part of the prosthesis, positioning on the patient's face and delivery of the prosthesis.

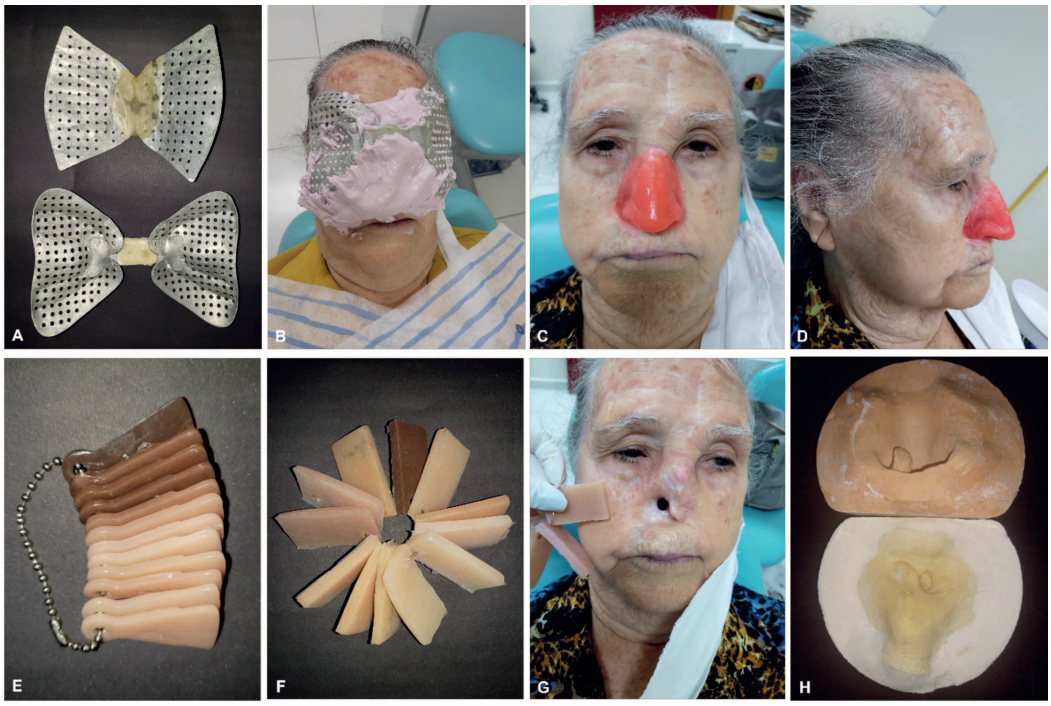

Figure 4: **A**- *Prefabricated perforated metal trays modified for molding of MFP;* **B**- *Molding with alginate;* **C**- *Frontal view of the waxed-up trail of the prosthesis;* **D**- *Right profile view of the waxed-up trial of the prosthesis;* **E**- *Customized colorimetric scale for intrinsic pigmentation of MFP made of acrylic resin;* **F**- *Customized colorimetric scale for intrinsic pigmentation of MFP made of silicone;* **G**- *Choice of the color for intrinsic pigmentation through the customized colorimetric scale;* **H**- *Inclusion of the model and the wax-up in muffle;*

Facial prosthesis (which involves the rehabilitation of the ocular region)

1. Registration of the patient's image, with Frontal and profile photographs;
2. Choice of size and color of the iris, and painting with acrylic paint (Acrilex) on prefabricated eye socket (Clássico) (Figure 5.A);
3. Wax-up of the ocular prosthesis with transparent wax 7 (Clássico), inclusion in a muffle with common plaster, removal of the wax and acrylization of the ocular prosthesis;
4. Make the facial prosthesis, following the same technique described above. The ocular prosthesis, previously made, must be positioned at the moment of waxing;
5. Choose the color for the intrinsic pigmentation (Figure 5.B). After the intrinsic pigmentation and vulcanization of the facial prosthesis (Figure 5.C), we continue with the characterization, through the insertion of eyelashes and eyebrow:
    a. Eyelashes: adaptation and gluing with transparent acetic silicone (Tekbond) of false eyelashes on the internal part of the prosthesis in the region of the mobile eyelid (Figure5.D);
    b. Eyebrow: insertion of synthetic hair, one by one, with a needle (40x1.2mm or 30x0.80mm), giving the size and shape similar to the eyebrow of the opposite hemiface;
6. Trial fitting of the prosthesis on the patient's face, adjustments and extrinsic pigmentation with make-up (following the same technique described for the nasal prosthesis), if necessary;
7. Application of the glue for Ultra Hold capillary prosthesis (Walker Tape) on the internal part of the prosthesis and positioning on the patient's face and delivery of the prosthesis.

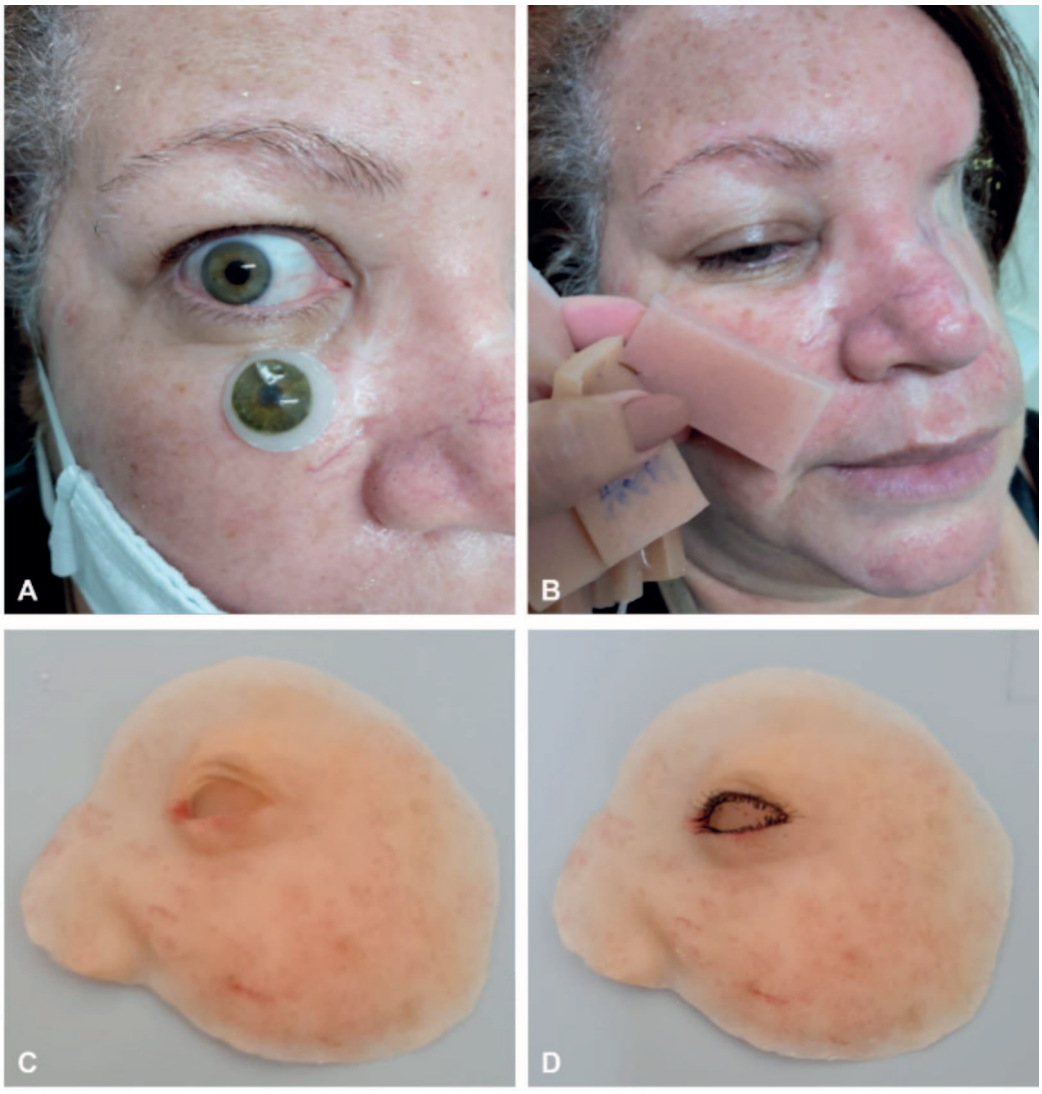

Figure 5: A- *Choice of size and color of the iris;* **B**- *Choice of the color for intrinsic pigmentation through the personalized colorimetric scale;* **C**- *Appearance of the facial prosthesis after intrinsic pigmentation and vulcanization;* **D**- *Appearance of the facial prosthesis after eyelash placement.*

Obturator prosthesis

1. Selection of prefabricated perforated tray (metallic or plastic);
2. Protection of the bucosinusal communication with moist cotton, aiming to reduce retention and the risk of tearing of the impression material and anatomical impression with alginate type II Avagel (Dentsply Sirona);
3. Disinfection of the mold with sodium hypochlorite and version in plaster type 4 Dent-Mix (Asfer) for making the study model;
4. Delimitation of the plating area and making of individual perforated tray in self-cured acrylic resin (Clássico);
5. Functional impression with the individual tray and condensation silicone;
6. Disinfection of the mold with sodium hypochlorite and version in plaster type 4 Dent-Mix (Asfer) for making the working model;
7. Confection of the base plate in self-cured acrylic resin (Clássico) and wax plans 7 red (Clássico);
8. Testing of the base plate with the wax planes on the patient and determination of the vertical dimension of occlusion using the Fox ruler and marking of the reference lines on the wax planes: midline, canine line/nose wing distance and high smile line;
9. Choice of tooth shade (Trilux scale) and mounting of teeth on the wax plane;
10. Testing the teeth mounted on the wax plane on the patient;
11. Inclusion in muffle with common plaster, wax removal and acrylization of the prosthesis with acrylic resin heat-curing (Clássico);
12. Finishing by removing excesses with burs and sandpaper, followed by polishing with pumice stone, cloth wheel and brush;
13. Testing of the prosthesis, adjustments and delivery.

DISCUSSION

The post-surgical rehabilitation is an essential part of the treatment plan - for functional, aesthetic and psychological issues - directly influencing the social life, reducing anxiety, improving self-esteem and quality of life of cancer patients (8,9). This rehabilitation can be done both through reconstructive surgeries and MFP (10).

The reconstructive surgeries, despite being a viable option and sometimes with satisfactory results, need specific conditions for its realization, being commonly contraindicated in cases with extensive losses, impairment of the patient's general condition, age extremes, economic limitations or even reluctance of the patient to undergo new surgical procedures (13). Moreover, in cases of surgery associated with adjuvant radiotherapy, the irradiated site becomes less vascularized, impairing the performance of reconstructive plastic surgery, since the area is altered, which males difficult the use of grafts (13).

On the other hand, MFP stand out and represent devices capable of reestablishing aesthetics and in some cases function. In addition, since they are removable devices, they allow direct observation of the surgical wound and, therefore, facilitate the observation of a possible disease recurrence (9). Among other advantages, they also allow for early rehabilitation, reduced hospitalization time, reduced use of nasoenteral tube, and consequently, decrease treatment cost (10).

The type and functionality of the MFP depend directly on the area that will be rehabilitated, and it can be: palatal obturator, nasal, facial, ocular, orbital, auricular or pharyngeal (9,10). The nasal, facial and orbital are key in protecting the surgical defect (14), thus avoiding the accumulation of residues in the region and the consequent development of secondary infections. In addition, they are essential in reestablishing aesthetics and its psychosocial consequences, as can be observed in the cases described.

The material for making the MFP will depend on factors related to the patient, the post-surgical anatomy, and the type of prosthesis. The ocular ones in particular can be made of glass or acrylic resin (polymetacrylate), the second one being the most used; the facial ones, of acrylic resin or silicone (11) and the obturators of acrylic resin. The fixation of these prostheses can be done only by anatomy or by means of auxiliary devices, such as magnets, implants, pericranial springs, adhesive, glasses frames, or even by the combination of more than one mean of retention (10,15). Thus, the choice of material should be made case by case, taking into account these variables and their respective advantages and disadvantages.

Facial prostheses made of acrylic resin are usually less expensive, more durable, and require less skill for correct positioning. However, because it is a more rigid material, they are less adaptable to facial movements, less aesthetic due to the shine generated by polishing, have thicker and more visible margins, and may easily fracture. Moreover, they generally require glasses for positioning and fixation (15), adding this cost for patients who do not use the device regularly. Such characteristics may hinder the patient's adaptation to the acrylic facial prosthesis, as observed in case 1.

Another material option for facial prostheses is silicone. It is gaining prominence, especially because of its easy handling and physical properties, such

as its stability when exposed to heat, its chemical inertness, its hydrophobicity, its repellency against organic materials, and its flexibility. Moreover, it is well tolerated by the mucosa and skin, allows the reconstruction of details, the making of thinner and less noticeable margins, and a greater similarity with the skin in terms of texture, brightness and color; it also allows a better adaptation of the margins, is relatively durable and resistant to friction (15). Another advantage is the possibility of extrinsic pigmentation with makeup, improving the aesthetics and masking the margins of the prosthesis.

Despite such advantages, silicone facial prostheses have a significantly higher cost, require the patient to use a specific glue (which also impacts the overall cost of the prosthesis), as well as manual dexterity for correct positioning and adaptation of the margins, which may represent an additional difficulty for elderly patients or those with motor difficulties (15). Furthermore, it is worth mentioning that sweating may interfere with the gluing power during use, and that some patients may present allergy to the glue fixative, which implies on the use of silicone prosthesis (15).

The average duration of the silicone MFP is usually from 8 months to 1 year (16), shorter when compared to the acrylic resin ones; although it does not fracture, as the acrylic does, it may suffer tearing and deterioration of the margins, colonization by fungus, pigmentation change and increase of the surface porosity, as observed in case 1. In this same sense, the importance of cleaning these prostheses should be emphasized: for it to be done properly, it is necessary to completely remove the skin and prosthesis layers, and this is not always possible (especially when the patient with MFP has less manual dexterity or less instruction), thus making the MFP more susceptible to fungal colonization and odor (especially in nasal prosthesis, in which moisture and secretion from the nasal cavity contribute to the development of this condition). Consequently, an ineffective cleaning results in a shorter durability.

As for obturator prostheses, their main function is to seal the bucosinusal communication and consequently, to prevent the passage of food and air, contributing directly to chewing, swallowing and phonation (9,10). In the case specifically reported, since the patient was edentulous, the dental elements were also included in the prosthesis, allowing, in addition to the filling of the oral sinus communication, the reestablishment of a solid diet. Moreover, the prosthesis also restored aesthetics, both by recomposing the smile and by the buccal volume and lip repositioning.

In this context, the insertion of the dental surgeon in the multidisciplinary oncology team is of fundamental importance, and these professionals are responsible for dental care before, during, and after oncological treatment, in order to prevent, diagnose, and treat oral toxicities (17). Included in this scenario are the dental surgeons trained by the multidisciplinary residency programs in oncology (18) and the specialists in MFP. According to the article 66 of the resolution 185 of Brazilian Federal Council of Dentistry, dated April 26, 1993, “the oral and maxillofacial prosthesis specialty has as objective the anatomical, functional and aesthetic rehabilitation, by means of alloplastic substitutes, of regions of the maxilla, mandible and face that are absent or defective as a consequence of surgery, trauma, congenital malformations or developmental disorders” (19). However, still in 2021, the same Council has only 64 professionals registered as specialists in this area (20).

Thus, the report of these cases aims to disseminate the use and importance of MFP to the general population, encouraging the search for qualified professionals, and allowing more patients to this benefit. Likewise, this study becomes relevant in the sense of making the academic, scientific and clinical communities aware of their role in the rehabilitation process of cancer patients using the MFP.

CONCLUSION

Through the three cases presented, this study shows that MFP are essential tools for restoring aesthetics and function (chewing, phonation, breathing and swallowing) in cancer patients, as well as contributing to psychological issues, the process of reintegration into society and improving the quality of life of these individuals. Therefore, since the dental surgeon is the professional responsible for making the MFP and monitoring these patients, the importance of their inclusion in the multidisciplinary oncology team in all phases of antineoplastic treatment and in the context of the MFP, with emphasis on postoperative rehabilitation, is highlighted.

Conflict of interest: The authors declare no conflicts of interest.

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