

Maxillofacial rehabilitation after rhinectomy using two different treatment options: clinical reports

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SUMMARY The aim of these clinical reports was to describe two different approaches to prosthetic rehabilitation after facial disfigurement because of a total rhinectomy. A man with a total rhinectomy was scheduled for craniofacial implants in the nasal residual defect. Three oral implants were used instead of craniofacial ones. A conventional framework was designed to connect the prosthesis to the implant abutments in the anterior nasal floor, and a custom-made ball attachment was positioned in the glabella abutment. A woman with a free rectum

abdomis flap covering the defect of the middle face was scheduled for a nasal prosthesis. A titanium framework with a novel connection between the eyeglasses and the prosthesis was manufactured. The two clinical reports presented in this article illustrate favourable clinical treatment outcomes in the rehabilitation of disfigurement.

KEYWORDS: nasal prosthesis, craniofacial implant, maxillofacial rehabilitation, rhinectomy

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Introduction

The quality of life after the rhinectomy is severely compromised if an efficient surgical reconstruction or a prosthetic device is not provided (1, 2). Fukuda *et al.* (3) surveyed patients with nasal or paranasal malignant tumours who underwent anterior craniofacial resection. Current status of long-surviving patients and their subjective assessment of the surgical treatment were also evaluated through questionnaires. The results showed that all patients complained of unsightly appearance, and when the patients themselves evaluated their condition after surgery, 63% were dissatisfied. The authors suggested that the surgical treatment is valid for selected patients not only with regard to the survival outcome, but also is important psychologically and functionally. This study underscores the paradox of medical success versus patient-perceived success.

Malignancies of the nasal septum are rare and account for only 9% of all cancers of the nasal cavity (4). Treatment options for reconstruction after ablative cancer surgery are plastic surgery or a nasal prosthesis,

depending on the site, size, age, aetiology, severity and patient's desire (5). Microvascularized free flaps or rotated frontal flaps are usually used to surgically restore the defect, and excellent results may be obtained (6–9). As yet, no clinical trials have been conducted to compare new microvascularized reconstruction outcomes with previous reconstruction methods (10).

Sometimes the results of the plastic surgery are not sufficient to restore the entire volume of the nose (11). In these patients, a facial prosthesis is aesthetic and provides the respiratory function (12–15). Moreover, a prosthesis offers the clinician and the patient the means to observe the healing wound for recurrence of disease, as well as providing technical simplicity and inexpensive care. Three solutions exist to retain the prosthesis: a mechanically supported prosthesis, an adhesive prosthesis, or a prosthesis anchored on craniofacial implants. Craniofacial implants improve the stability of the prosthesis and provide ease of use without eyeglasses or adhesives. In this article we describe the use of craniofacial implants in the premaxilla and

glabella to stabilize a nasal prosthesis, and the use of eyeglasses to support the nasal prosthesis when no bone is available.

The aim of this article was to evaluate two different prosthetic solutions for the rehabilitation of a total rhinectomy.

Procedure 1

For the first solution, a conventional (16) framework was designed to connect the prosthesis to the implant abutments in the anterior nasal floor, and a custom-made ball attachment was positioned in the glabella abutment. Instead of the craniofacial implants, three ITI oral implants were used after CT scan examination. A 76-year-old male was scheduled for cancer reconstructive surgery in the Maxillo-Facial section of the Bellaria Hospital in Bologna (Italy) for a carcinoma of the nasal septum. An attempt to surgically reconstruct the defect failed, and the patient was scheduled for a nasal prosthesis in the Maxillo-Facial Prosthesis section of the Department of Oral Science at the University of Bologna-Italy (Fig. 1).

- 1 An alginate impression of the defect was made for developing a diagnostic wax-up of the nose.
- 2 A trial on the defect of the patient to evaluate the aesthetic profile and the correct positioning with respect to the median line of the face was performed.
- 3 The planning of the implant position was represented by means of three gutta percha points in a template for the CT examination, which was the duplicate of the diagnostic wax-up.
- 4 After the CT scan was executed, three ITI implants (4.1 × 10 mm, instead of the conventional craniofacial ones) were positioned in the bone, two in the



Fig. 1. Patient 1, the initial situation after rhinectomy.

premaxilla by way of the nasal floor and one in the glabella region, as previously planned. A period of six months elapsed before the connection of the abutments.

- 5 A polyether impression of the defect and implants was taken. Two metal frameworks were manufactured: a composite bar retention framework was created for the implants in the anterior nasal floor, and a custom-made ball attachment abutment was designed for stabilizing the nasal prosthesis in the glabella (Fig. 2).
- 6 A resin connecting structure was assembled and then enclosed in the definitive silicone prosthesis to anchor it to the implant framework (Fig. 3).
- 7 After the extrinsic colouring of the prosthesis was completed, it was delivered to the patient and the maintenance hygiene protocol was followed (Fig. 4).

Procedure 2

For the second solution, a titanium framework with a novel connection between the eyeglasses and the nasal prosthesis was manufactured, using the components for implant supported prosthesis. A 69-year-old female was referred to the Maxillo-Facial Prosthesis section of the Department of Oral Science at the University of



Fig. 2. Patient 1, the metal framework.



Fig. 3. Patient 1, the anchoring resin structure.



Fig. 4. Patient 1, the final result.



Fig. 5. Patient 2, the initial situation before the removal of the nasogastric nutritional device.

Bologna (Italy) for a nasal prosthesis. The patient was affected by a basal cells carcinoma of the zygoma region. Six ablative cancer surgeries for local recurrences of the cancer were executed. The final one was

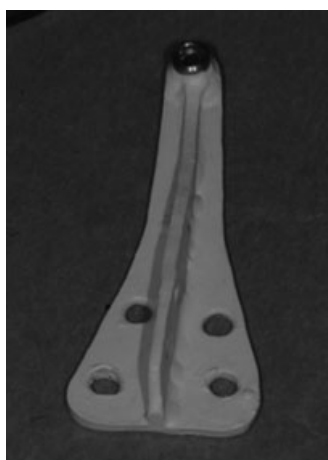


Fig. 6. Patient 2, the novel titanium framework.



Fig. 7. Patient 2, the prosthetic abutment and the connection system.

executed in the maxillofacial section at the University Hospital of Parma (Italy), using a microvascularized free rectum abdominis flap to cover the residual defect. A nasal-gastric device was used to feed the patient, because of her dysphagia. A colonization of the *Helicobacter pylori* obliged the clinician to eliminate the nasal-gastric device. The patient was then scheduled for nasal prosthesis construction. The main anatomical problem was the non-axial residual opening of the defect with respect to the median line of the face. Moreover, no bone was available for positioning the craniofacial implants. A mechanically retained prosthesis was planned for the patient (Fig. 5).

- 1 An alginate impression of the defect was made for developing a diagnostic wax-up of the nose.
- 2 It was tried on the defect of the patient to evaluate the aesthetic profile and the correct positioning with respect to the median line of the face.
- 3 The eyeglasses were then positioned and a silicone (Easy Mix Putty)* was used to check the relationship with the prosthesis.
- 4 The nasal prosthesis wax-up and the eyeglasses were repositioned onto the cast to build the titanium framework used to connect the prosthesis to the eyeglasses. The design incorporated retention holes for the silicone of the final prosthesis and a triangular basis for adequate support (Fig. 6).
- 5 A screw, laser welded in the titanium framework, connected the eyeglasses to the prosthetic abutment (NP Multi Unit Protection Analog)[†] (Fig. 7).

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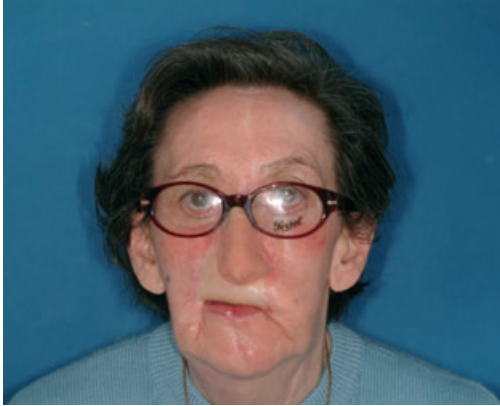


Fig. 8. Patient 2, the final result.

- 6 After the extrinsic colouring of the prosthesis was completed, it was delivered to the patient and the maintenance hygiene protocol was followed (Fig. 8).

Discussion

The benefits and strengths of *Procedure 1* are:

- 1 The optimal stability of the prosthesis guaranteed the patient recovery of his social life.
- 2 The patient was able to alternate between sunglasses and prescription glasses.
- 3 The patient was taught the correct hygiene maintenance procedures of the peri-implant tissues and in only three weeks became expert at performing home hygiene care.
- 4 Only one of the two disposable bar attachments was used in the framework positioned in the maxilla: the other remains as an emergency alternative should the implant in the glabella fail.
- 5 The oral implants used offered a wider surface for osteointegration than the craniofacial ones, and the 2-year follow-up showed no problems in the peri-implant glabella bone.

A weakness of *Procedure 1* is that it relies on sufficient available bone in the glabella area: if the cortical thickness does not allow the oral implants insertion, the use of a craniofacial short implant in that zone may become a clinical failure in the long-term follow-up.

The benefits and strengths of the *Procedure 2* are:

- 1 The patient was able to resume her acting career in the popular theatre company, in which she was an actress for the last 30 years

- 2 The patient's self-esteem increased very quickly, because she did not need to hide the defect any more.
- 3 The use of a titanium connecting structure increased the weight of the prosthesis only slightly.

The weaknesses of clinical *Procedure 2* are:

- 1 The patient is restricted to the use of only one pair of eyeglasses.
- 2 The patient needs a strap behind her hair to hold the facial prosthesis in place.
- 3 The titanium may cause discolouration of the silicone compound.

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