Since the introduction of microvascular free flaps, most facial defects are now rehabilitated surgically. However, not every patient is a candidate for a surgical reconstruction. For example, squamous cell cancers have metastatic potential, so periodic visual inspection of the oncologic defect is important. Teichgraeber and Goepfert\(^1\) recommended a 2-year wait before any surgical reconstruction because the cancer recurred in 45 of 147 patients (30.6%), and two-thirds of all recurrences were seen within 2 years. Also, the complexity of the nose makes surgical reconstruction difficult, especially after a total rhinectomy.\(^2\) Multiple surgical reconstructive procedures are needed to achieve an acceptable looking nose, and postoperative radiation therapy can delay wound healing and increase the risk of flap complications.\(^3\)\(^-\)\(^5\)

Prosthetic rehabilitation can be an attractive alternative to the surgical reconstruction of the nose. Since the advent of endosseous dental implants, patients have shown great acceptance of oral-nasal prostheses, with excellent recovery of oral and nasal function; the prosthodontics community has also shown satisfaction with such prostheses.\(^6\)

This clinical report describes the prosthetic rehabilitation of a patient who initially presented with squamous cell carcinoma of the nasal septum, floor, lateral wall, vestibule, and maxilla. He underwent a total rhinectomy, partial maxillectomy, wide local excision of the upper lip, split thickness graft, and full-mouth extraction, and 4 implants were placed in the maxilla. He was then treated with concurrent radiation and chemotherapy.

**CLINICAL REPORT**

A 57-year-old man presented for prosthetic rehabilitation after a total rhinectomy and partial maxillectomy as part of his cancer treatment. The patient needed a nasal and obturator prosthesis because of the surgical defect.

**Denture design and placement**

Preliminary impressions were made with irreversible hydrocolloid for the fabrication of custom trays. The healing abutments were removed, and the tissue depths were measured for future locator abutment heights (Fig. 1).

At the patient’s next appointment, 4 locator abutments (Locators; Zest Anchors Inc) were inserted and tightened according to the manufacturer’s recommended torque values. Next, the maxillary and mandibular custom trays were evaluated clinically, and the functional...
The borders of the vestibule were recorded with green modeling plastic impression compound (Kerr Impression Compound; Kerr Corp). The locator abutment level impression copings were then placed onto the locator abutments, and a closed-tray impression was made with light body polyvinyl siloxane impression material (Take I Advanced; Kerr Corp) (Fig. 2).

The processed record bases were placed in the mouth and adjusted to accommodate the patient’s anatomy. The occlusal rims were adjusted according to the patient’s vertical dimension of occlusion, esthetics, and phonetics and to ensure adequate lip support. The maxillomandibular relation was recorded in an upright position with polyvinyl siloxane occlusal registration material. A mold guide (BlueLine; Ivoclar Vivadent Inc) was then used to select the appropriate denture teeth and arrange them in lingualized occlusion.

Once the wax trial dentures were approved, the dentures were processed using heat-polymerized poly(methyl methacrylate) (Lucitone 199; Dentsply Intl) (Fig. 3). At the patient’s next appointment, the maxillary overdenture and mandibular denture were delivered (Fig. 4). Once the patient was comfortable with the new prostheses, the design and fabrication of the nasal prosthesis began.
Nasal prosthesis fabrication and combination procedure

A multipurpose magnet with lip (MPMS; Factor II, Inc) was attached to the superior extension of the maxillary denture for the future retention of the nasal prosthesis (Fig. 5). Before the definitive impression of the nasal defect and surrounding tissues was obtained, undesirable tissue undercuts were blocked out with wet gauze. The patient was instructed to breathe through his mouth throughout the definitive impression procedure. A customized impression coping for the magnet was placed, and polyvinyl siloxane adhesive was added to the impression coping. Next, the patient’s facial midline was marked with an indelible marker (Dr. Thompson’s sanitary color transfer applicators; Great Plains Dental Products Co). The definitive impression of the nasal defect along with the surrounding face was made with light body polyvinyl siloxane material, and heavy body polyvinyl siloxane was placed over the light body impression material for rigidity (Fig. 6).
An acrylic resin keeper was fabricated with a magnet over the definitive cast, and the nasal prosthesis was sculpted with specially formulated wax in the usual manner and adapted to the patient’s defect during the next visit. Once the fit and esthetics had been optimized and confirmed, oil paint was mixed with MDX 4-4210 silicone and Georgia kaolin to create a sample color that matched the patient’s facial base color. The remaining nasal sculpture was then invested in the usual manner. Once the wax was eliminated, the definitive cast was duplicated with irreversible hydrocolloid to make a perforated cast for the polyurethane lined prosthesis as described by Udagama.

Next, MDX 4-4210 silicone was mixed with oil paint and Georgia kaolin to match the previous base color of the patient’s skin and mixed with medical adhesive type...
A. The silicone mixture was inserted into a syringe, injected into the mold, and processed as described by Udagama and Drane. Finally, the mold was placed into a spring press and allowed to polymerize overnight.

On the day of insertion, the excess silicone was trimmed, and extrinsic color was painted on the nasal prosthesis in several layers with the prosthesis on the patient. The prosthesis was then oven polymerized (Fig. 7).

On the day of delivery, the nasal prosthesis was retained on the face by a magnet attached to the implant-supported maxillary denture and water-based adhesive (Daro Adhesive Extra Strength; Factor II Inc) for edge retention (Fig. 8). Three months after delivery of the prosthesis, the patient reported improved mastication, speech, and deglutition, and he was satisfied with the overall appearance.

**DISCUSSION**

For the rehabilitation of midline midfacial defects, Nadeau described an intraoral-extraoral combination prosthesis with magnets. Later, such combination prostheses were discouraged because the connection of the prostheses often resulted in movement of the facial
prosthesis during mastication.9,10 However, in these case reports, the combination prostheses were mainly retained by medical adhesives or tissue undercuts. Retention of a large prosthesis is one of many limitations of prosthetic rehabilitation; others include the property of materials, the psychological effect, and the mobility of tissues.11 This clinical report describes how these challenges were addressed in the fabrication of an implant-supported and magnet-retained combination oral-nasal prosthesis for a patient with a midline midfacial defect.

In the patient described, 4 implants were placed in the maxillary ridge, with good anterior-posterior spread for better support and retention; this improved the likelihood of the patient accepting the prosthesis. By having endosseous dental implants, not only was the overdenture retained but also the nasal prosthesis could be magnetically attached and supported by a stable base instead of movable tissues. Because of its magnetic support, the patient was able to orient the nasal prosthesis easily and without discomfort. Also, the patient needed only minimum medical adhesive, which translates to better patient acceptance and ease of care and the extended life of the prosthesis. Overall, the addition of implants and a large magnet with a flange increased the acceptance of the intraoral-extraoral prosthesis to the great satisfaction of both the patient and treating team.

**SUMMARY**

Prosthetic rehabilitation can be a good alternative to surgical reconstruction for patients who have undergone a total rhinectomy. Prosthetic rehabilitation can lessen the number of surgical procedures and result in better appearance and a natural-looking nose. The value of dental implants in the rehabilitation of maxillofacial patients is indisputable, as the implants increase stability, support, and retention, thus improving the overall outcome and patient satisfaction with the restoration. For the patient in this report, the implant-supported oral-nasal combination prosthesis represented a major improvement in quality of life. His masticatory, speech, and deglutition functions and his facial esthetics improved so that he could return to normal life. Without the implants, his current level of comfort would not have been achieved.

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