Restoration of nasal defect with implant-retained nose prosthesis

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In patients with the loss of facial structures due to neoplasms, trauma or congenital deformities, reconstruction using autogenous tissue is a complex and multistage procedure with an unsatisfactory outcome. Prosthetic reconstruction becomes the treatment modality of choice in such cases. A prosthesis fabricated on an osseointegrated implant is an excellent method to rehabilitate such patients. In these procedures, permanent percutaneous connections anchored in the underlying bone support the facial prosthesis (auricular orbital or nasal prosthesis).

Key words: Osseointegrated implants, prosthesis, rehabilitation

INTRODUCTION

The lack of a nose following ablative surgery for nasal carcinoma is a significant deformity of the face requiring urgent attention. When reconstruction with an autogenous tissue is not possible, patients frequently use a silicone prosthesis fixed to the surrounding skin with an adhesive. Unfortunately, the adherence is often inadequate and the prosthesis can detach, leading to an embarrassing situation to the patient in society and a negative impact on his/her self confidence.

The placement of implants and associated reconstructive surgical procedures aim at the retention of the prosthetic device.[1] They also seek to facilitate the design and provision of a prosthesis that can restore the tissue defect and provide for the maximum improvement in long-term function, comfort and esthetics. A further objective is to ensure that the health of the soft tissues adjacent to the implants can be maintained effectively by the patient.

This case report presents a patient with the excision of nose due to xeroderma pigmentosa rehabilitated with implant reataine silicone nose prosthesis.[2]

METHODS

Osseointegrated implant-retained silicone nasal prostheses were fabricated for three patients suffering from xeroderma pigmentosa. The patients presented with the loss of nasal tissue following the excision of the basal cell carcinoma leaving a significant deformity of the face[3] [Figure 1a]. Patients were using a conventional, silicone prosthesis fixed to the surrounding skin with an adhesive.

Surgical phase

Two cylindrical implants with a diameter and length of 3 mm and 10 mm [EZ Hi-Tec from Israel] were surgically inserted in the floor of the anterior maxilla. EZ surgical drills and kit were used for the same [Figure 1b, c]. In dentate patients, care was taken to avoid the roots of the teeth.

After a healing period of six months the implants were surgically exposed [Figure 1d], cover screws removed, and universally modified abutments (UMA) [Figure 1e] and healing caps attached [Figure 1f]. Healing caps were removed after 1 month and this was followed by the prosthetic phase.

Prosthetic phase

Impression posts were attached to the UMA for transferring the position of the implants onto a stone cast [Figure 2a]. Impressions of the nasal tissues were taken in a rubber base impression without distorting the surrounding tissues. Implant analogs (to replicate the retentive portion of the implant body) were fixed to the impression post and master cast was obtained [Figure 2b]. Wax pattern of the retention bar (superstructure) was fabricated on the master cast

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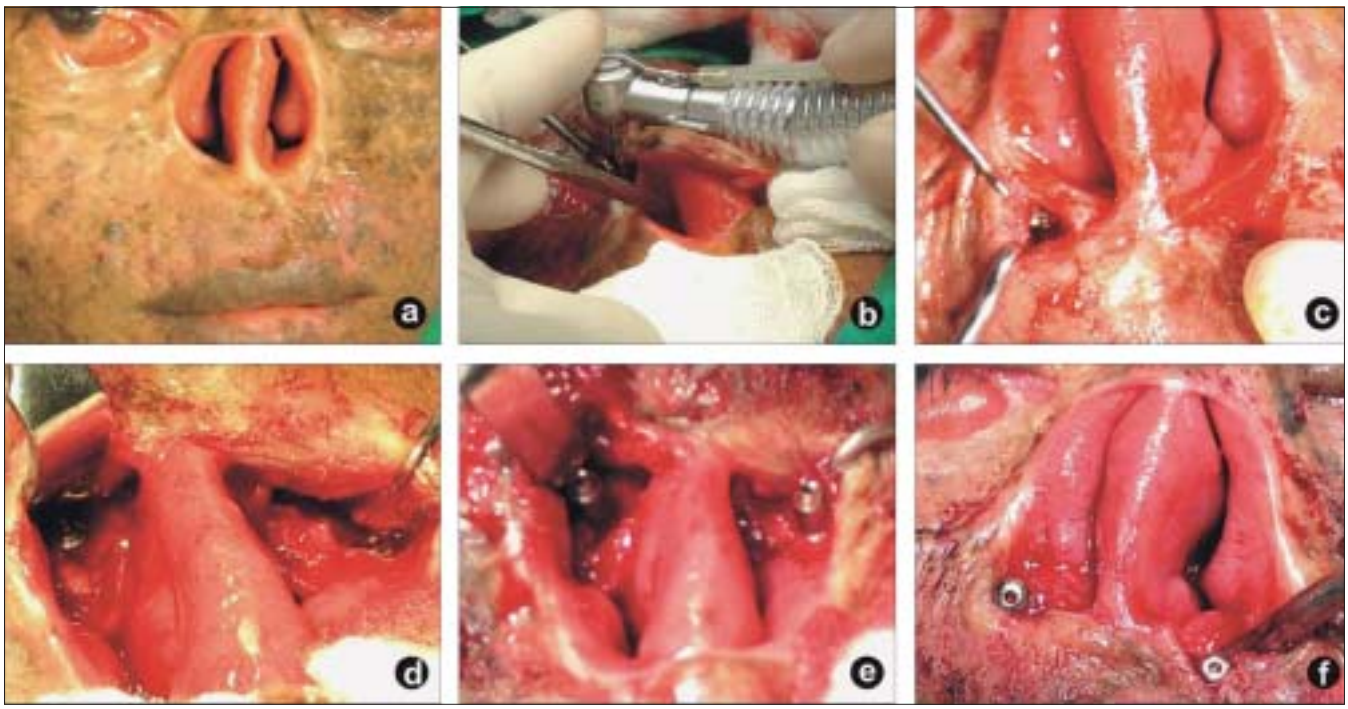

Figure 1: Surgical phase: (a) Preoperative view of the face. (b and c) Insertion of the implants in the anterior maxillary region. (d) Second stage exposure of implants. (e) Attachments of UMA abutments. (f) Attachments of healing caps on UMA abutments.

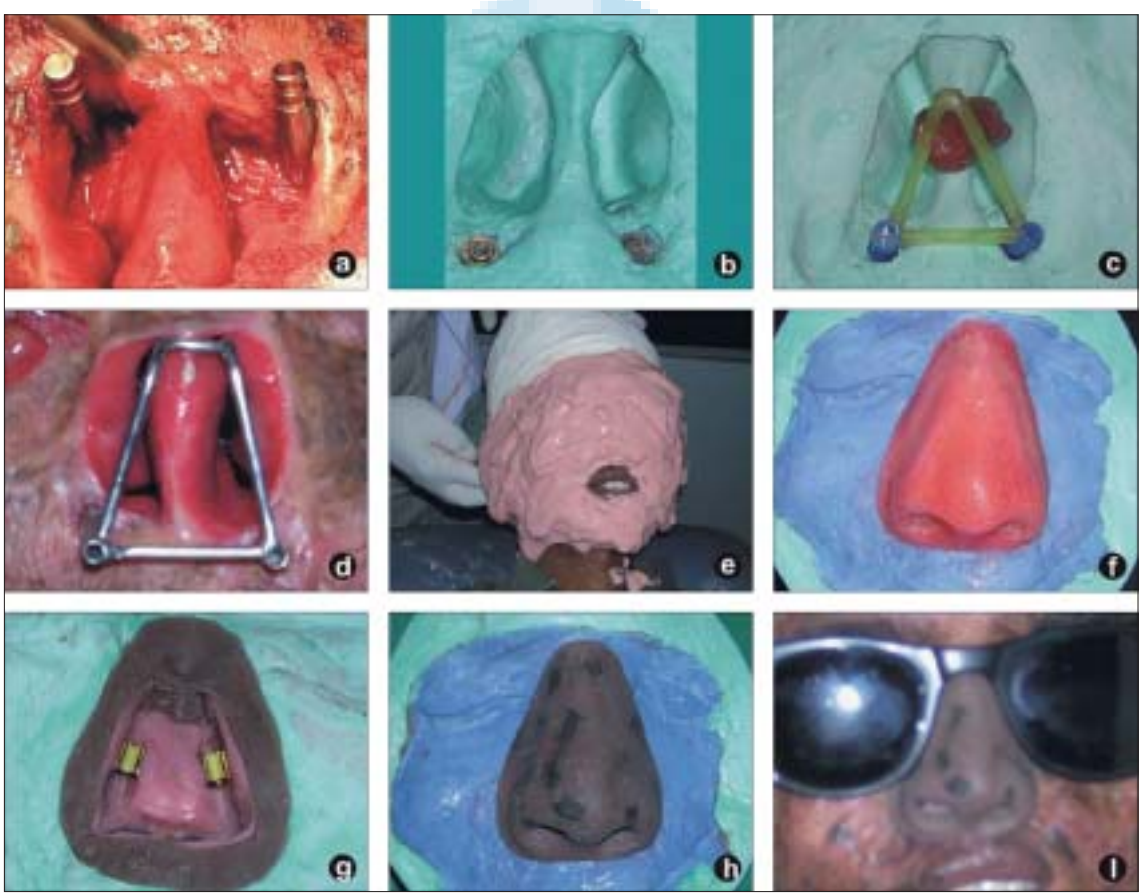

Figure 2: Prosthetic phase: (a) Impression post attached to the UMA abutments. (b) Working model with implant analog. (c) Wax pattern of the bar (d) Retention bar casted and fixed on the UMA attached to the implants. (e) Facial moulage in alginate with acrylic resin, substructure fixed on the bar. (f) Sculpted nose (wax) adapted on acrylic substructure. (g) Tissue surface of the silicone nose prosthesis and acrylic substructure with retained bar clips. (h and i) Final prosthesis fitted on the face of the patient

[Figure 2c]. The trial of the wax pattern on the face was taken. Subsequently, retention bar was casted in metal. After assessing the fitting of the retention bar, it was fixed on the UMA attached to the implants [Figure 2d]. The impression of the tissues was taken again [Figure 2e]. The stone model for sculpting was obtained.

The sculpting of the prosthetic nose in wax to achieve appropriate size, contour, surface texture, and margins was done. Superior and superio-lateral portions of the lateral margin were positioned beneath the glass frame. The lower portion of the lateral margin was blended with the skin [Figure 2f]. The sculpted prosthetic nose was adapted on an acrylic substructure.

Acrylic resin substructure was adapted on the retentive bar. It contains the retentive element - bar clip, which must fit within the confines of the nasal prosthesis. Sufficient surface area was ensured so that the bond between the resin and silicone did not fail [Figure 2g].

The processing and flasking of the sculpted wax nose was performed for the fabrication of a silicone (Factor II, Inc. USA) nose prosthesis with an acrylic substructure containing the bar clips [Figure 2h].

RESULTS

Silicone nose prosthesis secured with bar clips on to the retention bar, which was fixed to the UMA abutments, attached to the implants anchored in the anterior floor of the maxilla was fabricated [4] [Figure 2i]. This prosthesis snaps on rigidly due to bar clips on the metal bar. This assures firm fixation with satisfactory esthetics and minimal tissue invasion. This modality ensures the patient a secured prosthesis that obviates the social embarrassment of an adhesive prosthesis.

DISCUSSION

Prosthetic reconstruction is the treatment modality of choice in patients with facial deformities when reconstruction is not possible with autogenous tissues. Prosthetic reconstruction is indicated in such circumstances.

The introduction of osseointegrated implant biotechnology to the facial prosthesis provides an opportunity for the secure retention of the prosthesis without jeopardizing the integrity of the skin and underlying tissue.

When compared with existing conventional methods of autogenous reconstructive surgery and non-implant retained prosthesis, craniofacial implant rehabilitation appears to be less expensive in the long term as this procedure being on outpatient basis reduces the hospitalization cost for autogenous reconstruction. Importantly, in most cases, an osseointegrated implant-retained prosthesis affords a significantly improved outcome in terms of limited surgical morbidity, achieving superior esthetics and well-established psychosocial improvement. Craniofacial implant rehabilitation improved the quality of life for patients with facial disfigurement.[5]

CONCLUSION

Osseointegrated implants in patients undergoing nasal excision offer a rigid fixation for a prosthesis, enabling satisfactory concealment of the deformity. This improves the confidence of the patients enormously and allows them to function normally and makes them socially acceptable. Thus, the primary objective to restore form, function and preserve the remaining hard and soft tissues leads to an important secondary objective of restoring the individual to society.

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REFERENCES

1. Jacobsson M, Tjellstrom A, Fine L, Andersson H. A retrospective study of osseointegrated skin penetrating titanium implant fixture used for retaining facial prostheses. Int J Oral Maxillofac Implants 1992;7:523-8.
2. Sugar A, Beumer J. Reconstructive prosthetic methods for facial defects. Oral Maxillofac Surg Clin North Am 1994;6:755-64.
3. Tjellstrom A, Granstrom G, Bergstrom K. Osseointegrated implants for craniofacial prosthesis. *In*: Weber R, Miller MJ, Geopfert H, editors. Basal and squamous cell skin cancers of head and neck. Williams and Wilkins: Baltimore; 1996. p. 313-30.
4. Beumer J, *et al*. Restoration of facial defects: Etiology, disability and rehabilitation in maxillofacial rehabilitation - prosthodontic and surgical considerations. In: Beumer J, Curtis T, Marunick M. Ishiyaku Euro America: St. Louis, Tokyo; 1996. p.337-444.
5. Roumanas E, Freymiller EG, Chang TL, Aghaloo T, Beumer J 3rd. Implant retained prosthesis for facial defects: An up to 14 year follow up on the survival rates of implants at UCLA. Int J Prosthodont 2002;15: 325-32.

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