Case Report

Prosthodontic rehabilitation of combined oronasal defect in patients with non-Hodgkin's lymphoma using two different attachments: Two case reports

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Abstract

Debridement of affected parts in patients with non-Hodgkin's lymphoma leads to large mid facial defects leading to poor quality of life due to cosmetic disfigurement and various functional comorbidities. Therefore, a surgeon should refer the patients to a prosthodontist for replacement of lost tissues to improve their function and esthetics. Two cases have been presented here with a history of non-Hodgkin's lymphoma having large, continuous defects involving nose, cheeks, and maxilla. Retaining large facial prosthesis and intraoral obturator was a challenge as supporting hard and soft tissues were less. Two-piece lightweight prostheses were fabricated and retained with the use of very economical titch buttons used (used in clothes) in case 1 due to financial constraints and slightly expensive iron boron neodymium magnets in case 2. Functional and esthetic rehabilitation was successfully achieved with intraoral and facial prostheses attached to each other.

Keywords: Lymphoma, magnet, nasal prosthesis, obturator, silicone

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INTRODUCTION

Facial defects which are referred for prosthodontic rehabilitation are usually the result of resection of various neoplasms.[1] One of such tumors is non-Hodgkin's lymphoma of natural killer (NK) cell type. This rare malignancy has been reported with high recurrence rate, poor prognosis, and low survival rate of the patients. Treatment includes the combination of aggressive radiotherapy and chemotherapy which results in bone necrosis.[2] Subsequent debridement usually leads to structural defect and discontinuity.

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Continuous defects involving the mid face and oral cavity lead to severe esthetic disfigurement and functional problems such as difficulty in swallowing, mastication, and impairment of speech. Patients usually avoid social interaction because of problems such as their peculiar looks which may be uncomfortable for the others, taking long time to complete meals, untidiness, and need for special preparation and food selection. This adversely affects the psychological well-being and overall quality of life of the affected individuals.[1] Hence, the restoration

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of maxillofacial defect is an essential step in patients' rehabilitation.

Usually, the surgical rehabilitation of the combined oronasal defect in non-Hodgkin's lymphoma is not preferred due to the aggressive nature of the tumor. The prosthodontic management involves the fabrication of obturator prosthesis to cover the intraoral defect and facial prosthesis for cosmetic rehabilitation. However, due to lack of adequate tissues to hold the prosthesis in place, use of some retentive aid becomes mandatory. Various means of retaining a facial prosthesis can be anatomic retention using tissue undercuts;[3] mechanical retention using eye glasses,[4] magnets,[5,6] adhesives,[7-9] osseointegrated implants;[10,11] and a combination of anatomic, mechanical, and adhesive retention. Each one of them has its own advantages and disadvantages and their use depends on specific criteria. Furthermore, besides these methods, various indigenous and innovative means have also been reported in literature.[12]

When using eye glasses alone for retention purpose in the continuous defect, it is difficult to achieve proper tissue contact, especially at the lower border of the prosthesis. Using adhesive alone also does not work in midfacial region due to the high range of movement of the mid facial muscles and the tearing of the thin margins of the prosthesis during usage. Implants are also not used due to the aggressive nature of the tumor.

Magnets are commonly used to provide retention and stability to the maxillofacial prosthesis in patients with combined deformities.[13] Majority of the prostheses are sectioned and have magnet in each part. When the sections are assembled properly, the magnets are attracted toward each other and retain the sections.[6-8] However, the higher cost of magnets makes their use difficult in patients with financial constraints.

Prosthodontic rehabilitation of two cases having combined oronasal defect secondary to surgical debridement of non-Hodgkin's lymphoma has been discussed in this article. Facial prosthesis was retained in position using titch buttons (used in clothes; case 1) and magnets (case 2).

CASE REPORTS

Case 1

A 41-year-old female patient from a low socioeconomic background had reported to oncology department, with chief complaints of bleeding from the nose and running nose followed by swelling and ulceration over the nasal area over a period of 1.5 years. Investigations were confirmatory for high-grade T-cell lymphoma (NK type). Initially, the patient was treated with radiotherapy (45 Gy/20 fractions by three-dimensional conformal radiotherapy) followed by chemotherapy (6 cycles of SMILE). After the treatment, positron emission tomography-computed tomography showed no evidence of metabolically active disease and histopathological examination showed necrotic bone without any evidence of malignant pathology. Plastic reconstruction was denied due to very high recurrence rate of the underlying tumor. Hence, the patient was referred to the department of maxillofacial prosthodontics for prosthetic rehabilitation.

She presented with chief complaints of severe disfigurement of face, unintelligible speech, difficulty in chewing food, and its leakage from the nose. Extraoral examination [Figure 1a and b] revealed continuous oronasal defect involving the medial wall of antrum, bilateral ala, nasal septum, and one wall of the nose. Intraoral examination [Figure 1c and d] revealed the presence of a large intraoral defect continuous with the nasal cavity involving the premaxilla and most of the palate. Residual bone was necrosed and denuded leading to unesthetic appearance of the face [Figure 1a]. Teeth 11, 12, 21, and 22, were missing in the maxillary arch.

It was not possible to rehabilitate the patient while keeping the necrosed bone. Hence, the patient was referred to the ear, nose, and throat (ENT) department for surgical debridement which was performed under general anesthesia. Finally, a well-healed defect was achieved with teeth 11, 12, 13, 21, 22, 36, and 46 missing.

Case 2

A 24-year-old male patient was referred from the ENT department with the chief complaints of unpleasant

Figure 1: (a) Pretreatment view (Case 1). (b and c): Postdebridement view (Case 1). (d) Occlusal view of mandibular arch (Case 1)

appearance of face, uncomfortable feeling while appearing in the public, and an inability to swallow, chew, and speak effectively. The patient used to wear a bandage over his face to hide his mid face deformity and to prevent any chance of infection through the open cavity. He was treated for NK cell-type lymphoma of the nasopharynx with chemotherapy and surgical debridement. The probability of the surgical reconstruction was excluded by the surgeon himself; therefore, he was referred to the department of maxillofacial prosthodontics for prosthetic rehabilitation.

Extraoral examination [Figure 2a] revealed facial asymmetry and sunken appearance due to large mid facial defect extending from the glabella region till the upper lip and laterally involving a part of cheek on both the sides. The defect extended till the medial canthus of the left eye. The upper lip was taut and the surrounding facial tissues were fragile and mobile.

Intraoral examination [Figure 2b and c] revealed the presence of a large intraoral defect continuous with the nasal cavity involving the premaxilla and the palate. Maxillary second premolar and maxillary first, second, and third molars were present on the maxillary right side, while on the left side, only maxillary third molar was present. Full complement of the mandibular teeth was present. The patient was unable to swallow and his speech was not intelligible as the tongue could not make effective functional contact in the absence of anatomic (palatal, alveolar, and dental) boundaries.

Treatment plan

Both the cases presented in this article were treated cases for NK cell-type lymphoma leading to large continuous orofacial defects.

A two-piece prostheses comprising of an intraoral obturator to replace the missing part of the maxilla and silicone facial prosthesis were secured to each other using some attachment. The commonly used titch buttons in clothes were used in case 1 and magnets were used for the same purpose in case 2. In these cases, due to the high recurrence rate and aggressive nature of non-Hodgkin's lymphoma, it becomes necessary to complete the prosthetic rehabilitation in a short period of time. Hence, the fabrication of the cast partial framework was not considered and an acrylic obturator was fabricated for both the patients.

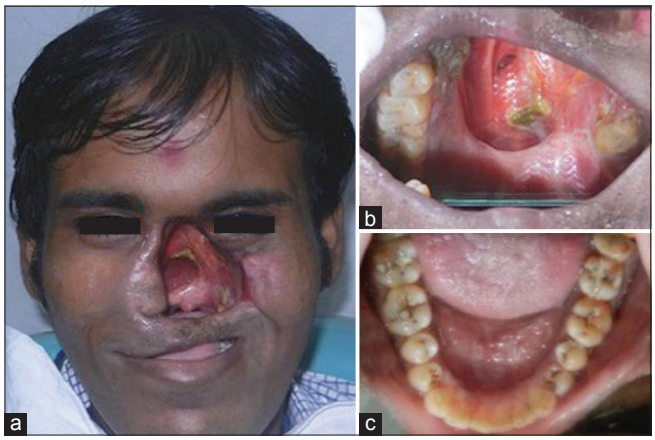

Figure 2: (a-c): Postdebridement view (Case 2)

Both the patients were explained about the possibility to use magnets to retain the facial prosthesis with obturator, but due to the poor socioeconomic status of the patient (case 1), she was unable to bear the cost of the magnet. Hence, titch buttons were used. The second patient (case 2) was ready for the use of magnets. Before the execution of the treatment, both the patients were explained in detail about the treatment plan, number of appointments required, time involved in completion of treatment, and the cost. Accordingly, written informed consents were obtained from both the patients.

The treatment was executed in two main steps as follows:

a) Fabrication of acrylic obturator
b) Fabrication of silicone facial prosthesis with acrylic conformer.

Procedure

Steps of fabrication have been described in common.

Fabrication of hollow-bulb closed-top obturator

Primary impression was made in irreversible hydrocolloid (Imprint, DPI, India) and cast obtained was used to fabricate custom tray in autopolymerizing resin. Border molding was done to record the peripheral tissues and final impression was made in irreversible hydrocolloid again after making perforations in the tray for the mechanical retention of the material. Jaw relations were recorded and anterior teeth were arranged in an edge-to-edge position. Due to the absence of premaxilla and taut upper lip, it was difficult to obtain proper lip support. Hence, such edge-to-edge arrangement of the teeth not only provides the acceptable lip support but also enhances the stability of the prosthesis. Wrought wire circumferential clasps were used to obtain intraoral retention of the obturators.

For patient 1, to attach the patrix part of titch buttons, a vertical projection was made on the bulb of the obturator in superior direction. The height and shape of the projection were adjusted at try-in stage to check the ease of insertion and removal of obturator intraorally. Finally, the obturator was processed in heat-cured acrylic resin (Trevalon,

Dentsply, India) and was delivered to the patient after finishing and polishing. Once the patient was satisfied with respect to the comfort and the function of the obturator, patrix part of the titch button was attached on to the projection over the acrylic obturator with self-cure acrylic resin facing anteriorly [Figure 3a].

For patient 2, both the matrix and patrix part of magnets (Magfit DX 600, 4.4/1.3 mm, Aichi steels, Japan) had been attached, respectively, to the nose conformer and the anterior aspect of the bulb with self-cure acrylic resin at the time of the delivery of the final prosthesis to prevent any loss of magnetism during the processing of the prosthesis. However, the close apposition of the flat surfaces of the conformer and obturator provided necessary stability to carry out the clinical procedures with ease and accuracy.

Fabrication of silicone facial prosthesis with acrylic nose conformer

Acrylic obturator was inserted in the patient's mouth and she/he was asked to keep the teeth in maximum intercuspation position; facial moulage was made in irreversible hydrocolloid after necessary block out. For patient 1, patrix part of the attachments was colored with eosin pencils so that their positions could be transferred in the impressions. However, for patient 2, markings for the attachments on the bulb of the obturator had been marked tentatively [Figure 4a]. Casts were obtained in type III Gypsum (Kalstone, Kalabhai, India) [Figure 4b].

Modeling wax was carved resembling the shape of a miniature nose to fabricate the hollow acrylic conformer [Figure 5a]. Its inner surface (opposing the obturator bulb) was made flat with space for engaging the matrix part of titch buttons and magnets in acrylic conformer. The conformer was kept hollow from inside to maintain the patency of airway and to reduce the bulk of the prosthesis. It was tried on to the patient's face for orientation, comfort of breathing, and to make space for the matrix part of attachment. For that, the matrix part was placed over the patrix part engaged in the obturator. Wax from the intaglio surface of wax pattern in respect to attachment was scooped out. Once the complete sitting was verified, the conformer was processed in heat-polymerized acrylic resin. After processing, various holes were made in the conformer to provide additional mechanical retention between silicone and acrylic. It was checked on to the patient's face to evaluate the adaptation, location with respect to the bulb of obturator, and comfort of breathing by the patient [Figure 3b and 5b].

For attaching the matrix part of attachments to the conformer, firstly, the matrix part was engaged in the patrix part of the titch buttons. Small amount of self-cure acrylic resin was applied in the respective area for matrix part in the nose conformer and the latter was seated in position. After curing of self-cure acrylic resin, the conformer was detached from the obturator. Hence, the matrix part got

Figure 3: (a) Obturator bulb with titch buttons in place (Case 1). (b and c) Frontal and rear views of conformer (Case 1)

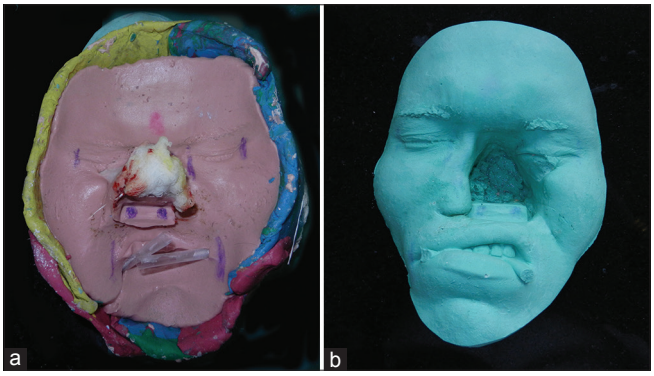

Figure 4: (a and b) Facial moulage and model of the face with markings for attachments (Case 2)

Figure 5: (a) Wax try-in of acrylic conformer (Case 2). (b) Acrylic nose conformer over the face (Case 2)

captured in the conformer leaving behind the patrix part in obturator [Figure 3c].

Once the adaptation and the comfort of the nose conformer had been evaluated, the undercut areas besides the conformer were blocked with the gauze piece on to the patient's face and wax was filled inside the nose conformer to block the space in between [Figure 6]. Afterward, facial impression was made with the conformer in position. This retrieved impression had conformer with matrix part of attachments. Thick layer of petroleum jelly was applied over the matrix part of the attachments to ease in the removal of the model and impression was poured in dental stone to obtain a model. The model was retrieved from the impression and wax inside the nose conformer was removed.

Wax pattern for silicone facial prosthesis was made over the nose conformer in modeling wax (previous photographs of the patients were taken as a guide for sculpting the wax pattern) and tried on the patient's face to check the optimum size, shape, and contour [Figure 7a]. Following the final trial of the wax pattern, functional impression of the border areas was made for the close adaptation of the prosthesis on patient's face during different facial movements. To make the functional impression, the patient was seated in upright position. The intaglio surface of wax trial prosthesis was scraped in border area (approximately 5–7 mm in width) to make space for impression material. Ultra-light body addition silicone (Aquasil ultra-light body, Dentsply India Pvt Ltd, India) impression material was painted over the border areas and it was placed in position with attachments fitted in each other on to patient's face [Figure 7b]. The patient was instructed to make various facial movements, i.e., to open and close the mouth, to say cheese, and to make frowning movements of the forehead.

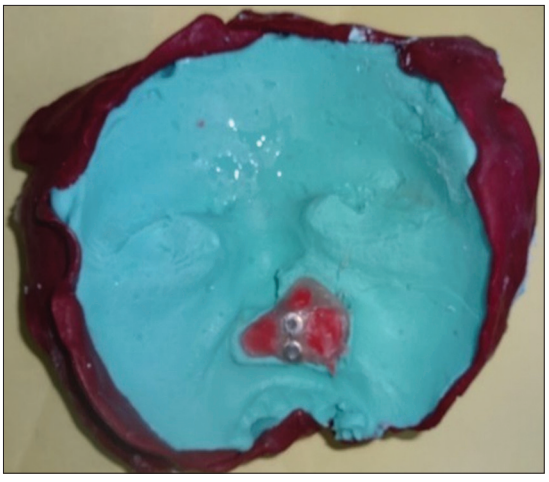

Figure 6: facial impression for fabrication of wax pattern for nose (Case 1)

After the setting of impression material, it was removed from the patient's face and checked for any voids or flaws. Thick layer of petroleum jelly was applied over the matrix part of attachments and impression was poured in type IV gypsum and model was obtained with ease. The model was scored slightly (0.02–0.03 mm) at the border areas of prosthesis to enhance its adaptation at marginal areas and was sealed with wax. Surface texturing of the wax pattern was done using warm gauze piece to match the texture of the skin of the surrounding tissues.

For flasking, initially, Type IV gypsum (Kalrock, Kalabhai, India) was poured inside the nose conformer to prevent the extrusion of the silicone through holes in the conformer and hence to maintain the patency for the airways followed by flasking of the wax pattern in the first part of brass flask [Figure 8a-c]. Just before flasking, a thick layer of petroleum jelly was applied over the matrix part of the attachments to prevent the flow of die stone inside and to ease in the retrieval of the silicone prosthesis. Flasking was completed using conventional procedure and dewaxing was done. Mold-releasing agent and primer were applied over the plaster and conformer, respectively. Shade matching and packing were done in room temperature with vulcanizing silicone material (Factor II, Inc., AZ, Lakeside, USA). Prosthesis was retrieved after 24 h and verified on the patient's face for fit, shade, and any further need of extrinsic staining.

Final prostheses were delivered to the patients [Figure 9a-c]. No adhesive was used as the functional impression and the scoring of the model made the margins adapted to the skin of the patient. Patients were trained to insert the obturator intraorally followed by the placement of extraoral prosthesis, thus aligning the matrix and the patrix part of attachments. They were educated about the maintenance of the prosthesis, i.e., to handle the prosthesis gently and with clean hands, to clean prosthesis with normal soap solution regularly, and to remove it during bed time, bathing, etc.

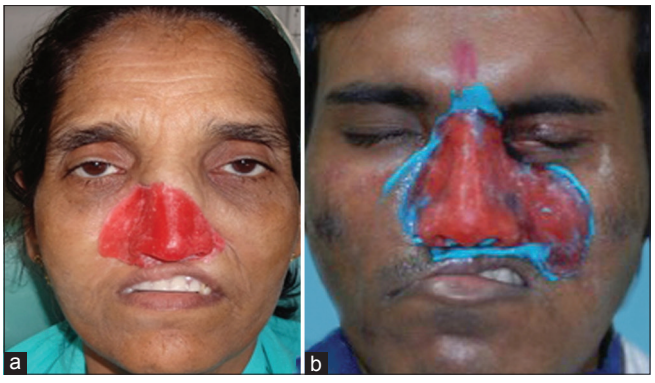

Figure 7: (a) Trial of the wax pattern for nose over patient's face (Case 1). (b) Functional impression (Case 2)

Both the patients were satisfied with the restored esthetics, function, and phonetics [Figure 10a and b].

DISCUSSION

Surgical reconstruction or prosthetic rehabilitation can be used to restore the acquired maxillofacial defects. On the one hand, surgical reconstruction gives a satisfaction of self-like appearance, but on the other hand, it is difficult to restore a large defect using this modality. Moreover, size, location, and etiology of the defect limit the choice of surgical reconstruction.[14] Rehabilitation of such defects requires a facial prosthesis to restore the function and esthetics and an obturator to accomplish the functions of mastication, swallowing, speech, and cosmetic rehabilitation.

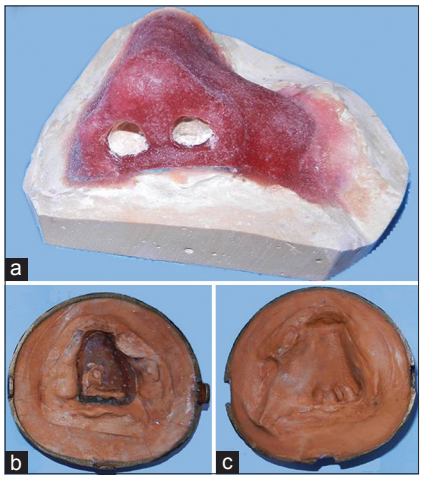

Figure 8: (a-c) Block out of nostrils and molds after dewaxing

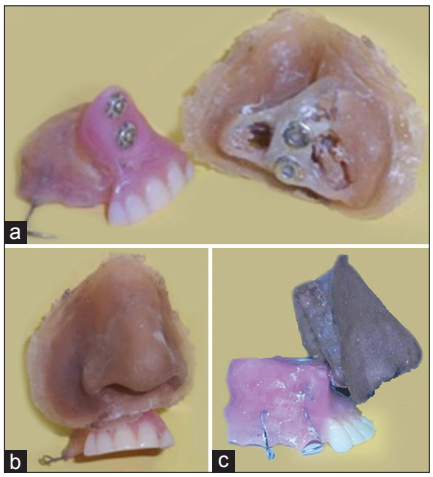

Figure 9: (a and b) Final prosthesis (Case 1). (c) Final prosthesis (Case 2)

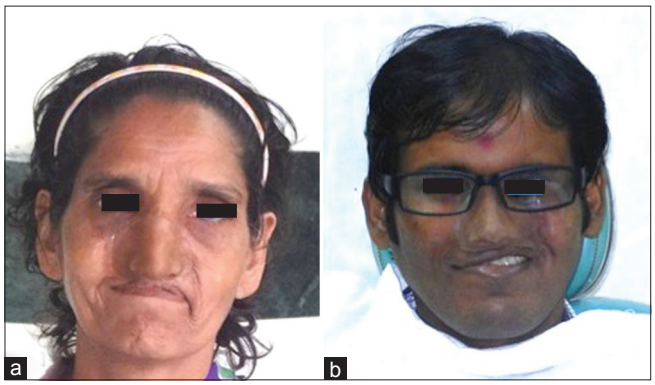

Figure 10: (a and b): Extraoral view of patients with final prostheses

Both the patients presented here had undergone surgical debridement along with chemotherapy and/or radiotherapy. The defects were secondary to the treatment of NK cell type of non-Hodgkin's lymphoma which has a very high recurrence rate.[2] Prostheses could be made in acrylic[15,16] or in silicone and spectacle could be used for retention. Silicone has life-like appearance. Hence, it was preferred over acrylic and use of spectacle-retained acrylic prosthesis was excluded as it provides compromised esthetics and marginal adaptation with the peripheral tissues.[17] Tissue adhesive was also avoided because it has questionable retentive efficiency in case of nasal prosthesis because of fragility and mobility of the tissues surrounding the defect.[18]

In the first case, stainless steel titch buttons were used to join two prostheses in indigenous way. These titch buttons are same as those used for clothing purposes and made up of stainless steel. They are easily available, economical, and easily reproducible method of retention. They also provide a satisfactory level of required retention. If the patient reports back after a period of time, the same can be easily replaced for future use.

In the second case, magnets were used as retentive aid for the facial prosthesis. Iron boron neodymium magnets were used for providing retention to the prostheses, which is the most powerful commercially available magnet material. These magnets are of closed circuit type, encased in stainless steel cassette via laser welding, and offer much better resistance to corrosion.[19] Attractive force is about four times greater than that of open circuit type and closed assembly increases the longevity of the magnet.[20] Moreover, the magnets were placed in such a location that exposure to saliva was minimal. Hence, the tendency of magnets to corrode was minimized further.

The first patient has been followed up till 1 year with no complaints and with no rusting of titch buttons, while unfortunately, the second patient could not be followed up after 4 months because of recurrence and untimely demise.

CONCLUSION

Prosthetic rehabilitation of patients with maxillofacial defects improves their function and quality of life. In this article, closed hollow obturators were fabricated along with facial silicone prosthesis supported by underneath hollow acrylic nasal conformer. Closed circuit-type magnet assembly or titch buttons were used for securing them together. A hollow nasal conformer provided the lightness to the prosthesis, ease in breathing, and platform for attaching the magnets/titch buttons.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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