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Rehabilitating Oro-facial complex using a titanium obturator and silicone nasal prosthesis - A case report

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Abstract

Tumors involving maxillofacial region often necessitates radical surgery which requires partial or total removal of nasal, orbital, antral contents and jaw resections resulting in orofacial defects. Ooronasal or sinus communication ppatients face several problems, including fluid reflux through nasal cavity as well as difficulty in chewing, swallowing and speech affecting the quality of life. Ffulfilling the requirements such as retention, stability and sealing of the prosthesis can be challenging in these patients. Facial prosthesis helps to restore normal appearance, alleviate social stigma and improves quality of life of patients.

Keywords: Oroantral fistula, Titanium based obturator, Orofacial defect, Silicone Nasal prosthesis.

Introduction

Treatment for carcinomas involving maxillofacial structures consists of surgery, radiotherapy, chemotherapy or a combination of these modalities.[1] When the maxilla is affected, the surgical treatment whether partial or total maxillectomy often results in communications between the oral cavity and nasal or sinus cavities.[2] Ooronasal or sinus communication ppatients face several problems, including fluid reflux through nasal cavity as well as difficulty chewing, swallowing and speech affecting the quality of life.[3]

Ssurgical or prosthetic treatment or even a combination of both can be used for rrehabilitation of the patient with maxillary loss.[4] Treatment options may include surgical closure of the fistula before fabrication of the complete denture or an implant-retained fixed dental prosthesis or overdenture.[5] Ssome patients may refuse or be medically unfit for such procedures, because these options require surgery.[5]

Ffulfilling the requirements such as retention, stability and sealing of the prosthesis can be challenging in these patients.[2]

The goal of prosthetic rehabilitation is to obturate the palate, allowing separation between the nasal and oral cavities, to re-establish the speech, to improve chewing and swallowing, to eliminate the hypernasality of voice by reducing the nasal air escape during breathing and articulating speech and also to improve esthetics of the patient.[6]

This clinical report describes the prosthetic rehabilitation of a patient with oronasal communication and partial nasal defect using maxillary titanium obturator and silicone nasal prosthesis.

Case report

A 62-year-old male patient was referred from the Regional Cancer Centre, Thiruvananthapuram, to the Department of Prosthodontics, Government Dental College, Thiruvananthapuram, for prosthetic rehabilitation of the palatal defect. The patient had a history of carcinoma of nasal cavity for which surgical resection was carried out eighteen months back followed by radiotherapy. This resulted in post-surgical palatal fistula formation. Radial forearm flap along with local flaps were used to close the defect but still residual palatal fistula was persisting.

The patients chief complaint was nasal regurgitation of fluids and difficulty in speech and mastication due to persisting oronasal communication. Intraoral examination revealed two palatal fistulas of dimensions 5x4mm and 4x3mm on mid palatine region and right half of the palate (FIG- 1). Anteriorly, the defect was lined using radial forearm flap and local flaps.

The mandibular arch revealed presence of only three teeth (33,34 & 35) which are contraindicated for extraction due to possible consequences of radiotherapy such as osteoradionecrosis (FIG- 2). On extraoral examination partial nasal defect was noted on the right side along with post-surgical scar formation (FIG-3A, B). It was decided to fabricate a titanium obturator prosthesis for closure of oronasal communication and a removable partial denture was planned on the mandibular arch. To improve the esthetics, a silicone nasal prosthesis was also fabricated for rehabilitating the nasal defect.

Procedure

Fabrication of intraoral prosthesis

Preliminary impressions of the maxillary and the mandibular arches were made using irreversible hydrocolloid impression material (Zelgan Alginate, Dentsply). In order to prevent extravasation of impression material into the nasal cavity, wet guaze was inserted into the fistulas prior to impression making. Primary casts were poured over which custom trays were fabricated. Border moulding was carried out using green stick impression compound (DPI). Multiple holes were placed in the anterior region of the maxillary custom tray to prevent excess pressure over the mucosal flaps. Then final impression was made using polyvinyl siloxane light body impression material (Aquasil, Dentsply) (FIG- 4). Master casts were obtained and the wax pattern for framework was designed with projections extending 5mm into the defect areas following which the framework was casted in titanium in order to reduce the

weight of the prosthesis (FIG- 5). The metal framework try in was done in patient's mouth (FIG- 6). Maxillomandibular relation was recorded followed by teeth arrangement (FIG- 7). The try in of the dentures was carried out and the function, esthetics and phonetics of the patient were evaluated. Processing of the dentures were done in a conventional manner and the final prostheses were finished and polished (FIG- 8). The prosthesis was inserted and occlusal equilibration was done to eliminate deflective occlusal contacts and improve occlusal stability (FIG- 9,10). The patient showed significant improvement in the phonation, devoid of fluid regurgitation and the masticatory efficiency was considerably enhanced.

Fabrication of silicone nasal prosthesis

A facial moulage was made using irreversible hydrocolloid impression material (Zelgan Alginate, Dentsply) which was supported by plaster backing (Dental plaster Type - 2, Shruti products, Gujarat, India) (FIG- 11,12). A stone cast was poured over which wax pattern was sculpted. Pre operative photograph of the patient was used as a reference for sculpting of the wax pattern. Trial of the wax pattern was done on the patients face and evaluated for proper contours (FIG- 13). Margins of the wax pattern were thinned out and adapted closely on the patients face. Intrinsic shade selection was done during try in appointment and the wax pattern was invested followed by dewaxing. Room temperature vulcanizing silicone was mixed with intrinsic colours to obtain a base shade and packed in the mold cavity. It was allowed to polymerize overnight. After polymerization the prosthesis was retrieved and the excess flash was trimmed out. The prosthesis was tried on the patient and extrinsic staining and characterization was done for proper shade matching. The prosthesis was retained with the help of adhesive (Pro Bond Adhesive, UK) and the margins of the prosthesis were concealed by using eyeglasses (FIG- 14). Instructions regarding the usage of adhesive and care and maintenance of the prosthesis were given. The patient was highly satisfied with the esthetics during the follow up appointments.

Discussion

Tumors involving maxillofacial region often necessitates radical surgery which requires partial or total removal of nasal, orbital, antral contents and jaw resections resulting in orofacial defects.[7] The basic objective of prosthetic rehabilitation is the closure of the surgical defect and maintain the patency of oral and nasal cavity separation of oral cavity from the nose and antral cavity.[8] Facial prosthesis should not be considered as a replacement for surgical and plastic reconstruction, but in certain circumstances it may be a lone option. Facial prosthesis helps to restore normal appearance, alleviate social stigma and improves quality of life of patients.[9]

In this case report prosthetic rehabilitation of patient with palatal fistula and partial nasal defect was described. Titanium framework was used as it is a biocompatible material and it also reduced the total weight of the prosthesis thereby enhancing retention of the prosthesis and comfort of the patient. The main advantages of titanium are its low density (4500 kg/m3), good corrosion resistance, and high strength. The other advantage of titanium framework is it significantly reduces the risk of infections with pathogenic oral microorganisms, may protect from local oral or systemic infections.[10] Adhesive retained silicone nasal prosthesis was fabricated. The main advantages of the RTV silicone material were the use of stone molds, ease of manipulation, ease of colouring and life lie appearance. Other advantages are colour stability and biological inertness.[11] The margins were concealed with the help of

eyeglasses which resulted in improved esthetics and partial retention.

Conclusion

Maxillofacial defects have a huge psychological impact on the patients limiting their normal function and quality of life. Successful prosthetic rehabilitation in such patients will enhance the function, esthetics and self-confidence to a greater extent.

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Legend Figures

Fig 1: Oro antral fistulae in the mid palatine region

Fig 2: mandibular arch

Fig 3a: preoperative frontal view

Fig 3b: lateral view

Fig 4: final impression

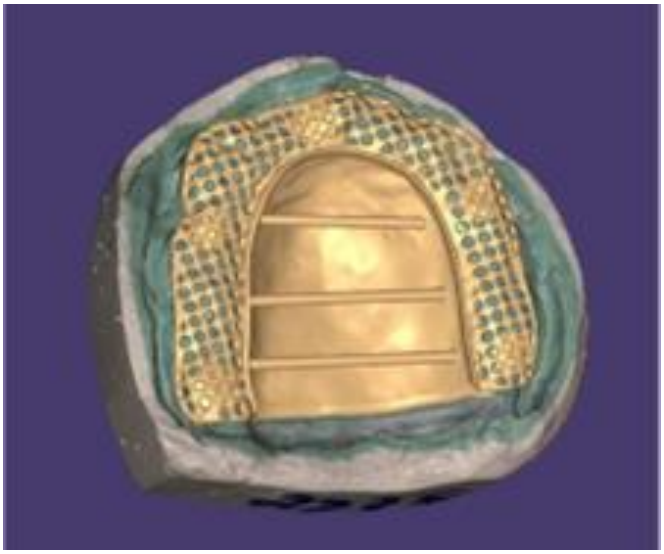

Fig 5: designing of the framework

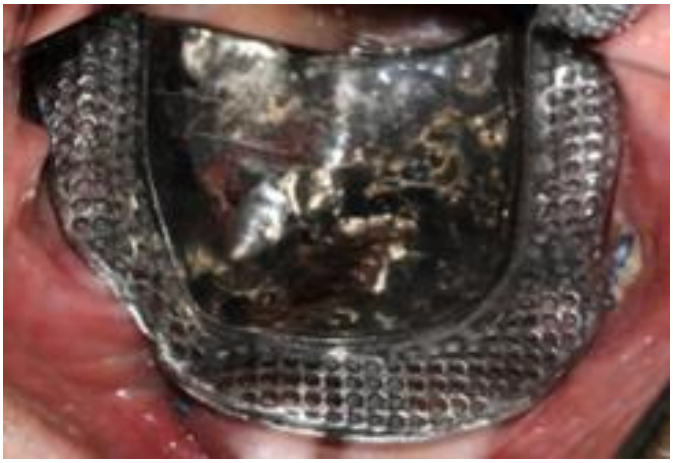

Fig 6: framework try in

Fig 7: maxillomandibular relation recorded

Fig 8: finished prosthesis

Fig 9: prosthesis in situ

Fig 10: post operative frontal view

Fig 11: recording the facial defect

Fig 14: final prosthesis in situ

Fig 12: facial moulage

Fig 13: wax pattern try in