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Prosthodontic management of partially edentulous Maxillectomy patient: A case report

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Abstract

Patient with maxillectomy presents a significant challenge for prosthetic rehabilitation. Difficulty in swallowing, speaking and frequent nasal regurgitation, leads to significant functional, esthetic and social compromises which alters the psychological well-being of the patient. Early rehabilitation with maxillofacial prosthesis plays a significant role, replaces the missing soft and hard tissues. A definitive obturator is fabricated to replace the interim denture. Patient presents only four remaining teeth posteriorly on left side intra-orally with Aramany class IV defect. Keeping patient's socioeconomic condition in mind, an obturator is fabricated using heat cure polymethylmethacrylate resin. Patient's satisfaction with absence of any discomfort like nasal regurgitation and hypernasality during functional movements, swallowing, speaking has been given prime importance. The main objective of the article relates to the situation where an obturator can be fabricated using simple conventional technique with water tight seal that enable to restore structure, function and esthetics to a reasonable level.

Keywords: Maxillectomy, obturator, prosthodontic rehabilitation

1. Introduction

Most common malignant tumour seen in males in India is squamous cell carcinoma. Most of which are diagnosed late, especially, when tumour invade the underlying bone intra-orally. Today, treatment of malignant neoplasm of the hard palate comprises surgical resection having previously evaluated the location and extent of the lesion, histotype, patient's age and general state of health [1].

Rehabilitation of the patient presenting with a malignant tumor in the maxilla requires a multidisciplinary approach including surgical treatment, radio/chemotherapy, phonetic rehabilitation, physiotherapy, and prosthetic treatment. When there is large extension of carcinoma, partial maxillectomy, subtotal maxillectomy or total maxillectomy is done. These defects can be repaired surgically using free microvascularized flaps or pedicle flaps [2].

Maxillectomy or surgical resection of maxilla may cause several problems including difficulties in speech, swallowing, and mastication. Change in facial appearance and loss of underlying tissues also results in emotional stress, social phobia, and psychological problems. [3] There comes the role of dental or maxillofacial prosthesis, which obturates the defect. Maxillofacial prosthodontics is the branch of prosthodontics concerned with the restoration and / or replacement of the stomatognathic and craniofacial structures with a prosthesis that may or may not be removed on a regular or elective basis. Maxillofacial prosthesis is any prosthesis used to replace part or all of any stomatognathic and / or craniofacial structure [4].

The prosthesis recreates a partition between oropharynx and naso-pharynx and facilitates improvement in mastication, deglutition and speech intelligibility [6]. A pressure-resistant seal of the obturator against the mucosal lining and skin graft, if placed, restores speech and swallowing functions. A successful prosthetic design for functional restoration of the maxillectomy defect utilizes the remaining palate and dentition to maximize the support, stability, and the retention of an obturator. Fabricating a successful obturator prosthesis used for the prosthetic rehabilitation of congenital or acquired defects in the maxilla depends on making a detailed impression and constructing the prosthetic parts compatible with the oral tissues [7].

The prosthetic rehabilitation is generally done in three phases. The first phase involves a surgical obturator which is given just after surgery.

The second phase is an interim obturator given 2–4 weeks after surgery and it to be worn by patient during healing phase until the fabrication of definitive prosthesis. After a period of 3–6 months and after complete healing, the tissues are dimensionally more stable and hence definite obturator is given [3]. It has been proposed by M. A. Aramany, that partially edentulous maxillectomy dental arches can be classified into six groups. The design of the framework for maxillary obturator varies greatly in each group, in order to select the most suitable components to resist the various forces acting on the obturator prosthesis without applying undue stress on the remaining teeth and soft tissue structures [8].

The present report describes a prosthodontic rehabilitation of a patient with Aramany class IV maxillary defect showing complete healing of tissues followed partial maxillectomy procedure.

2. Material and Methods

A 48 year old male patient reported to the Department of Prosthodontics and Implantology in Government Dental College & Research Institute at Bangalore, Karnataka, India, with the chief complaint of missing teeth and nasal regurgitation of food.

He was complaining of opening in the palate and insufficient seal of the interim prosthesis he had. Intra oral examination revealed that four remaining teeth 24,25,27,28 were present posteriorly on left side, which were firm and were able to sustain the forces acting on prosthesis and defect was classified as Aramany class IV (figure 1). Patient had difficulty in speaking due to marked hyper nasality. Keeping the patient socioeconomic condition in mind, it was planned to fabricate a removable prosthesis made of heat cure polymethyl methacrylate resin with clasp arms as retentive components. Procedure followed was -

1. Primary impression was made in rim lock stock tray. Impression compound type II was kneaded in warm water and adapted to the anterior portion and side of the tray to support irreversible hydrocolloid and placed in the mouth. Over it, irreversible hydrocolloid was filled in the tray to make impression. Cast was poured in Plaster of Paris.
2. Custom tray was fabricated 2mm short of the sulcus depth using polymethylmethacrylate self-cure resin. In order to record the functional depth of the defect, border moulding was done in incremental manner using low fusing green stick compound. Patient was instructed to do neck movements including flexion and left and right turn, during border moulding to attain proper seal.
3. Dual impression technique was used. Final impression was made using zinc oxide eugenol impression paste in custom tray followed by pick up impression using irreversible hydrocolloid material in a stainless steel stock tray to make impression of remaining teeth and to complete borders. Type III dental stone was used for the fabrication of master cast. (Figure- 2, 3)
4. All the undesirable undercuts were blocked and a temporary denture base record was made on master cast using auto polymerizing resin and occlusion rim was fabricated. Jaw relation record at correct vertical dimension and horizontal relation was made and transferred to the semi-adjustable articulator.
5. Teeth arrangement was completed and wax try-in was done, the patient approval for esthetics was taken (Figure 4).

6. A round stainless steel wrought wire 22 gauge was used for clasp and adapted to the teeth 24 and 27.
7. Obturator was flasked and processed using heat cure polymethylmethacrylate resin using conventional method.
8. The finished and polished final prosthesis was inserted and was checked for peripheral seal. The pressure areas were relieved using pressure indicating paste (Figure 5).
9. Denture was inserted and taught the placement and removal of an obturator (Figure 6).
10. Post-insertion instructions were given to the patient in the care and use of obturator and recalled for regular post-insertion visits.



Fig 1: Intra-oral view of maxillary



Fig 2: Final impression



Fig 3: Master cast



Fig 4: Jaw relation record



Fig 5: Finished and polished



Fig 6: Post- insertion of obturator

4. Discussion

Oral squamous cell carcinoma represents 90%–95% of all malignant neoplasm of the oral cavity. It occurs in well established sites, including the floor of the mouth, tongue, gingiva, lips, buccal mucosa and also in tooth bearing areas of either the maxilla or the mandible^[3].

Rehabilitation of the acquired defect in the oral cavity and dentition following maxillectomy procedure, can be achieved by using an obturator prosthesis or a vascularised free-flap containing a bone segment^[1].

Maxillofacial prosthetics is the art and science that deals with the anatomical, functional and cosmetic reconstruction using inert substitute. Prosthetic rehabilitation of an acquired large palatal defect is a challenging procedure.^[5] However, rehabilitation of patients with acquired maxillary defects is relatively simpler than rehabilitation of defects in the mandible, and pleasing as well as accepted outcomes can be identified at the end of treatment. On the other hand, great efforts should be given in dealing with large defects to obtain the substantial requirements for retention and support of the prostheses^[2].

Prosthetic intervention with maxillary obturator prosthesis is necessary to restore the contours of the resected palate and to recreate the functional separation of the oral cavity and sinus and nasal cavities. This should occur at the time of surgical resection, and it will be necessary for the remainder of the patient's life. Hence, proper understanding and knowledge of the obturator is a must to make awareness of the efficacy of the treatment modality^[9].

Aramany reviewed the patient population and six different groups were classified according to the relationship of the remaining abutment teeth to the palatal defect. The classification excluded patients who have large palatal defects involving both sides of the dental arch and those who have only one tooth remaining^[10]. Besides this, several classification of obturator has been given by different authors, and few of them may be discussed as -

1. Depending on the material used- metal obturator, resin obturator, silicon obturator.
2. Depending on the time of intervention for treatment of acquired hard palate defects- immediate surgical

obturator, transitional/interim obturator and definitive obturator^[9].

A successful prosthetic design for functional restoration of the maxillectomy defect utilizes the remaining palate and dentition to maximize the support, the stability, and the retention of an obturator.^[7] In dentate patients, remaining teeth, soft tissue undercuts and scar band, play an important role in primary retention, support, and stability of an obturator^[5]. The technique described in the article for the fabrication of obturator is convenient and easy. Besides this, rather than recording depth of the defect and subsequent increasing height of prosthesis, broad coverage and water-tight seal was given more importance, which eliminates the need for hollow prosthesis, most often leads to decreased strength of the obturator.

Care should be taken during the fabrication of definitive obturator to check the site for fresh complications, and only when the size of the defect is dimensionally stable, the definitive prosthesis should be given.

3. Conclusion

Prosthetic rehabilitation of the maxillofacial defect patient is a lengthy and multidisciplinary procedure. However, if attention is paid to the proper sequencing and details of treatment, it can be one of the most satisfying procedures. Patient was satisfied with the definitive prosthesis. There was marked improvement in the retention and stability of denture as compared with the previous one he had. There was no nasal regurgitation of fluid on drinking and hypernasality of speech was corrected upto patient satisfaction.

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