Prosthetic Rehabilitation of A Dentulous Maxillectomy Patient with Obturator Prostheses: A Clinical Report

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Abstract

Maxillary defects resulting from resection involving the maxilla pose unique surgical and prosthetic rehabilitation challenges. Such defects occur as a consequence of congenital malformations, trauma or surgical resection of tumors. Surgical reconstruction of large maxillary defect is seldom tried. The obturator is a prosthesis used to close maxillary defects to restore masticatory and phonetic functions. This clinical report describes prosthodontic management of a maxillectomy defect with obturator prosthesis.

INTRODUCTION

Ablative oncologic surgery for the control of malignancies in oral cavity may result in palatal defects which permit oroantral and/or oronasal communication that compromises the integrity and function of the oral cavity [1]. The prime objective of rehabilitating these defects is to eradicate the disease and to improve the quality of life of the patient. Maxillectomy defects pose a unique surgical and prosthetic challenges and rehabilitation of the patient with such defect requires a multidisciplinary approach. The maxillofacial prosthodontist, as a member of the surgical team, aids in the recovery of the patient by fabricating and placing obturator prosthesis.

The name obturator is derived from the Latin verb "obturare" which means close or to shut off. According to the Glossary of Prosthodontic Terms-8, obturator is defined as prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or contiguous alveolar structures. Closure of the palatal defects after maxillectomy with obturator is an acceptable intervention to recreate an anatomic barrier between the cavities and to restore masticatory function and to improve speech [2,3].

The literature reveals the use of artificial material to obturate the palatal defect. Pierre Fuchard (1728), pioneer of modern obturators, described two types of palatal obturators. Claude Martin (1875) started using a surgical obturator. Fry (1972) described importance of impression making before surgery. Steadman (1927) described the use of gutta-percha to hold a skin graft in position for surgical correction of maxillectomy [4]. This clinical report describes the surgical and prosthetic therapy of a patient who presented with angiosarcoma involving left maxillary antrum.

CASE REPORT

A 40-year-old man presented to the Department of Prosthodontics and Maxillofacial Prosthetics for fabrication of a surgical obturator. The patient was diagnosed as having angiosarcoma of left maxillary antrum (FNLLC Grade 2, T3N0M0) and had been scheduled for left total maxillectomy. The planned surgery with regards to amount of excision was discussed with the surgical team. The team expected the resection to result in a defect corresponding to Aramany’s Class II [5]. Maxillary and mandibular irreversible hydrocolloid impressions (Zelgan, Dentsply) were made with stock trays. The casts were poured in type III gypsum (Kalstone; Kalabhai) and the anticipated line of resection was marked on the cast which was altered to conform to the proposed surgical resection. Autopolymerizing clear acrylic resin (DPI Cold Cure, DPI) dough was adapted over the modified cast to fabricate immediate surgical obturator. The prosthesis was retained using wrought wire fitted labial bow (Figure 1). Insertion of the immediate surgical obturator was carried out after the surgical resection was completed. The borders of the obturator were adjusted so as to ensure a passive fit and not to cause any irritation to the reconstructed flap.
Seven days after surgery the prosthesis and surgical packing were removed. The rapid changes in the defect following surgery resulted in poor fit of immediate surgical obturator (Figure 2). So, fabrication of delayed surgical obturator was planned. A gauze piece was packed in the defect and floss was tied to it for retrieval after the impression was made. Impression was made using irreversible impression material (Figure 3). Ease of manipulation, adequate record of surface details, better elasticity and hydrophilicity makes irreversible hydrocolloid a commonly used material for recording maxillofacial defects. The impression should capture all the intraoral structures on the non resected side and the resection defect with sufficient extension, including the residual soft palate, the residual hard palate, the anterior nasal aperture, the lateral scar band and the height of the lateral wall. The impression was boxed and poured in Type III dental stone (Figure 4). Unfavorable undercuts were blocked and modeling wax was put into the open defect area, with the patient’s normal palatal ridge being used as a guide, leaving an approximately 2 mm thickness for the open lid portion of the obturator (Figure 5). Auto polymerizing clear acrylic resin dough was adapted on the cast for processing an open lid obturator using conventional laboratory procedures (Figure 6, 7). The superior surface can be either left open or closed. Open lid obturator is preferred because it has less weight and is easier to adjust, plus speech may be better with this configuration. The obturating portion of the prosthesis was relined with tissue conditioning material (Permasoft, Dentsply) (Figure 8). The constantly changing defect dimensions required the soft liner to be changed frequently during healing period.

After 2 months the defect was stabilized to the point that the continuous changes were minimal and considerations for interim obturator were made (Figure 9). Occlusal relationships were secured and mounted in a semi-adjustable articulator. Teeth position and occlusion were checked, and the necessary corrections were made before processing the interim obturator. Open lid interim obturator was fabricated for the patient (Figure
DISCUSSION

Frequently, the control of malignancies in oral cavity necessitates ablative oncologic surgery, leaving the patient with a defect that can compromise the integrity and cause some functional and esthetic problems [1]. A multidisciplinary approach is usually needed for rehabilitating such maxillofacial defects.

A successful prosthodontic rehabilitation should recreate the partition between the oral cavity and nasal cavity, restore facial contour, improve mastication, improve speech intelligibility, provide lip support, improve articulation, and reduce drooling. Prosthodontic prognosis is affected by the volume and location of postsurgical bony anatomy, availability of abutment teeth, size of the defect, quality of mucosa, history of therapeutic radiation.

The obturator portion of the prosthesis was smoothed to reduce the possibility of trauma to the mucosa and thus improve tolerance of the prosthesis. The patient was trained regarding the insertion and removal of the prosthesis and was instructed in hygiene procedures, and follow-up appointments were recommended every 3 to 6 months, or as needed, to evaluate the fit of the prosthesis and the condition of the oral mucosa.
therapy, the patient's experience with dental prostheses, and neuromuscular control of the patient. The overall treatment outcome is dependent on a thorough understanding of surgical and prosthodontic limitations and close collaboration between the surgical and prosthodontic teams [7].

Two broad treatment modalities are available for the rehabilitation of such defects: prosthetic obturators and surgical reconstruction. Surgical flap reconstruction is associated with increased operating room time, need for technical expertise, and the possibility of donor morbidity at the flap harvest site [8,9]. For the patient who will undergo prosthetic rehabilitation, there are four distinct prostheses that will be required: immediate surgical obturator, delayed surgical obturator, intermediate obturator, and definitive obturator [10,11].

The object of surgical obturator includes immediate restoration and maintenance of oral function to a reasonable level which shortens recovery time and expedites the patient's return to the community as a functioning member. They support soft tissues, minimize scar contracture and disfigurement, improve postoperative oral hygiene, providing a positive effect on the patient's psychology [12,13].

In the dentate patient, surgical obturator designs may vary from a prosthesis using an acrylic resin record base bearing no teeth [14] with or without wrought-wire clasps [15] to a clamped acrylic resin prosthesis that restores the dental arch form [16]. It is recommended that posterior occlusal contacts not be established on the resected side until the surgical wound is healed [6,17].

The use of various materials like acrylic resin, light cured resin, resilient liner, fluid resin and flexible silicone to fabricate obturator prostheses have been reported in the literature. Acrylic resin is the most commonly used material for obturators but it does not fulfill all of the requirements. The use of flexible silicone material has been proposed to provide better retention and less irritation than hard acrylic resin. Other advantages of silicone obturators are lightness of weight and ease of insertion and removal of the prostheses [18]. Depending on the case, the operator should select the best suitable material and technique for successful rehabilitation.

CONCLUSION

Maxillary defects resulting from resection involving the maxillae pose unique surgical and prosthetic rehabilitation challenges. This report describes the treatment sequence of a patient with angiosarcoma of left maxillary antrum. The obturator prosthesis improved the ability to feed and swallow to a reasonable level. Intelligible speech was achievable with the prostheses. This had a positive psychological effect on the patients, thereby enhancing their self-esteem after prosthodontic rehabilitation.

REFERENCES