Maxillofacial Prosthetics

Kamolphob Phasuk, DDS, MS*, Steven P. Haug, DDS, MSD

KEYWORDS

• Maxillofacial prosthetics • Maxillofacial prosthodontics • Obturator prosthesis
• Head and neck neoplasms—rehabilitation • Facial prosthesis

KEY POINTS

- Maxillofacial prosthetics is a branch of prosthodontics associated with restoration and/or replacement of stomatognathic and craniofacial structure with prostheses, which may or may not be removed on a regular or elective basis.
- After cancer ablation surgery in the head and neck region, a maxillofacial prosthesis can rehabilitate a patient's appearance and functions, including mastication, swallowing, and speech.
- When surgical construction after cancer ablation surgery is limited, patient functioning and esthetics can be restored by a maxillofacial prosthesis. Patient quality of life and psychological status are improved.
- A maxillofacial prosthodontist works closely with the oncologic surgeon, physicians, and others cancer care team members to deliver the best treatment outcome for the patient.

INTRODUCTION

Maxillofacial prosthetics is a branch of prosthodontics associated with restoration and/or replacement of stomatognathic and craniofacial structures with prostheses, which may or may not be removed on a regular or elective basis.[1] After cancer ablation surgery in the head and neck region, a maxillofacial prosthesis can rehabilitate a patient's appearance and functioning, including mastication, swallowing, and speech. Not just after surgical treatment, but on many other occasions the maxillofacial prosthodontist is requested to fabricate a device to support the ongoing cancer treatment. A positioned radiation stent for radiation therapy and a feeding appliance are good examples of those devices. In general, a maxillofacial prosthodontist works closely with the oncologic surgeon, physicians, and others cancer care team members to deliver the best treatment outcome for the patient.

PROSTHETICS MANAGEMENT OF PATIENT AFTER MAXILLARY RESECTION SURGERY

Surgical excision of tumors in the maxilla is a principle reason for a maxillectomy or a maxillary resection surgery.[2,3] Even though it depends on the type and location of the tumor, cancer ablation surgery of the maxilla often involves hard palate, maxillary sinus, and nasal cavity. An alteration of the hard palate as the result of surgery can create a communication between the oral cavity and the nasal cavity. Because of this oronasal communication, a food bolus and liquids can escape the oral cavity to exit the nares. The failure to impound the air causes a sound distortion called hypernasality. The consequences of a maxillary defect can lead to unintelligible speech and difficulty eating with a potential for inadequate nutrition intake. Prosthetic intervention, with a maxillary obturator prosthesis, is necessary to restore the contour of the hard palate and to recreate the functional separation of the oral cavity and nasal

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Department of Prosthodontics, Indiana University School of Dentistry, 1121 West Michigan Street, Indianapolis, IN 46202, USA
* Corresponding author.
E-mail address: kphasuk@iu.edu

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cavity and maxillary sinus.[4] This prosthetic intervention can be started as early as at the time of the maxillary resection surgery and will be necessary for the remainder of the patient's life.

PROSTHETIC TREATMENT PLANNING

Treatment planning of prosthodontic rehabilitation for the patient undergoing maxillary resection surgery starts before the surgery. The principle when treating maxillectomy patients preoperatively is a comprehensive evaluation, in a limited time, to maximize the health status after surgery and maintain the usefulness of the remaining teeth.[2,3] A comprehensive oral and dental examination should be performed and dental radiographs should be taken. An accurate study cast that includes all important anatomy has to be obtained (**Fig. 1**) and mounted in an appropriate articulator.[5] It is preferred to have at least 2 sets of casts. One is preserved as a pretreatment record and other may be used to fabricate the surgical obturator or interim obturator. Irreversible hydrocolloid is generally the material of choice for making the impression for study casts. This material has an innate property that captures anatomic details in a short clinical working time and is gentle to soft tissue, which is especially important around a tumor. When possible, dental prophylaxis or gross debridement should be performed as well as any minor operative dental procedures. These dental preventative measures minimize the risk of dental and periodontal problems owing to the difficulty of oral hygiene practice postoperatively. Unsalvageable teeth should also be removed at the time of surgery or preoperatively.

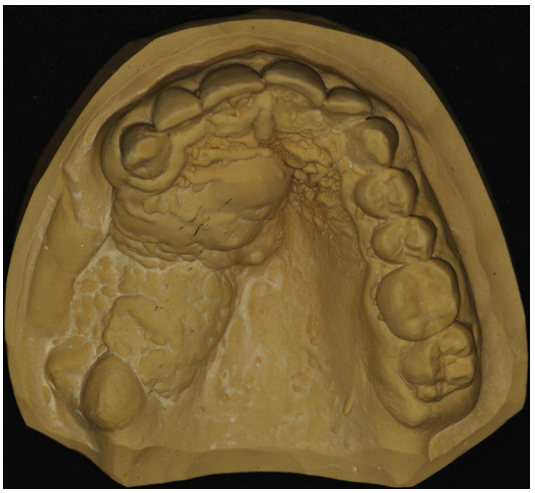

Fig. 1. Preoperative study cast for a maxilletomy patient.

It is very important to discuss with the patient the plan for oral rehabilitation. Most patients are not familiar with the services that the prosthodontist can provide. The benefits, limitations, and sequence of the prosthodontic treatment plan should be explained to the patients and their family. Patient compliance and acceptance are very important for the success of the treatment.

Prosthetics rehabilitation for maxillary resection surgery can be classified into 3 phases[4,5]:

- Surgical/immediate obturation,
- Postoperative/interim obturation, and
- Definitive obturation.

Surgical/Immediate Obturation

Surgical obturation has many benefits for the either edentulous or dental patients who require any type of maxillectomy or palatalectomy. The benefits of surgical obturation include providing a matrix on which the surgical packing can be placed and a decrease in the risk of oral contamination to the wound. The prosthesis improves the patient's psychological status by enabling the patient to speak and swallow immediately after surgery. The ability to swallow immediately after surgery may eliminate the need for a nasogastric tube or facilitate earlier removal. When using a surgical obturator, the hospitalization period potentially reduces to 3 to 5 days after surgery.[5]

Communication between the prosthodontist and the surgeon is critical for the design and fabrication of the surgical obturator prosthesis. The goal of a head and neck surgeon is to achieve complete oncologic resection of the tumor and leave clear margins at the resected site. However, for prosthodontic rehabilitation after maxillary resection surgery, maintaining as many structures (eg, hard palate, teeth) as possible is the key to improving functional outcomes with a maxillary obturator. In general, the prognosis of the prosthodontic rehabilitation of edentulous patient varies with the defect size.[6] For the dentate patient, the more alveolar process and teeth that are preserved, the better the functional outcome of the prosthesis. The surgical incision line also greatly influences the design and extension of the surgical obturator. One should design an obturator with the most conservative line of resection. By using the most conservative surgical planning, the prosthesis may be used even if the defect is larger than previously planned. However, if the most extensive line of resection is used for design and less tissue is resected at the time of surgery, the surgical obturator could be too large and would require an adjustment in the operating room. In