

# A simple technique to fabricate a surgical obturator restoring the defect in original anatomical form

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Oral cancer treatment involves the surgical removal of all or part of the maxilla, leaving the patient with a defect that compromises the integrity and function of the oral cavity. The postoperative restoration of esthetics, deglutition, and speech shortens recovery time in the hospital and expedites the patient's return to the community as a functioning member. The surgical obturator is the proven treatment option in such situations. This article describes a simple technique to fabricate a surgical obturator that restores patient's original dentition and facial and palatal tissue form. The obturator fabricated with this technique utilizes the vacuum formed index of patient's original tissue form and duplicated partly in heat and partly in auto polymerizing acrylic resin. Duplication of the original tissue form helps patient to minimize the immense physiological trauma immediately after the surgical resection. The obturator fabricated with this technique supports soft tissues after surgery and minimizes scar contracture and disfigurement, and thus may have a positive effect on the patients' psychology. [J Adv Prosthodont 2011;3:106-9]

**KEY WORDS.** Maxillofacial prosthesis, Maxillectomy, Obturator

## INTRODUCTION

Oral cancer treatment involves the surgical removal of all or part of the maxilla, leaving the patient with a defect that compromises the integrity and function of the oral cavity. The maxillofacial prosthodontist, as a member of the surgical team, is able to aid in the recovery and rehabilitation of the maxillectomy patient by fabricating and placing a surgical obturator. The immediate postoperative restoration of form and function shortens recovery time in the hospital and expedites the patient's return to the community as a functioning member. The obturator supports soft tissues after surgery and minimizes scar contracture and disfigurement thereby making a positive effect on the patients' psychology. Artificial replacement of the teeth and palate aids speech, mastication, esthetics, and morale.<sup>1,2</sup> In the dentate patient, surgical obturator designs may vary from a prosthesis using an acrylic resin record base bearing no teeth,<sup>3</sup> with or without wrought-wire clasps,<sup>4</sup> to a clasped acrylic resin prosthesis that restores the dental arch form.<sup>5</sup> It is recommended that posterior occlusal contacts not be established on the resected side until the surgical wound is healed.<sup>6,7</sup> This article describes a simple technique to fabricate a surgical obturator by restoring the patient's original denti-

tion, facial and palatal tissue form. A vacuum formed sheet was used to duplicate the presurgical tissue form of the affected maxillary region.

## CASE REPORT

A 62-year-old man, visited to the Department of Ear-nose-throat in Government medical college and hospital, Nagpur (India) due to the extensive ulceration and swelling in the left maxillary palatal region. Intraoral examination revealed the deep ulceration 4 cm antero-posteriorly and 3 cm mesio-distally on the palatal aspect of the left maxillary posterior teeth. Orthopantomographic examination revealed large radiolucency covering entire left half of the hard palate. Clinico-pathological examination revealed T3N2M0 squamous cell carcinoma of left maxilla. The speech, mastication and swallowing functions were drastically affected due to the cancer lesion. Surgical resection of the cancer tissues was planned followed by restoration of the defect with the surgical obturator. The surgical obturator was fabricated by restoring the patient's original anatomical tissue form of the future defect-area and delivered immediately after surgery.

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### Technique to fabricate a surgical obturator

1. Examine the oral cancer lesion carefully prior to surgery and discuss the planned treatment with the surgeons with regard to the proposed line of incision and amount of resection.
2. Take a pre-surgical impression of the maxillary arch with irreversible hydrocolloid (Dentalgin; Prime dental products, Mumbai, India). Pour the impression with type III gypsum material (Kalstone; Kalabhai Karson, Mumbai, India) to obtain a working cast and outline the anticipated line of resection on the maxillary working cast (Fig. 1). Review the design with the surgeon to verify the anticipated scope of the planned resection.
3. Modify the cast (in the areas of the lesion) to obtain normal anatomical contours (Fig. 2). Note that the swollen areas of the lesion can be scraped and the defect (ulcer) areas can be built-up with dental stone in order to create the normal anatomical tissue form on the cast.
4. Manipulate 19 gauge hard round stainless steel orthodontic wire (3M Unitek, Monrovia, Calif) to fabricate 'C clasps' that engage the labial infrabulge retentive areas of the remaining healthy teeth on the nonresected and/or resected side.
5. Fabricate the plate incorporating the clasps with heat polymerizing acrylic resin (DPI Heat cure; Dental Products of India, Mumbai, India) in conventional manner. Finish and polish the palatal plate in usual manner.
6. Reseat the palatal plate on the maxillary cast and make a vacuum formed template over the plate (Fig. 3). Note that the facial surface on the defect side of the cast should be completely recorded in the vacuum formed template till border areas.
7. Pick-up the palatal plate from the cast and transfer it in to the vacuum formed template.
8. Section the definitive cast according to the anticipated line of resection and separate the sectioned portion of the cast (Fig. 4). Use remaining portion (of normal structures) of the cast to fabricate the prosthesis.



**Fig. 1.** Maxillary working cast with anticipated line of resection marked.



**Fig. 2.** Scraping of the cast to achieve the normal anatomical contours in the labial vestibule.

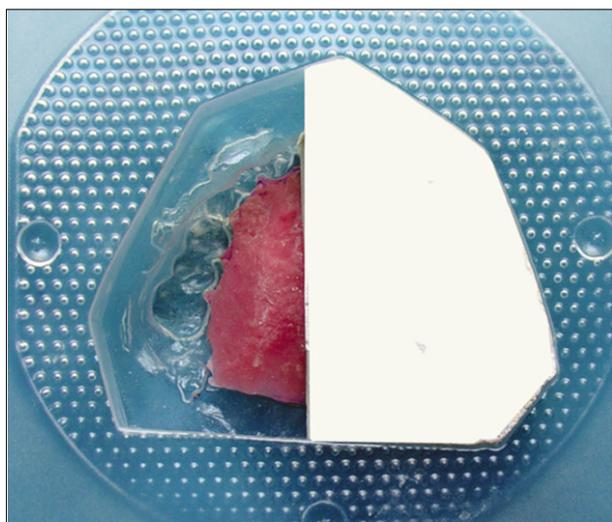


**Fig. 3.** Vacuum formed template adapted on the prosthetic base.



**Fig. 4.** Maxillary cast sectioned according to the pre-planned line of resection.

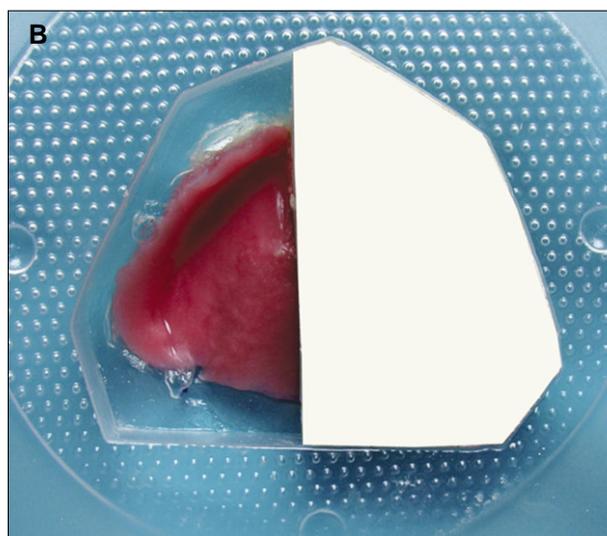
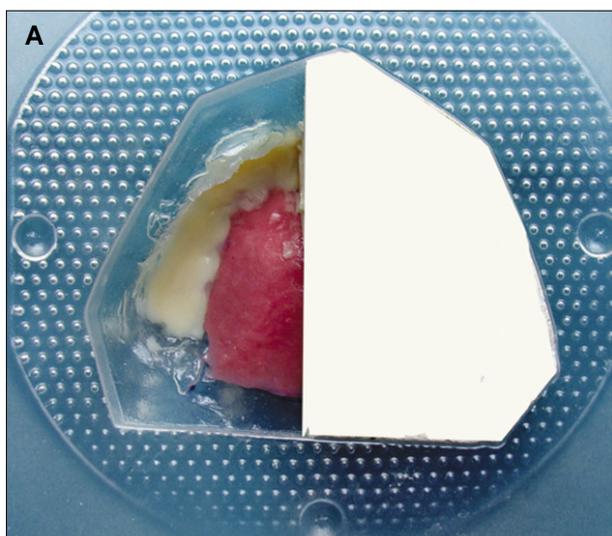
9. Reseat the remaining part of the cast (along with the palatal plate) onto the vacuum formed template (Fig. 5).
10. Create prosthetic teeth by incrementally adding tooth-colored autopolymerizing acrylic resin (Unifast II; GC Corp, Japan) into the impression areas of teeth in vacuum formed template. Also create the facial flange (uniformly 2 - 3 mm in width) by adding pink colored autopolymerizing acrylic resin (DPI cold cure; Dental Products of India, Mumbai, India) using sprinkle-on technique (Fig. 6).
11. After complete polymerization carefully remove the cast from vacuum formed template. Remove the prosthesis from vacuum formed template carefully. Trim the excess acrylic resin of the facial flange and finish and polish the prosthesis in conventional manner (Fig. 7).<sup>9</sup>
12. After fabrication of the obturator, operate the patient for resection of the left maxilla to eradicate all possible cancerous tissues. Carefully examine the surgical defect area (Fig. 8).
13. Disinfect the prosthesis before trying it in patient's mouth with a glutaraldehyde 0.2% solution (Sekucid; Paragerm Lab, Carros, France). Carry out the minor adjustments to fully seat the prosthesis in position immediately after the surgery (Fig. 9). Adjust the occlusal surfaces of the posterior teeth (approximately 2 mm) to make them out of occlusion.<sup>6,7</sup> Place a surgical pack in the defect area before placement of the obturator if necessary.
14. Schedule the patient for routine recall appointments for the examination of the healing tissues and adjustment of the obturator.



**Fig. 5.** Reseating of cast on vacuum formed template.



**Fig. 7.** Completed surgical obturator.



**Fig. 6.** Creation of the prosthetic teeth (A), and facial surface (B) in tooth colored and pink colored autopolymerizing acrylic resin respectively.



**Fig. 8.** Surgical defect after maxillectomy.



**Fig. 9.** Surgical obturator was placed after maxillectomy.

## DISCUSSION

This article describes a simple technique to fabricate a surgical obturator by restoring patient's original dentition and facial and palatal tissue form. Obturators with teeth may be made using several methods, using a celluloid matrix,<sup>1</sup> modifying a surgical obturator,<sup>5</sup> using a denture duplicator,<sup>10</sup> or using light cured<sup>8,11</sup> or heat-polymerized acrylic resin.<sup>9</sup> The obturator fabricated with this technique utilizes the vacuum formed index of patient's original tissue form and duplicated partly in heat and partly in auto polymerizing acrylic resin. Immediate obturator fabricated with this technique supports soft tissues after surgery and minimize scar contracture and disfigurement that may have a positive effect on the patients' psychology. The other advantages are the following: 1) immediate esthetic improvement 2) retention and enhanced bracing effect provided by wire clasps 3) the same surgical obturator can later serve as an interim obturator following modification of the tissue surface and 4) cost effectiveness, as only one obturator is prepared. Most authors suggest that posterior teeth should not be added to surgical obturator prosthesis since they may impose excessive stress on the wound and delay the healing process.<sup>2</sup> This technique describes replacement of dentition that would be missing followed by grinding occlusal contacts of posterior teeth (at least 2 mm) to position them out of occlusion. Keeping the occlusal surfaces of posterior teeth in infraocclusion and maintaining intact axial surfaces serves the purpose of facial soft tissue support as well as esthetics without disturbing the healing process. Anterior teeth should not be altered unless the incisal contacts hinder the healing tissues. The purpose of adding missing teeth (anterior or posterior) may prevent significant psychological trauma to the patient and helps to prevent scar contracture and subsequent disfigurement. The developed facial flange also helps to support the facial soft tissues which can maintain the patient's original facial esthetic appearance. The space auto-

matically formed between intaglio surfaces of facial flange and palatal plate can easily be utilized for placement of the surgical pack immediately after the surgery. Thus the obturator can provide supporting and stabilizing medium for the surgical pack. The only concern of this technique is that it leaves teeth and facial flanges created in auto polymerizing acrylic resin. The use of light polymerizing acrylic resin can be used alternatively to create teeth and facial flanges to solve this problem.<sup>8,11</sup>

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