# Cast Metal Definitive Obturator Prosthesis for Hemi-maxillectomy Patient: A Case Report

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## Abstract

Maxillary jaw defect produced due to traumatic, surgical or congenital reason often creates communication between antrum and nasopharynx. The defect not only causes nasal reflux during swallowing but also interfere with articulation and production of speech. These limitations are commonly overcome by restoration of the defect with a prosthesis called an obturator. This case report focuses on the prosthetic rehabilitation of a post-surgical maxillary defect with cast metal definitive obturator.

***Keywords:*** *Maxillary Defects, Definitive Obturator, Cast Metal Obturator Definitive Prosthesis, Interim Prosthesis.*

## Introduction

Surgical rejection of maxillary jaw cancer often compromises the integrity and functions of the oro-nasal cavity.[1] The acquired defect formed due to hemimaxilloctomy, impairs the speech,mastication, swallowing and facial esthetic. Rehabilitation of such defect is essential to improve the functional quality of life and self-esteem of the patient.[2]

A multidisciplinary sequential approach involving oncologist, prosthodontist and speech therapist is required to handle such a case.[3] Surgical repair of such defects can be done with free micro vascular flaps or pedicled flaps, autogenous fibula free graft with or without dental implants.[4] However, in a patient with a large defect, history of irradiation, risk of advanced complications or financial issues surgical repair is avoided. Prosthetic rehabilitation of maxillectomy defect with obturator is the preferred option in such circumstances.[5] It recreates the anatomic barrier between the oro-nasal cavities, thereby improving the fluid intake, deglutition and speech of the patient.[6]

The success of an obturator is often subjected to the size of the defect, the amount of undercut of the defect and the number of remaining teeth. Patients with large intraoral defects have been found to have impair functional adaptability, owing to the bulky size of the obturator. The heavy size of the obturator put continuous stresses on remaining supporting structures jeopardizing their health. On the contrary, a hollow maxillary obturator can reduce the weight of the prosthesis by up to 33%, depending on the size of the maxillary defect.[7] This clinical report describes the step by step technique for fabrication of a lightweight, hollow type definitive cast obturator for a maxillectomy patient.

**Case Report:** A 34 -year- old female patient had reported to the Department of Prosthodontics, with a chief complaint of a loose obturator with difficulty in taking food with liquid coming out of the nose during intake. Past medical history of the patient revealed that she had undergone left maxillectomy approximately $2^{1/2}$ yr earlier, for inverted papilloma. Postoperatively, she had used an interim acrylic obturator for 1 year.

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The obturator was found to be ill-fitting and grossly undersized compared to the defect itself.

The extraoral appearance of the patient was found to be asymmetrical with a collapsed left side of the lip (Fig. 1). The mouth opening of the patient was normal. Intraoral examination revealed sub-total maxillectomy of left side crossing the midline and hence was diagnosed as a situation of Armany's Class IV (Fig.2).[8] Right side was partially edentulous with missing 16 and a metal crown of 17. All the walls of the defect were lined with healthy mucosa. Tongue function was normal and speech was altered.

Considering the large size of the defect, health of supporting structure and cost, it was decided to rehabilitate the case with a hollow bulb cast metal definitive obturator. The consent of the patient was taken for the same.

**Procedure:** The procedure was initiated with oral prophylaxis, followed by the removal of the existing metal crown of 17. The finish line of 17 was modified. Primary impressions of the upper and lower arch were made with irreversible hydrocolloid (Tropicalgin; Zermack Dental). Before this, excessive undercuts of the defect were blocked out with a petrolatum laden gauge. The diagnostic casts were retrieved from the impression and upper cast was surveyed and designing of the metal framework of the cast obturator was done on it.

A tripodal design was planned. Embrasure clasps concerning 14,15 and 17,18 were designed for the direct retention of cast framework. The rest seat for 17 was planned to be incorporated in the distal side of its crown. Indirect retention was intended to be obtained from the rest seat on 14 and the palatal extensions on the anterior teeth. Retentive loops were designed on the side of the defect, for attachment of the bulb of the obturator. A full palatal major connector was planned

Necessary mouth preparations were done accordingly followed by an impression of the upper arch with polyvinyl siloxane impression material (Aquasil, Dentsply/Caulk, Milford, DE). The secondary maxillary working cast was made with dental stone type III (Kalstone; Kala Bhai Pvt Ltd., Mumbai, India). It was subsequently duplicated with reversible hydrocolloid to prepare the refractory cast. Wax up of the cast framework on the refractory cast was done as per design, followed by casting with cobalt-chromium base metal alloy (Fig. 3). After proper finishing and polishing, try-in of the metal framework along with a metal crown of 17 was done. Then cementation of the metal crown of 17 was done and the metal framework was seated intraorally. A pickup impression was made with polyvinyl siloxane impression material (Aquasil, Dentsply/Caulk, Milford, DE) in a stock plastic tray, to incorporate the impression of the defect side.

In the final cast, the loops of cast framework were joined with auto polymerizing acrylic resin base covering the defect side. Jaw relation records, teeth arrangement, and try-in were done subsequently in a conventional manner (Fig. 4). After approval of the patient, waxed up prosthesis was processed with heat-cured acrylic resin (DPI-Heat cure; Dental Products of India, Mumbai, India). A sealing the lid with auto polymerizing acrylic resin was used to obtain a hollow bulb obturator.[9] The obturator was subsequently tried in the patient's mouth for adaptability (Fig. 5A,B,C). A permanent soft liner (Ufi Gel C) was applied around the bulb and border of the defect portion of the prosthesis. Necessary border molding was accomplished and the patient was asked to use the relined prosthesis for 1 week. Afterward,the relined permanent soft liner was replaced with heat cure denture material (DPI-Heat cure; Dental Products of India, Mumbai, India) The definitive obturator was positioned intraorally and assessed for nasal regurgitation and quality of speech production. Post insertion oral hygiene instructions and maintenance were given to the patient. The case was followed up for a period of 1yr, during which the patient was found to be satisfied with the prosthesis functionally and esthetically.

**Figure 1. Extra Oral View**

**Figure 2. Intraoral defect of palate**

**Figure 3. Cast metal framework**

**Figure 4. Try in of teeth arrangement**


**Figure 5a. Post insertion extraoral view;**
**Figure 5b. Post insertion intraoral view; Figure 5c. Post insertion intraoral view**

## Discussion

The present case is a classic Armany class IV type defect, as it has crossed the midline and included the premaxilla of the opposite side. (Armany classification I) It was a 2yr old post-operative case with no recurrence of the disease. The wound had healed properly. So it was a favorable case for the definitive cast obturator prosthesis.[10]

Preservation of remaining structure has been the motto of Prosthodontic therapy.[11] This is arguably achieved with the cast metal definitive obturator. As the metal framework stabilizes the prosthesis, soreness and discomfort of soft tissue in the superior- lateral aspect of the defect are reduced. So the jaw relation record and wax try-in of the prosthesis are accurate in terms of esthetic and phonetics.[12] In comparison to the conventional acrylic obturator, it also provides maximum support and retention.[12] So the abutment teeth and soft tissue undercuts were subjected to less stress. Further, midline fatigue fracture is not an issue with cast obturators.[13]

A tripod design framework was planned for the prosthesis, as the remaining teeth were present in a curved manner, with 12 and 13 being still there. Primary retention, support, and stability of the prosthesis were provided by the remaining teeth.[14] Soft tissue undercuts of the defect were used for added retention. Support was obtained from the remaining teeth as well as palate. Definitive rest seats located on the premolars and molars provided the support. As the defect size was large, a full palatal major connector was used for the maximum distribution of functional load.

The definitive obturator design was made hollow to decrease the weight of the large prosthesis. Otherwise, the remaining teeth would have been subjected to persistent non-axial cantilever load, jeopardizing the health of supporting structures.[15] In contrast, a hollow bulb obturator is lighter and promote favorable palatal contour.[7] Moreover, the resonance of speech is achieved as it simulates the functional anatomy of the maxillary sinus. Proper nutritional intake and ability to communicate without nasality is achieved immediately with definitive maxillary cast obturator.

## Conclusion

Prosthetic rehabilitation of maxillectomy defect with definitive obturator restores the mastication,swallowing, aesthetic, resonance and speech of the patient. This helps the patient to resume a normal social life.

**Conflict of Interests:** None

**Ethical Permission:** Approved

**Funding:** Nil

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