

**Case report:**

## **Rehabilitation of Hemi-maxillectomy Defect by Maxillary Hollow Obturator**

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**Abstract:**

Prosthodontic rehabilitation of congenital or acquired maxillofacial defects is always a challenging clinical scenario. These defects pose a major physiological and psychological threat not only to the patients, but to the entire family. A multidisciplinary team approach, thorough investigation, long term follow up, proper counseling and sympathetic attitude may help to bring these suffering patients back to normal life stream. This case reports defects in the maxilla associated with oro-antral and oronasal communications which affected the patient's function and esthetics leading to emotional imbalance. Palatal obturator is the only substitute which covers the defect and contributes to normal speech. It eliminates hypernasality and improves the communication. It is difficult to provide desired retention and stability due to the surgical defect. In the present case, surgical removal of part of the palate made the labial and buccal mucosa more stretched and fibrous, thus limited the potential to use features which otherwise help in retention and stability of denture.

**Key words:** Oro-antral neoplasm , Hemimaxillectomy, hollow bulb obturator

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**Introduction:**

Malignant tumors of the nasal cavity and paranasal sinuses are rare, comprising less than 1% of all malignancies, with poorly differentiated squamous cell carcinoma of the maxillary sinus being the most common.<sup>1,2</sup> . Most lesions remain asymptomatic or mimic sinusitis for long periods while the tumor grows to fill the sinus. Hence, diagnosis may not be made until the lesion has perforated through the surrounding bone, and most patients are diagnosed with advanced disease.<sup>2,4</sup> While optimal treatment patterns, include combined radiation therapy, conservative surgery and chemotherapy. The resulting defects are in the form of an opening into the antrum and the nasopharynx<sup>5</sup>. Prosthodontic outcome for any obturator can be 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 therapy, patient's experience with previous dental prostheses, and neuromuscular control of the patient. Post-surgical maxillary defects pre-dispose the patient to hypernasal speech, fluid leakage into the nasal cavity, and impaired masticatory function. The goals of prosthetic rehabilitation for total and partial maxillectomy patients include separation of oral and nasal cavities to allow adequate deglutition and articulation<sup>6</sup>

Obturator & undercuts present in the defected area can serve as a means of retention. Weight of an obturator may be kept as minimum as possible to counter act the dislodging pull of gravity. Use of wrought wire or cast clasps, indirect retainers, rests and vertical guide planes may help in providing support to obturator prosthesis in partially dentate individuals.

Maximum extension onto the residual palate, alveolar processes and contact of obturator with pterygoid plate, temporal bone, floor of the orbit, or any other osseous structure within the defect may prove helpful for support of prosthesis. Incorporation of adequate support and retention may fulfill the needs of stability in obturator<sup>4</sup>.

#### **Case**

##### **Report:**

A 53 year old female patient reported with a chief complaint of inability to masticate, fluid leakage into the nasal cavity & nasal twang. Her past medical history revealed that she underwent right partial maxillectomy, for neoplasm of right maxillary sinus. Patient was wearing cast partial denture since 12 years, that was now ill-fitting because of breakage of clasps and wearing of denture.(figure 1). On extra oral examination, there had been collapsed facial profile with intelligible speech and complaints of compromised masticatory efficiency. Intraoral examination revealed Aramany class IV maxillary defect on the right maxilla and the remaining teeth on the defect side were 24, 25, 26 & 27. Signs of pain or recurrence were not seen.

##### **Treatment Plan:**

Definitive hollow bulb obturator with full palate major connector, and embrasure clasps on 24, 25 & 26, 27, and acrylic denture with hollow bulb containing with continuous clasp to be given. After the treatment plan was established it was explained to the patient and it was well accepted by the patient.

##### **Treatment Procedure:**

Her pre-operative records and impressions not available. Diagnostic impression of the defect area was made using putty impression material a primary cast was retrieved out of it.

The diagnostic cast was surveyed at 0° tilt, the depth of undercuts, and the location of

undercuts and selection of the path of insertion. All posterior and

posterolateral undercuts were completely blocked to allow comfortable seating of obturator.

Mouth preparation was done, occlusal rests on 24 and 25, 26 and 27. After the mouth preparation was completed. (figure 2). The cast partial framework was fabricated in a standard manner. The cast metal framework was tried in patient's mouth to verify complete seating and sufficient frictional fit. Once the framework was adjusted properly, autopolymerizing resin was added to the retentive loops of the framework to serve as an impression tray, for the obturator portion extending into the defect.

The defect site was molded using low fusing compound and altered cast impression was made. The original master cast was altered using altered cast impression of the defect area and the altered cast was obtained. Maxillomandibular jaw - relation was recorded.

Articulation and teeth arrangement was done. The wax try-in was carried out to check occlusion, phonation and esthetics. (Figure-3) The denture was flaked and dewaxed in the usual manner. After dewaxing separating medium was applied and then heat cure acrylic was packed in dough stage. Initially thin layer of acrylic was placed in the defect. And then salt was packed up to the palatal boundary above which a layer of acrylic was packed up to whole palate and the defect area. (Figure4)

Once it was cured in acrylizer one small hole was made with small round bur and salt was

taken out so that the weight is reduced and thus the hollow bulb obturator using acrylic shim was fabricated. The denture finishing and polishing was carried out in conventional manner (figure 5).

The prosthesis was inserted after intraoral adjustments and the patient was instructed about

the maintenance of prosthesis. Regular periodic recall checkups were done to verify condition of surgical site and prosthesis evaluation.

**Discussion:**

An obturator (Latin: obturare, to stop up) is a disc or plate, natural or artificial, which closes an opening or defect of the maxilla<sup>2</sup>. The basic principles of removable partial denture designing should be reviewed when designing a framework for an obturator. Major connectors should be rigid, occlusal rests should direct occlusal forces along the long axis of the teeth, guide planes should be designed to facilitate stability and bracing, retention should be within the physiological limits of the periodontal ligament and maximum support should be gained from the residual soft tissues<sup>7</sup>.

The number and location of occlusal and incisal rests is determined by the number, position and health of the remaining teeth as well as by the size and location of the defect. Multiple occlusal rests are suggested to improve stability and support for the obturator prostheses and to minimize the movement of the prosthesis towards the tissue<sup>8,9</sup>. Occlusal rests should be located as close to the defect as possible and adjacent to edentulous areas. They should be well-rounded so as to permit some prosthesis movement without placing excessive stress on the teeth. These principles must be recognized and followed during removable partial denture designing for definitive obturator prosthesis for maximum benefit in the function and comfort of the final prosthesis. In the present situation maximum distribution of support is achieved by

incorporating more of the remaining teeth into the design of the framework and maximizing the use of occlusal rests<sup>8,9</sup>. Maximum extension onto the residual palate by using full palate major connector also increased the support for the prosthesis. The metal framework provided good retention, support and stability. The longevity of the prosthesis could be attributed to the strength of the metal. Further, the thermal conductivity of the metal made it sensitive to the temperature changes and the patient showed better functional acceptance to the prosthesis. Lateral undercuts along the lateral margin of the defect were also engaged to enhance retention, stability and support for the prosthesis.

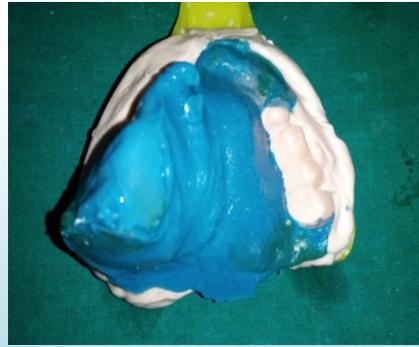
To reduce the weight of the prosthesis, the bulb portion of the obturator is hollowed after it has been processed into acrylic resin. Weight reduction is especially important when the obturator prosthesis is suspended without bony or posterior tooth support on the defect side, as is the case with most maxillary resection prostheses. A hollow maxillary obturator may reduce the weight of the prosthesis by up to 33%, depending upon the size of the maxillary defect<sup>5</sup>.

**Conclusion:**

The prosthesis rehabilitated the patient in terms of function by providing better masticatory efficiency, phonetics by adding resonance to the voice hence improving the clarity of speech and also improved the esthetics of the patient. The use of a hollow bulb design improved the comfort of the patient by decreasing the weight of the prosthesis



**Figure 1 : intra-oral preoperative view**



**Figure-2 Final Impression**



**Figure-3 try in**



**Figure 4-flasking & dewaxing**



**Figure 5: Cameo surface & Intaglio surface of Finished & Polished Denture**



**Figure 6-Postoperative view**

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