

**Case report**

**Hollow bulb obturator in right total maxillectomy patient**

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**Abstract:**

Maxillectomy is relatively a common surgical procedure, resulting in a surgical defect. The acquired defect needs to be corrected by the prosthetic replacement, challenging the goals of prosthodontic treatment which includes special clinical and lab procedure for the fabrication of obturator for a patient who has undergone maxillectomy. This article describes the stepwise procedure for the fabrication of hollow bulb obturator.

**Key words:** maxillectomy; obturator; rehabilitation

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**Introduction:**

Maxillary defects are created by congenital malformation, trauma, or by surgical treatment of benign or malignant neoplasms. Post-surgical maxillary defects predispose the patient to impaired masticatory and deglutition functions, hypernasal speech, fluid leakage into nasal cavity, loss of midfacial contour. A maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures is called an obturator.<sup>1</sup> The portion of the

obturator that extends into the defect area is called bulb. It helps in retention of the prosthesis, to get support from the underlying structures and to stabilize the prosthesis during function.<sup>2</sup>

The obturator can have basically two types of bulb designs, solid and hollow.<sup>3</sup> Brown has suggested to lighten the obturator in order to improve the cantilever mechanics of the suspension and to avoid overtaxing the remaining supportive structures.<sup>4</sup> The hollow bulb design can again be of closed and



Figure 1: Final impression made in elastomeric impression material.

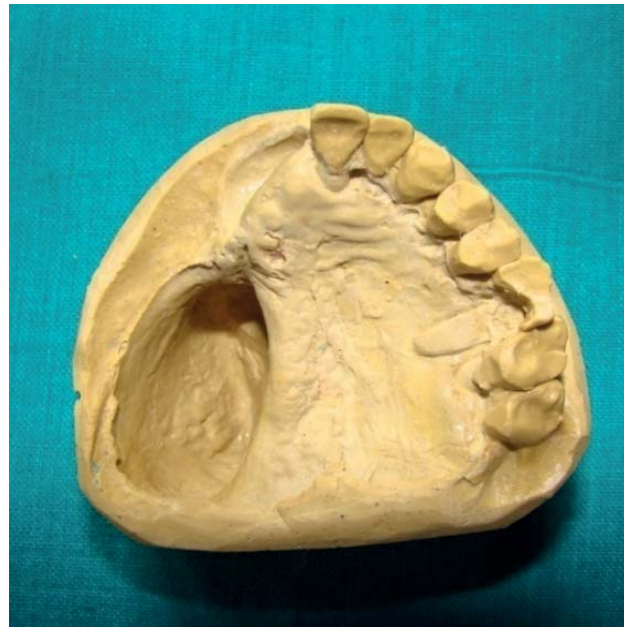


Figure 2: Master cast

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Figure 3: Insertion of the final prosthesis

open type. Desjardins RP<sup>2</sup> has advised to keep the high lateral wall of the bulb as it will undergo less vertical displacement during function and the height of the medial wall to be limited by the turbinates. Similarly, the anterior aspect of the bulb should be kept higher than the posterior aspect so as to facilitate mucous drainage in a medial and posterior direction into the nasopharynx. Also, the superior extension should be minimal for adequate nasal breathing. Various laboratory techniques have been adopted for the fabrication of the closed type hollow bulb obturator. Chalian's technique<sup>5</sup> using acrylic resin shim, creating hollow space using sugar and ice<sup>6,7,8</sup>, luting the two pieces of the obturator with self cure resin<sup>9,10</sup>, hollow bulb obturator with a removable lid<sup>11</sup> or a custom-made sealing screw cap<sup>12</sup> are few examples of these techniques. Similarly, Schiffman<sup>13</sup> have reported the technique to fabricate an open type hollow bulb obturator. Based on the materials used on fabrication, obturators can be made of metal, resin, silicone.<sup>14</sup>

#### **Case report:**

A 63 year old male presented to the department of maxillofacial Prosthodontics, BPKIHS, Dharan with a loose fitting obturator with partial denture which was fabricated 6 years back. The chief complaints of the patient were difficulty in deglutition, mastication, speech and poor salivary control. Medical history revealed that the patient had undergone total maxillectomy of the right side 6 years ago. Again, the medial maxillectomy was performed for recurrent papilloma of nasal cavity on the same side 5

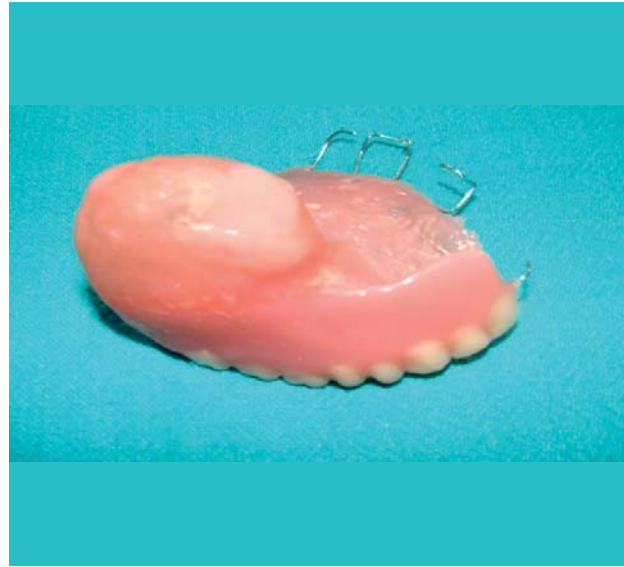


Figure 4: Tissue surface of the final prosthesis

days ago. Extra-oral examination revealed the depression on the right side of the cheek and the sutures were placed along the right side of the nose. Intraorally, the defect was present on the right side of the maxillary arch extending from second premolar to third molar region antero-posteriorly and posterolateral wall of the hard palate to the buccal vestibule mesio-laterally. Soft palate was not involved. Therefore this defect falls under Aramany's class II classification.<sup>15</sup> Missing teeth were 11 to 18, 26 was carious. All the mandibular teeth were intact. It was planned to fabricate a definitive hollow bulb obturator taking 21, 25, 28 as abutment teeth. The intraoral oral periapical radiographs showed adequate crown-root ratio and intact periodontal support for the prospective abutment teeth.

#### **Procedure:**

The preliminary impression of the maxillary arch was made with irreversible hydrocolloid impression material (Zelgan 2002, Dentsply) after the vaseline coated gauze with thread tied onto it, was inserted into the defect. The impression was poured with the dental stone (Kalstone, Kalabhai Karson Pvt Ltd). The custom tray was fabricated with self-cure acrylic resin (RR, Dentsply), after blocking the undercuts in the primary casts. Border moulding was done with low fusing impression compound (DPI Pinnacle tracing sticks) to record the borders. Secondary impression was made with regular bodied polyvinyl siloxane (Reprosil, Dentsply) and light bodied polyvinyl siloxane (Reprosil, Dentsply) (figure 1). The final impression was poured in dental stone to obtain a master cast (figure 2). Undercuts were blocked in the master cast with dental plaster



(Kaldent, Kalabhai Karson Pvt Ltd) and the denture base was made with self-cure acrylic resin extending into the defect. Occlusion rim was made with modeling wax (Modelling wax, Garg Dental Pvt Ltd) and bite registration was done. Teeth arrangement was done followed by try-in in the patient. Here, the occlusal scheme was determined by the pre-existing occlusion present in the non defective side. C-clasps on 21, 25, 28 and Adams clasps on 27 were fabricated with 20 gauge stainless steel wire for the retention of the prosthesis. Then the denture base was sealed to the master cast with wax. Flasking and dewaxing were done simultaneously. Shim covering the floor, and the walls of the defect was made with self-cure acrylic resin. To create a hollow obturator, the defect in the cast was filled with Salt sprinkled wax (Lost Salt Technique). Heat-cure acrylic resin was packed and acrylization was done after bench-curing for 30 minutes. After retrieving the prosthesis, hole was made in the polished surface of the obturator and hot water was syringed to remove the wax, thus creating a hollow bulb. Later the hole was sealed with self-cure acrylic resin. Insertion of the hollow bulb obturator with partial denture 11 to 18 was done (figure 3). Obturator adjustment, occlusal adjustment, clasps adjustment were done followed by polishing.

**Insertion:**

The hollow bulb made the obturator light and comfortable and the clasps helped in retention (figure 4). Patient was given to drink a glass of water and there was no leakage from the nasal cavity. Deglutition was possible. Mastication was easier with the partial denture. Buccal fullness was improved. Speech was

also improved. Audiological evaluation revealed improved speech discrimination. Patient was kept on follow up visits for the soft-tissue changes.

**Discussion:**

A conventional obturator with solid bulb design has poor stability and its weight exerts dislodging and rotational forces on abutments. Thus a hollow bulb obturator minimizes the weight of the obturator<sup>16</sup> and causes rapid damping of vibration and minimum displacement of retainers. Most clinicians<sup>2,3,4,5,6,7,8</sup> agree that the obturator should be hollow and lightweight, but there is some controversy concerning whether the superior surface can be left open or closed. The open type hollow bulb obturator has the advantages of ease of cleaning, light weight, speech intelligibility and easy fabrication. However, it is also a potential space for the collection of nasal secretion and food which leads the patient for frequent removal and cleaning of the prosthesis.<sup>11</sup> A closed type of obturator design aids in preventing collection of fluid and reduces air space in the maxillary defect but there is a possibility of fluid absorption through the porosities present in the acrylic resin seal. In that condition, the patient will not be able to clean the inner hollow space and this might lead to unhygienic environment of the oral cavity.<sup>11</sup>

The present case report discussed about the fabrication of the closed type hollow bulb obturator made up of heat cured acrylic resin. Since the bulb extension inside the defect is hollow, it contributes to weight reduction of the prosthesis leading to better



Figure 5: Pre-treatment profile

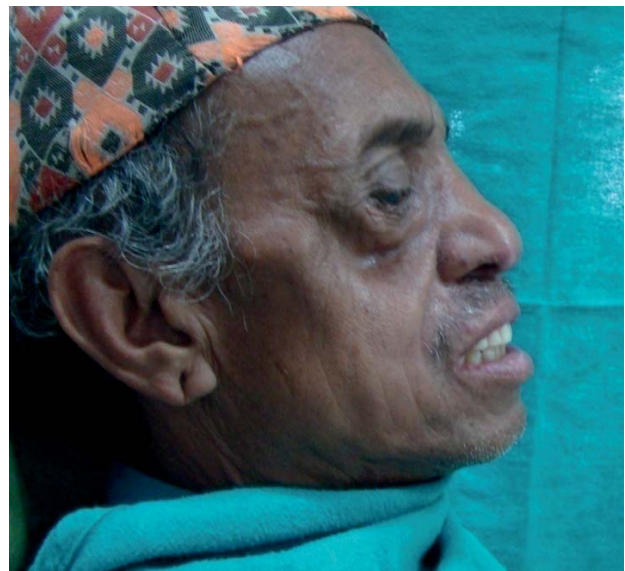


Figure 6: Post-treatment profile

retention and stability<sup>4</sup> and it also improves the nasal resonance during speech.<sup>17</sup> Moreover, the light weight of the prosthesis enhanced the patient comfort. During the fabrication procedures, self-cure resin shim was made after dewaxing and salt sprinkled wax was used to temporarily fill the defect area in order to create a hollow space. As compared to earlier reported techniques<sup>5,6,7,8</sup>, this method is easier, faster and less technique sensitive to fabricate a one piece closed type hollow bulb obturator with partial denture.

Although the defect present in this case is Aramany's class II only, the anterior teeth of the defect side are missing. This situation compromised the retentive quality of the prosthesis. However, the support can be obtained from the remaining alveolar ridge and the hard palate on the defect side.

**Summary:**

It is the duty of a dentist to help in the rehabilitation and to aid in the proper function, esthetics and comfort of the patient through his/her skill. A simplified technique of fabricating a hollow bulb obturator has been presented along with its advantages.

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