CASE REPORT

Maxillary hollow denture with lost salt technique with fabrication of temporary speech bulb prosthesis

Dr. Neelima A. Kamble,[1] Dr. Aparna S. Barabde,[2] Dr. Brajesh Dammani,[3] Dr. Bhagyashri Thombare,[4] Dr. Bhushan Wankhade,[5] Dr. Shraddha Ambadkar,[6] Dr. Komal Warghane[7]

1. PG Student, Department of Prosthodontics
2. Professor & HOD, Department of Prosthodontics
3. Reader, Department of Prosthodontics
4. Reader, Department of Prosthodontics
5. Reader, Department of Prosthodontics
6. Lecturer, Department of Prosthodontics
7. Lecturer, Department of Prosthodontics

Department of Prosthodontics, VYWS Dental College and Hospital, Amravati

Abstract: A Prosthodontist's primary goal in treating maxillary defects is to restore the functionality and aesthetics of both intra-oral and extra-oral structures, enabling normal mastication, speech, deglutition, and overall appearance. Maxillary defects can be congenital or acquired, with anatomical defects caused by surgery often leading to the creation of an opening between the nasal and oral cavities. This abnormal communication makes it difficult for patients to perform basic functions such as speaking and swallowing. Obturators are designed to address these challenges by sealing the defect and restoring normal function.

One of the main challenges in the rehabilitation of significant defects is the weight of the prosthesis, which can lead to bulkiness and poor retention, complicating both comfort and function. To overcome this issue, hollow obturators are often fabricated using various techniques. These hollow obturators reduce the overall weight while maintaining the necessary strength and retention. This article discusses various fabrication techniques for hollow obturators, including case studies that highlight their effectiveness in improving the patient's quality of life.

Key words: Palatal Obturator, Congenital Defect, Acquired Defect, Prosthesis, Maxillofacial prosthodontics, rehabilitation, obturator, Lost salt technique, Hollow bulb

Introduction: The term obturator has its origin from a Latin verb "obturare" which means to close or to shut off. Boucher in 1982 defined obturator as a prosthesis used to close a congenital or an acquired opening in the palate. Glossary of Prosthodontic Terms-9 defines an obturator as "a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar/soft tissue structures.[(1)]

Patients who have to have the maxillo-mandibular structures surgically removed due to trauma, infection, or cancer have substantial psycho- social setbacks bearing on their general quality of life. These flaws, particularly those following a maxillectomy, cause facial deformity, decreased speech, trouble with deglutition, and oro-antral communication.

For the rehabilitation of patients with such defects, both surgical and prosthetic treatment options exist. However, due to complications like graft rejection, the severity of the surgical defect, and the psychological impact of multiple surgeries, prosthetic rehabilitation often proves to be a more effective and successful alternative for patients who cannot undergo further reconstructive surgeries. The obturator serves two main functional purposes: sealing the surgical defect and replacing the missing dentoalveolar structures.[(2)]

Prosthetic intervention with maxillary obturator prosthesis is necessary to restore the contours of the resected palate and to recreate the functional separation of the oral cavity and sinus and nasal cavities. This should occur at the time of surgical

resection, and it will be necessary for the remainder of the patient's life. Hence, proper understanding and knowledge of the obturator is a must to make awareness of the efficacy of the treatment modality.

There are various functions of obturator

1. To close the defect
2. For feeding purpose
3. To keep the wound or defective area clean, thus enhance the healing of traumatic or postsurgical defects
4. As a stent to hold dressings or packs post surgically
5. To reduce the possibility of postoperative hemorrhage
6. Help to reshape and reconstruct the palatal contour and/or soft palate
7. Improve speech or in some instances, makes speech possible.

Classification of obturator[3]

1. According to origin of the discrepancy

a. *For congenital defect:*

i. To close the opening of hard palate, a simple base plate type of palatal plate helps to correct the swallowing, feeding, and speech

ii. An obturator with a tail, consisting of speech appliance or speech aid prosthesis, which restores soft and hard palate defects and a velopharyngeal extensions that correct the speech

iii. An overlay denture or a superimposed denture.

b. *For acquired defect:*

i. Immediate temporary obturator or surgical

ii. Interim obturator, temporary obturator, treatment obturator, or transitional obturator

iii. Permanent obturator or definitive obturator.

2. According to location of the defect

a. Lateral or buccal obturator:
b. Alveolar obturator
c. Hard palate obturator
d. Soft palate obturator
e. Palatal lift prosthesis or obturator palate to the level of
f. Pharyngeal obturator or speech aid prosthesis.

3. According to the type of obturator attachment to the basic maxillary prosthesis:

a. Fixed
b. Hinged
c. Meatus undergone a total soft palate resection
d. Detachable obturatore.
e. Magnetically retained obturator
f. Implant retained obturator

4. According to the physiologic movement of oral, nasal, and pharyngeal tissues adjacent to or functioning against the obturator:

a. Static obturator
b. Functional obturator

5. Depending on the material used

a. Metal obturator
b. Resin obturator
C. Silicon obturator.

6. Mohamed Aramany(1978)

a. Class I: Resection or defect is performed along the midline of the maxilla; teeth are maintained on one side of the arch. It is the most frequent maxillary defect

b. Class II: Defect is unilateral, retaining the anterior teeth on the contralateral side

C. Class III: Palatal defectoccurs in the central portion of the hard palate and may involve part of the soft palate. The surgery does not involve the remaining teeth

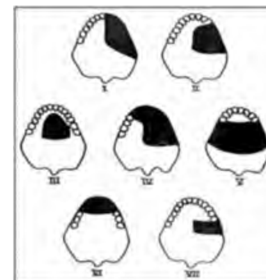
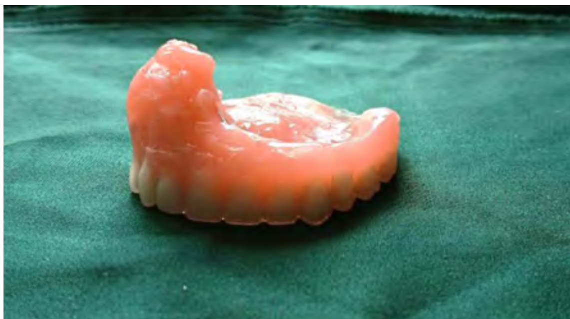


Fig 1: Mohamed Aramany Classification

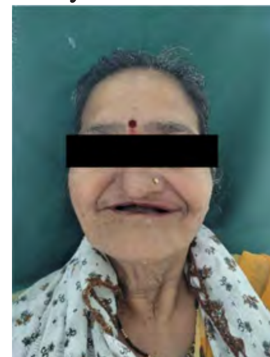
Palatopharyngeal insufficiency is a condition where there is lack of effective closure between the soft palate and one or more of the pharyngeal walls during swallowing or speech sounds that require high intraoral pressure. This lack of closure may be due to four etiologic categories, namely, anatomic deficiency, myoneural defi ciency, anatomic and myoneural deficiency, and neither anatomic nor myoneural deficiency. It is a congenital or acquired anatomical defect of the soft palate that makes the palatopharyngeal sphincter incomplete. Excessive nasal air flow, inadequate pressure affect the speech and nasal regurgitation also common during feeding. The muscles which are Levator veli palatini and superior constrictor play an important role during palatopharyngeal closure. Speech bulb prosthesis is a ideal choice for these defects. It is a removable prosthesis to restore an acquired or congenital defect of the soft palate with a portion extending into the pharynx to separate the oropharynx and nasopharynx during phonation and deglutition,

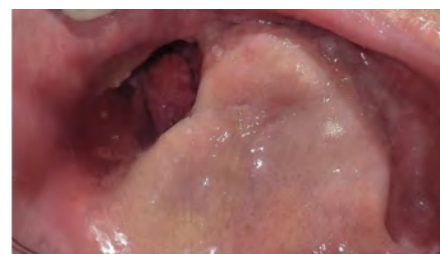


thereby completing the palatopharyngeal sphincter. Among the various options available for obturator fabrication, hollow obturators are a popular choice, as they can significantly reduce the weight of the prosthesis. Hollow obturators come in both solid and hollow forms, with the latter being preferred for larger defects.[4] This article highlights the use of the lost salt technique to create a hollow bulb definitive obturator. The lost salt technique involves filling the hollow space with substances such as salt, sugar, or polyurethane foam, which are later removed to create a lightweight prosthesis.[5]

This case report illustrates the fabrication of a one-piece closed hollow bulb definitive obturator for a patient with an acquired maxillary defect. The use of hollow obturators, as described in this case, greatly improves the patient's comfort, retention, and overall function, while reducing the bulk and weight of the prosthesis.

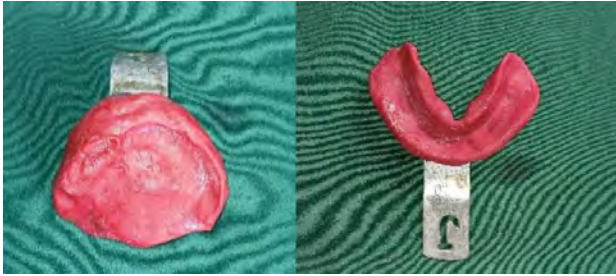
Case Report: A 55 year old female patient reported to the department of Prosthodontics and Crown & Bridge with right maxillary defect. She had undergone maxillectomy 1 year back due to Osteomyelitis. She had a large defect of size 8 cm length 4 cm broad and 4 cm depth and defect will come under type 2 Aramany (Unilateral resection) defect associated with depressed cheek, nasolabial fold and lack of lip support. Intra orally patient had edentulous maxillary and mandibular arch.



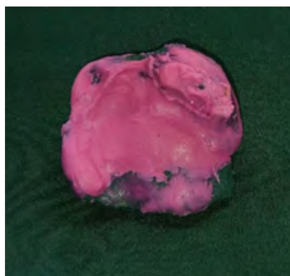


Procedure:

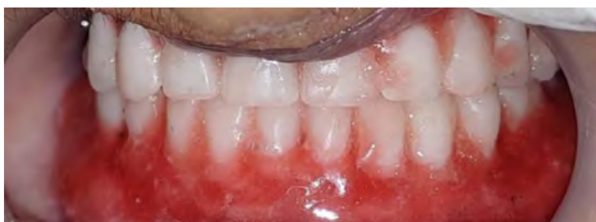
1. **Preliminary Impressions :** Preliminary impressions of upper and lower arch were recorded with impression compound and Impressions were poured with Type 3 dental stone and casts were obtained.



2. **Block Out of Defect:** Block out of the defect was done with modelling wax.
3. **Final Impression:** The impressions were beaded and boxed and then poured with Type 3 dental stone and master casts were retrieved.

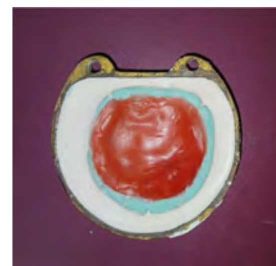


4. **Fabrication of Base plate:** Approximately 5-7cm of area was left from top of the palatal defect to prevent seepage of oral fluid and better adaptation of the final prosthesis. After this separating medium was used and denture base with extension in the defect was made with self cured acrylic resin (DPI, RR, Mumbai, India)
5. **Jaw Relation Record:** Maxillary and mandibular edentulous arches jaw relation record was made with the mandibular and maxillary arch.
6. **Try In of Trial Denture:** A try-in for a definitive obturator refers to a step in the process where a temporary obturator is fitted to assess the fit, function, and comfort before finalizing the definitive version. During this stage, adjustments are made to ensure the definitive obturator will provide the best possible outcome for the patient.



7. **Final Processing:** A conical bur was used to index the cast's land area and the trial denture was then glued to the final cast. A reversible hydrocolloid was used to replicate the trial denture, which was then poured into the dental stone.

A 0.5-mm thermoplastic sheet (Duran 0.5 125 mm, code 111; Liberal Traders Pvt. Ltd., New Delhi) was modified and placed on the recovered cast using a vacuum heat-pressing device to create a template for the replicated trial denture (Biostar). The trial denture was then processed in the standard manner up to the wax elimination stage. Two layers of baseplate wax were adapted to the definitive cast in the drag, conforming to the border extensions.

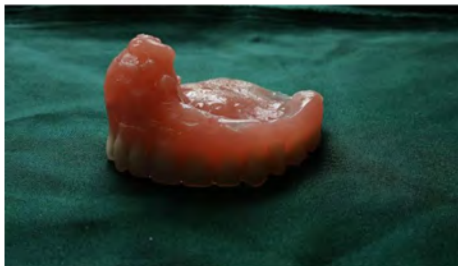


This baseplate wax was placed in a second flask and treated as usual. Following deflation, the transparent matrix was positioned on the final cast using the seating indices in the land area.

To make sure there is enough space between the resin and the teeth, the distance between the

matrix and the treated base was measured using an endodontic file with a rubber stop.

The dewaxed mold was correctly covered with half of the heat-cure poly methyl methacrylate (PMMA) (Trevalon, Dentsply India Pvt. Ltd., Gurgaon, India) in the dough stage before salt crystals were added.



Discussion: A well-fitted definitive obturator offers several benefits, including improved speech, better swallowing function, and enhanced quality of life. Additionally, it helps prevent further complications like nasal regurgitation of food and drink, which can lead to discomfort and social embarrassment. It also contributes to facial symmetry and overall aesthetics, which are essential for the patient's emotional well-being.

Conclusion: The definitive obturator represents an important step in the rehabilitation of patients who have undergone significant surgical resections of the oral cavity. By restoring function and improving quality of life, it enables patients to resume many daily activities that might otherwise be compromised. Advances in prosthetic design and materials continue to enhance the effectiveness and comfort of these devices, contributing to better patient outcomes and changing lives.

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