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### RESEARCH ARTICLE

#### A STOP UP PROSTHESIS - OBTURARE : CLINICAL CASE REPORT

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#### Abstract

Surgical resection of a tumour of the maxillofacial tissues leads to defects, which affect the function. Maxillectomy defects commonly affect the speech, mastication and swallowing due to oroantral communication. Obturator prosthesis has been mainly used for rehabilitation of such cases. The size and extend of the defect affects the prognosis of the prosthesis. Larger defects are generally made hollow to reduce their weight, thereby increasing retention of the prosthesis. This case report discusses designing and fabrication of a cast partial hollow obturator for a maxillectomy patient. The prosthesis can overcome functional difficulties like speech, mastication and swallowing and thereby improve the quality of life of the patient.

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#### Introduction:-

According to GPT-9, Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation, and maintenance of the oral function, comfort, appearance, and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues by using biocompatible substitutes<sup>1</sup>. Prosthodontics is not just related to replacement of missing teeth but also the rehabilitation of deficient maxillofacial tissue. Maxillofacial prosthetics is defined as the branch of Prosthodontics concerned with the restoration and/or replacement of stomatognathic and craniofacial structures with prostheses that may or may not be removed on a regular or elective basis. Defects of the maxilla and mandible can either be congenital or acquired. Surgical resection of hard and soft palate due to acquired or congenital defects results in oroantral communication<sup>2</sup>. This defect might be small or large involving the palate, alveolar ridges, floor of the mouth, nasal cavity and in some cases might involve the orbit. The oroantral communication poses problems of difficulty in mastication, hypernasal speech, and fluid leakage into the nasal cavity. Also this affects the orofacial appearance, decreasing the quality of life of the patient.

Defects involving the maxilla are most commonly restored with obturator prosthesis. This prosthesis closes the oroantral communication thereby enhancing the speech and mastication. Obturators are mainly of three types: surgical obturator, interim obturator and definitive obturator. The surgical and interim obturators are purely made of acrylic resins. Their primary role is to aid in healing during the recovery period and to shorten long-term convalescence and rehabilitation. It supports soft tissues, thus minimizing scar contracture, protects the wound from trauma and contamination with food debris<sup>3</sup>. Definitive obturators can be given after thorough evaluation of the healing. Dr.Aramany had put forward six classes of maxillectomy defects and also the designing principle for each class<sup>4,5</sup>.

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This case report describes a simple technique for fabrication of a definitive hollow bulb obturator to improve mastication and speech.

**Case report:**

Age 35 year old male patient reported to the department of Prosthodontics, KSR institute of dental science and research, Tiruchengode with the chief complaint of broken retentive components in his upper artificial teeth set. On examination, there was a palatal defect seen in the left side of the maxilla. Patient had undergone maxillectomy on the left side due to acute fungal sinusitis before 3 years. The past dental history revealed that the patient was rehabilitated with an interim obturator 2 years back. On examination of the interim obturator, the retentive components were broken and the patient wanted a replacement.

Intraoral examination revealed a Aramany's class I defect on the left side of the maxilla involving the hard palate, alveolar ridges, teeth and soft tissue not extending beyond the midline. 21 to 28 teeth (FDI system) were missing (Fig 1).

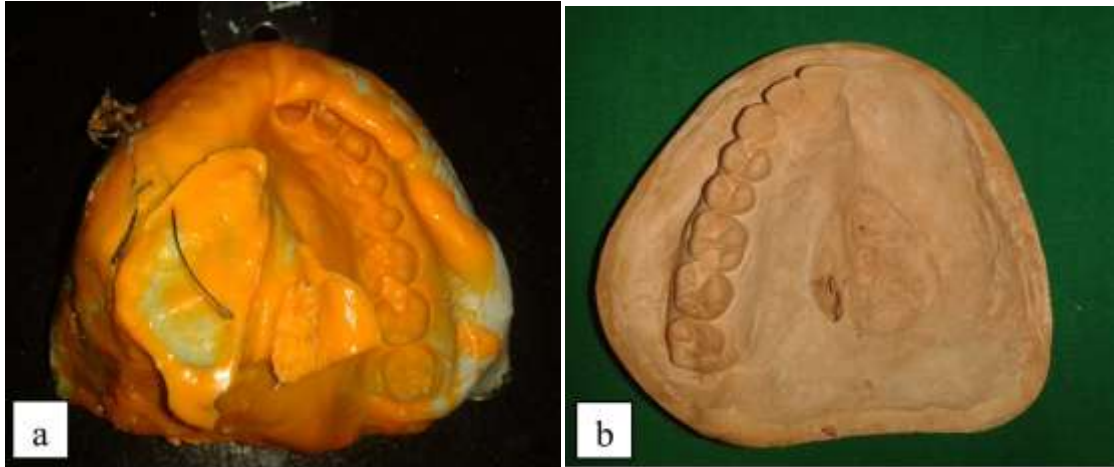


**Fig1:-** Intraoral view of the defect.

As the healing of the defect was found to be satisfactory, a definitive cast partial obturator was planned. The treatment plan was explained to the patient.

The defect area was blocked out with petrolatum gauze and the diagnostic impression of the maxillary and mandibular arch was made with irreversible hydrocolloid (Tropicalgin -Zhermack, Italy) using dentulous perforated stock tray. The impressions were poured using dental stone type III (Kalabhai Dental Pvt Ltd, Mumbai, India). The maxillary diagnostic cast was surveyed to assess the desired path of insertion. The definitive obturator was planned as per the designing principles of Aramany for Class I tripodal configuration, to enhance the stability and retention of the prosthesis.

Mouth preparation was done. Rest seat preparations were done on 13, 14, 16, and 17. Guide plane preparation was done on the mesial aspect of 11. Final impression was made in dentulous perforated stock tray with elastomeric impression material (Zetaplus-Zhermack, Italy) after blocking the undesirable undercuts with petrolatum gauze (Fig 2). The impression was poured using die stone (Kalabhai Dental Pvt Ltd, Mumbai, India). The obtained master cast was again surveyed to verify the path of insertion (Fig 3).

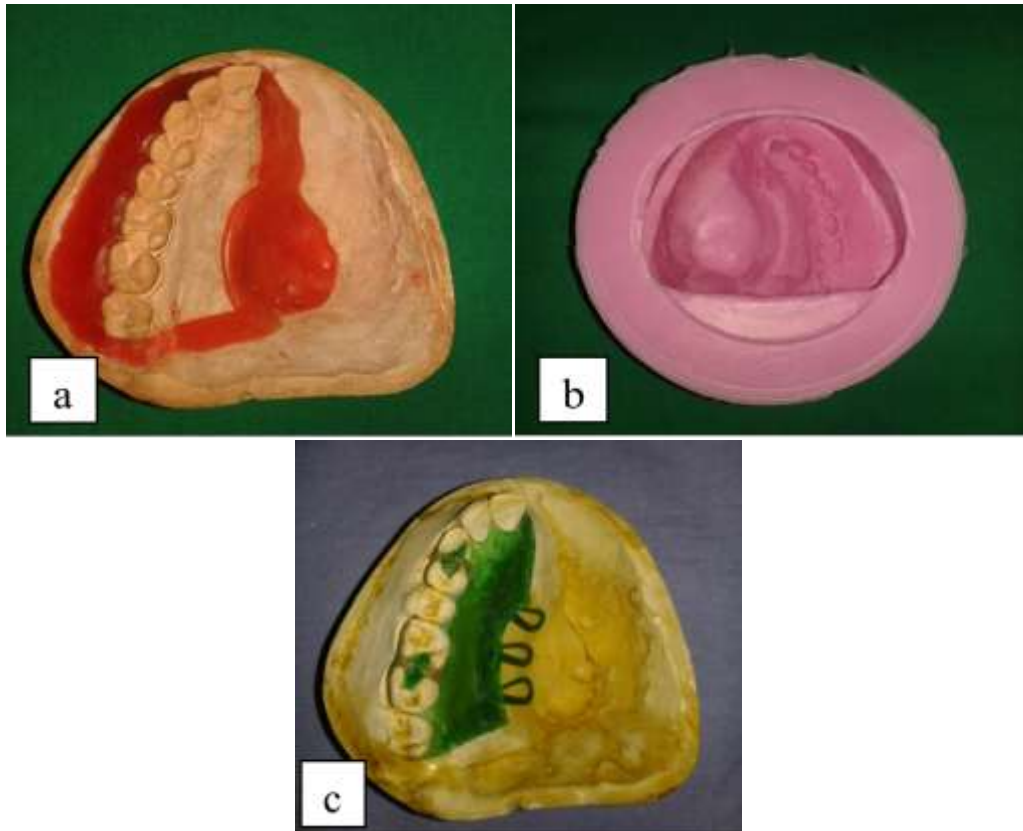


**Fig 2 a):-** Final impression and b).master cast.



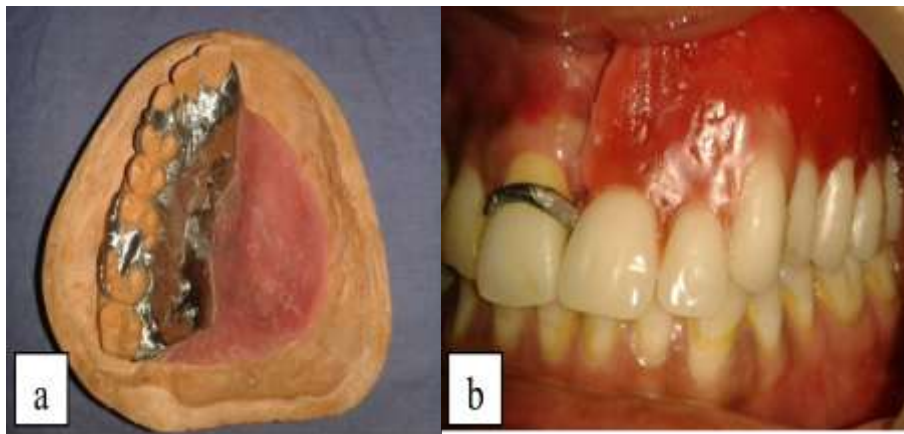
**Fig 3:-** Surveying of the master cast.

After surveying, designing was done. Retentive components were planned in 11, 14 (Circumferential clasps) and embrasure clasp in 16, 17 region. Block out was done using modelling wax (Hindustan, India) before duplication of the master cast. Duplication was done using silicone duplicating material (Unisil-Flow, Germany) (Fig 4). Refractory cast was poured followed by heat treatment. Wax pattern fabrication, sprue attachment, investing, casting and trimming of metal framework was done.



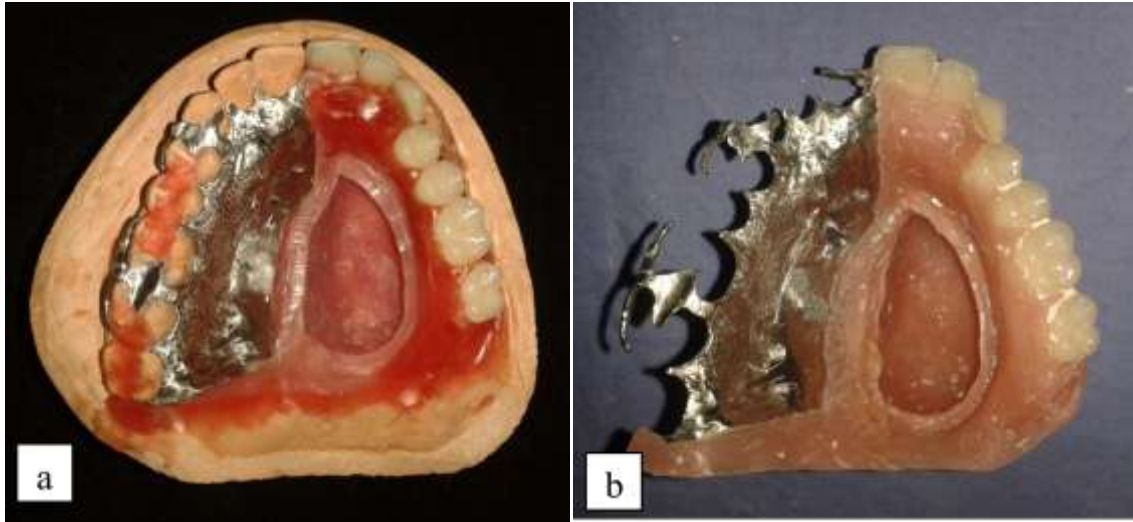
**Fig 4:-** a).Designing and block out was done on the master cast. b).Duplication using silicone duplicating material was done. c).Wax pattern fabrication was done on the refractory cast.

Metal framework try in was done intraorally. Temporary denture base fabrication was done along the defect area using autopolymerizing acrylic resin. Occlusal rim construction and bite registration was done. Teeth arrangement was done after mounting on mean value articulator followed by wax try in (Fig 5).



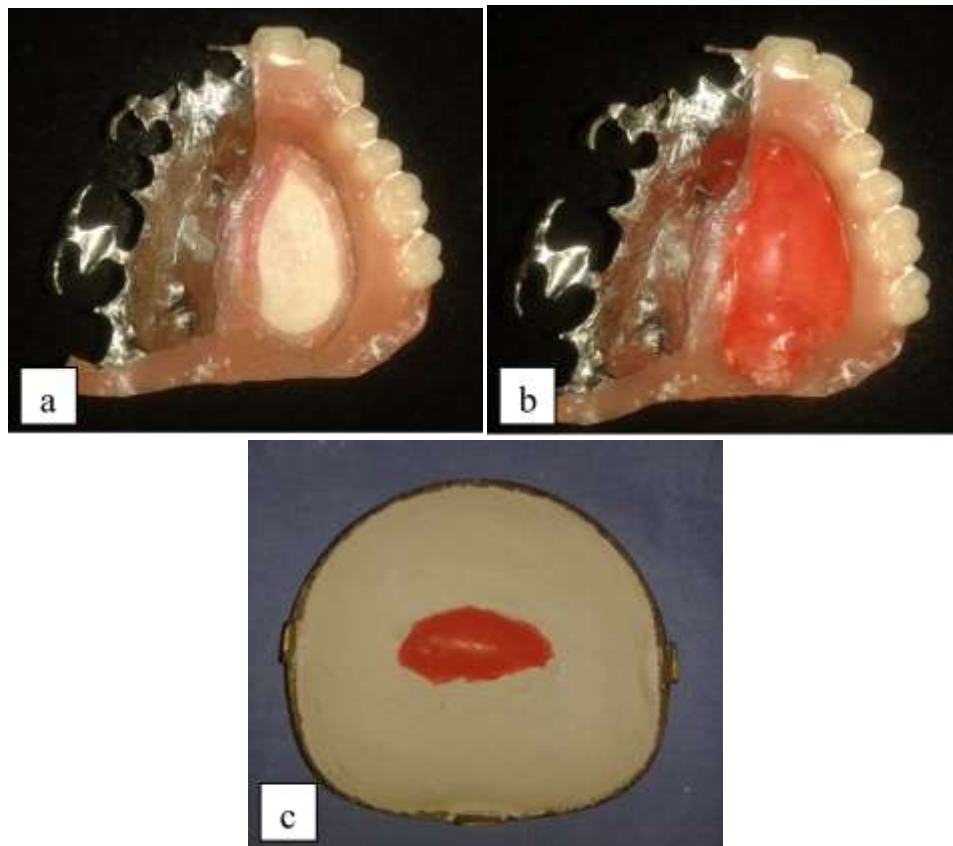
**Fig 5:-** a).Temporary denture base fabrication and b).Wax try in.

The processing of definitive hollow bulb obturator was planned in two stages. After try in and wax up, a ledge was created on the temporary denture base using wax in the defect area. Flasking, dewaxing, packing and curing was done using heat cure acrylic resin (SR Triplex hot, Ivoclar Vivadent, Liechtenstein) (Fig 6).



**Fig 6:-** a). Ledge was created with wax in the defect area on the temporary denture base before flasking. b).Denture retrieved after processing with heat cure acrylic resin.

After processing of the denture, the defect area was filled with plaster pumice mix for fabrication of wax pattern for the lid. Wax pattern fabrication was done followed by flasking and processing of lid separately using heat cure acrylic resin (Fig 7). The lid was oriented onto the permanent denture. The ledge in the permanent denture acted as a stop preventing further movement of the lid. The lid was sealed to the permanent denture using autopolymerising acrylic resin.



**Fig 7:-** a).Plaster pumice mix was filled in the defect area and b,c).wax pattern fabrication for the lid was done followed by investing and processing of the lid separately.

The final finishing and polishing of the definitive hollow bulb obturator was done (Fig 8). Insertion of the prosthesis was done and the post insertion instructions were given regarding the insertion, removal and maintenance of the prosthesis. Recall visits were scheduled after 24 hours and 1 week. Post insertion adjustments were made in the recall visits to ensure comfort of the patient.



**Fig 8:-** Final finished definitive hollow bulb obturator prosthesis.

### **Discussion:-**

The primary goal of obturator prosthesis is to close the oroantral communication and enhance the function<sup>6</sup>. As the patient presented with well healed defect area, a definitive obturator was planned. Various factors affect the stability and retention of the prosthesis. In case of obturator prosthesis the size and extend of the defect also affects the retention and stability of the prosthesis. Designing of the prosthesis plays an important role. In this case designing was done similar to principles of designing given by Dr.Aramany in 1978. A tripodal configuration gives better support, stabilisation and retention of the prosthesis. Hence a tripodal configuration was chosen for this case. The retentive components were given in 11, 14, 16 and 17 region. Presence of soft tissue undercut in the 11 region, contraindicated the use of I bar clasp. Though a circumferential clasp was used here in 11, it was not visible during function. Retentive tags were placed in mid palatal region of the metal framework for mechanical interlocking of acrylic resin. Occlusal rests were prepared in 14, 16, 17 and cingulum rest was prepared in 13, which acted as support for the prosthesis.

As the defect in this case was large, prosthesis was made hollow to reduce weight and increase retention. Wu and Schaaf stated that hollowing of the obturator prosthesis reduces the weight from 6.55% to 33.06%, depending on the size of the defect<sup>7</sup>. Various methods of hollowing of the prosthesis were proposed in the literature. Use of Salt and sugar were more commonly used method for hollowing out the prosthesis. Tanaka et used polyurethane foam material, Patil and Patil used preshaped wax bolus, thermocol was used by Bhochhibhoya A, Mathema S, Maskey B and balloon was used by Rani S, Gupta S, Verma M, for hollowing the prosthesis<sup>8,9,10,6</sup>. Two split denture flasks with interchangeable counter parts were used by Mehta S and Mascarenhas E<sup>11</sup>. In this case, the prosthesis was made hollow by fabricating the denture and lid separately and then joining them, thereby maintaining the hollow

space in between them. As a closed bulb obturator is better tolerated by the patient it was applied to this particular case.

**Conclusion:-**

According to De van's statement "Perpetual preservation of what remains is more important than meticulous replacement of what is lost". Obturator prosthesis just preserves remaining structures without any major invasive procedures. Obturator prosthesis not only restores the function but also improves the quality of life of the patient enhancing the psychological well being and restoring the lost smile.

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