

# Prosthodontic Rehabilitation of a Patient with Subtotal Maxillectomy using a Hollow Bulb Obturator

Gita Rani, Amarjeet Gambhir

## ABSTRACT

Successful prosthetic reconstruction of hemimaxillectomy defects is a challenging procedure that requires multidisciplinary expertise to achieve acceptable function, speech and esthetics. Rehabilitation of an acquired maxillary defect improves the quality of life for the patient as close to normal as possible. Obturation of the defect depends on its volume and position of remaining hard and soft tissues, to be utilized for retention, stability and support for the prosthesis. The prosthesis should be simple to handle, easy to maintain, biocompatible, light in weight and convenient for future adjustments. This case report describes a clinical case of subtotal maxillectomy, which was successfully rehabilitated with a hollow bulb obturator.

**Keywords:** Hemimaxillectomy, Defect, Rehabilitation, Hollow bulb obturator.

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## INTRODUCTION

Maxillofacial defects may be a result of congenital malformations, trauma or surgical resection of tumors. The rehabilitation of these defects presents a challenge both for the patient as well as the clinician. One of these defects is maxillectomy, which results in the formation of a communication between the oral cavity and the antrum and/or the nasopharynx. This inevitably results in difficulty in mastication and swallowing as well as impaired speech and

facial esthetics.<sup>1,2</sup> Several methods have been advocated for reconstructing these defects.<sup>3</sup> The use of obturator prosthesis is one of them. According to the glossary of prosthodontic terms,<sup>4</sup> obturator is defined as ‘a prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or contiguous alveolar structures’. The name obturator is derived from the Latin verb ‘obturare’ which means to close or shut off.

The present article is a case report explaining the rehabilitation of a patient who had undergone subtotal maxillectomy with hollow bulb obturator.

## CASE REPORT

A 26-year-old girl reported to the Department of Prosthodontics, Christian Dental College, Ludhiana with the chief complaint of missing teeth and difficulty in speech. She had undergone surgery for fibrosarcoma of maxilla at Postgraduate Institute of Medical Sciences, Chandigarh 11 months back, and was restored with interim obturator. She now requested for definitive obturator.

Intraoral examination revealed a subtotal right maxillectomy defect and partially edentulous maxilla on the left side (Fig. 1). The defect corresponded to the Aramany's<sup>5,6</sup> Class I situation. All walls were lined with healthy mucosa. Mandibular movements were within the normal range, tongue function was normal, with no evidence of supraeruption of mandibular teeth but hypernasality of speech was evident.



Fig. 1: Preoperative view

## TREATMENT PLAN

The decision was made to rehabilitate the patient with a hollow bulb obturator attached to the cast partial denture, considering stability, retention, load distribution and supra-structure longevity. The design followed was as given by Gregory R Parr (1989)<sup>7</sup>—Class I linear arch form. The linear design is used for the Class I defect when there are no anterior teeth present or when one does not desire to use the anterior teeth. The remaining posterior teeth are usually in a relatively straight line (Fig. 2).

In the presented case, support was provided by the remaining posterior teeth and the palatal tissues. Retention was achieved by the use of embrasure clasps on both the premolars and molars and partly by anatomic undercuts. Rest seat preparation was done on the disto-occlusal surface of the first premolar and molar and mesio-occlusal surface of the second premolar and molar.

## CLINICAL PROCEDURE

A gauze piece was packed in the defect area and floss was tied to it for retrieval after the impression is made. A perforated stock tray was selected and impression was made

with irreversible hydrocolloid (Zhermack neocolloid) (Fig. 3). Impression was boxed and poured in type II stone (Kalabhai Karson Pvt. Ltd, Mumbai), (Fig. 4).

The casts were surveyed and the necessary mouth preparation was performed on the patient before making secondary impression (Fig. 5). The special tray was fabricated. Border molding was done to record the soft tissues surrounding the defect using green stick compound. Details of the defect area were recorded using putty silicone elastomer and wash impression was completed using light body addition silicone elastomer (3M Espe Express Std, Germany) (Fig. 6).

Cast partial framework was fabricated and tried in patient's mouth for fit (Fig. 7). Record bases were made with heat cure acrylic resin (Lucitone 199, Dentsply Int). The jaw relation was recorded and the try-in done (Fig. 8).

Hollow bulb obturator was fabricated for the prosthesis. Heat cured acrylic resin lid was processed separately and adapted onto the defect area. The cast framework was then seated onto the duplicated cast and salt was sprinkled onto the hollow area (Fig. 9). The conventional wax up was completed and then processed. After processing, the salt from the hollow portion was taken out by making hole in

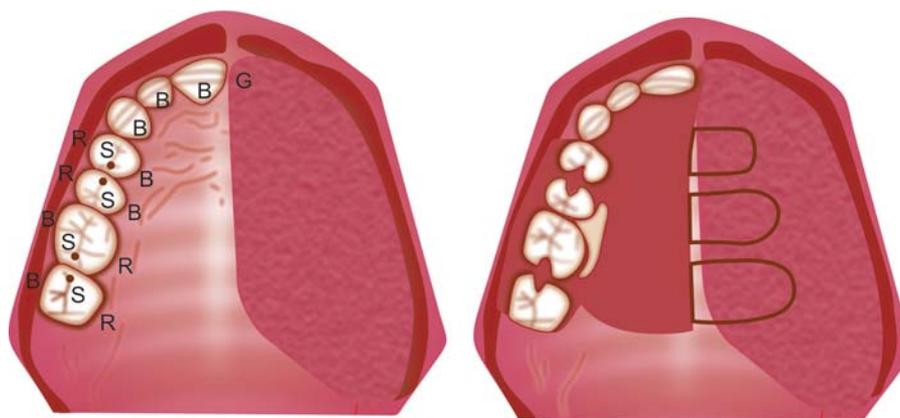


Fig. 2: Class I: Linear arch form (S: Support; R: Retention; B: Bracing; G: Guiding plane)



Fig. 3: Preliminary impression

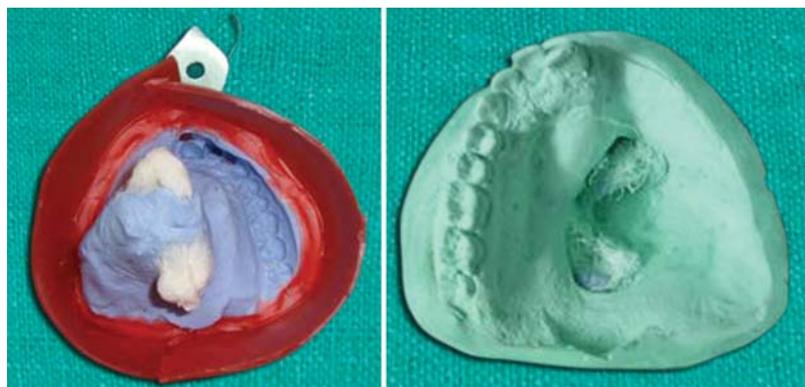


Fig. 4: Boxed impression, preliminary cast

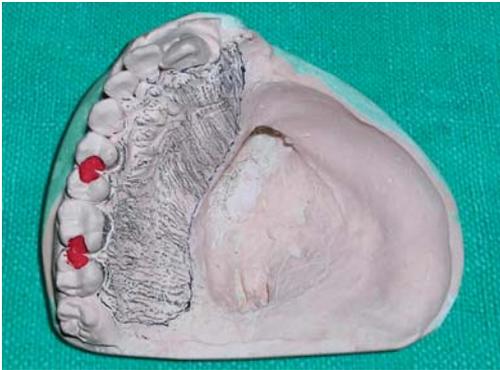


Fig. 5: Design of the cast metal framework



Fig. 6: Border molding, secondary impression



Fig. 7: Metal framework tried in the patients' mouth



Fig. 8: Jaw relations recorded, try-in done

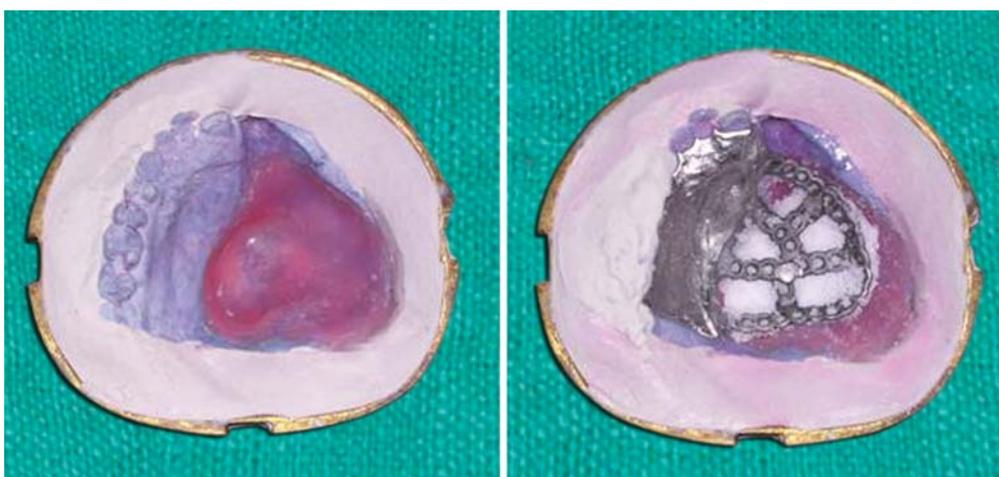


Fig. 9: Heat cured acrylic lid, salt sprinkled onto the defect area



**Fig. 10:** Occlusal and palatal view of the processed prosthesis



**Fig. 11:** Postoperative view

the lid area and tapping it. The final prosthesis was then polished and finished (Fig. 10).

The patient was trained regarding the insertion and removal of the prosthesis and postinsertion instructions were given. The hypernasality of the speech was corrected; the function and esthetics were restored (Fig. 11).

The patient was called after 24 hours for checkup. Recall visits were also scheduled after 1 week, 1, 3 and 6 months with satisfactory results.

## DISCUSSION

Obturator prostheses are commonly used in the rehabilitation of total or subtotal maxillectomy patients. It helps in separating the oral and the nasal cavities and restores normal deglutition and speech and further improves the midfacial esthetics by supporting the soft tissues.<sup>8,9</sup>

The most important consideration when restoring maxillectomy defects is the retention of the obturator prosthesis. Brown<sup>10</sup> and Desjardins<sup>8</sup> have suggested extending the lateral wall of the bulb higher geometrically and using extracoronal and intracoronal direct retainers for engaging the remaining teeth to maximize support, retention, and stability. In the present case, the defect could be categorized under Aramany Class I situation.<sup>5-7</sup> Based on this, the cast partial framework was designed with required components. Regular palatal strap major connector was modified in order to achieve a greater support from the palate, as the defect was large. 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 temperature changes and the patient showed better functional acceptance to the prosthesis.<sup>11</sup>

A hollow bulb design was chosen for the obturator in order to reduce the bulk of the prosthesis which in turn made it lightweight and more comfortable for the patient. The

hollow bulb further added resonance, thus improving the clarity of the speech.<sup>12,13</sup> The presented prosthesis not only improved the speech and function but also provided better comfort for the patient.

## SUMMARY

The present case report describes the prosthetic rehabilitation of a partial maxillectomy patient using a hollow bulb definitive obturator. It involved the fabrication of a cast partial denture framework onto which hollow bulb prosthesis was attached. 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.

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