

CASE REPORT

Prosthodontic Management of Dentate Maxillectomy Patient: A Clinical Case Report

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Patients with minor defects of the alveolar ridge and hard palate can easily be treated by surgical closure, while patients with larger defects are more amenable to prosthetic restoration. The case report describes the rehabilitation of a dentate maxillectomy patient with a definitive closed hollow bulb cast partial obturator. A tripod retainer design was chosen for direct retention in the case. The tripod design consisted of a T-bar clasp placed on the left first central incisor and two embrasure clasps with buccal retention and palatal bracing components between the right first & second premolar and right first & second molar. A complete palate major connector was designed to ensure uniform distribution of functional load across tissues. The remaining teeth, the palate, and the rest provided support for the prosthesis. Prosthetic rehabilitation of the defect with a definitive obturator thus seals tissue openings in the palate, improves deglutition, speech, mastication, aesthetics, and significantly improves quality of life.

Keywords: maxillectomy, dentate, obturator, cast partial denture

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Introduction

Acquired maxillectomy defects result in hypernasal speech, regurgitation of food and liquids into the nasal cavity, impaired deglutition, mastication, and cosmetic deformity [1,2]. In addition, patients with acquired maxillary defects experience psychosocial stigma affecting the quality of life [3,4]. Prosthetic rehabilitation of such defects is essential for restoration of the stomatognathic system and obturation of oroantral communication [5]. Maxillary prostheses also reduce aesthetic deformity by restoring missing teeth and contiguous tissues, thereby supporting the lip and cheek [2]. This case report describes the prosthetic rehabilitation of class II Aramany maxillary surgical defect with least favourable soft tissue undercuts and support, to improve aesthetics and restore speech, mastication, and deglutition function using a one-piece closed hollow bulb cast partial obturator.

Case Report

A 62-year-old male patient reported to the department of prosthodontics, RUHS College of Dental Sciences, Jaipur with the chief complaint of uncomprehensive speech and difficulty in eating following surgery two years back. The patient revealed a history of moderately differentiated squamous cell carcinoma of the left maxilla which was treated surgically by removal of the left-sided maxillary alveolar, palatine process, and the entire ipsilateral dentition from 22 to 28. Clinical examination revealed an Aramany class II surgical defect on the left side with remaining natural teeth on the right from 21 to 18. Radiographic examination revealed large radiolucency in the maxillary left palatal region surrounded by healthy bone

and occlusal/proximal caries in 14,16 & 17. The intraoral defect had healed satisfactorily, with vertical expansion to the nasal floor. Treatment options available were: interim partial denture, flexible partial denture, conventional cast partial denture, precision attachment cast partial denture, and implant-supported obturator prosthesis. The primary concern of the present clinical scenario was to distribute the occlusal forces amongst the remaining teeth. Based upon the patient's insistence for an economically viable treatment modality, a conventional cast partial design was planned, as it preserves and maintains harmony among the existing hard and soft tissues.

Clinical Procedure

After restricting the excessive flow of impression material into the nasopharynx using a layer of gauze, the primary impression was made with irreversible hydrocolloid (Zelgan, Dentsply) using the stock tray and poured with type III dental stone (Kalstone, Kalabhai). Once the primary cast had been surveyed by a surveyor, the framework was designed. The framework was planned for maximum support from the remaining palate along with tripod support from abutments. Direct retention was provided by the T-bar clasp placed on the 21 and two embrasure circumferential clasp between 14 & 15 and between 16 & 17. Following the principles of Aramany's Class II obturator design, the rest seats of 14, 15, 16, and 17 were prepared to receive the rest of the cast metal framework. 14, 16, and 17 were prepared to receive all-metal crown with rest seat. After cementation of the metal crowns, the master impression was made with medium body elastomeric impression material and was poured with Die Stone (Kalstone, Kalabhai Karson) to obtain the master cast (Figure 1). To fabricate the cast metal framework, a tripod configuration was designed. Cast metal framework design was transferred to the

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refractory cast, and a cast metal framework was fabricated and tried in the mouth for optimum fit and retention (Figure 2). An occlusal rim was added to the framework, and the jaw relationship was recorded before being transferred to an articulator (Hanau™ Wide-View, Whip Mix). Teeth arrangement was done on the metal framework, followed by a wax try-in (Figure 3). The waxed-up obturator was processed conventionally with heat cure acrylic resin after try-in to produce a closed hollow bulb definitive obturator (Figure 4). After finishing and polishing the obturator, it was inserted into the patient's mouth (Figure 5,6). A pressure indicator paste was used to locate and trim pressure spots on the fitting surface. The prosthesis was carefully examined to smooth off any rough, sharp, or uneven edges to ensure optimum fit. The patient was taught about insertion and removal of the obturator prosthesis. Oral hygiene instructions were given. The patient was recalled after 24 hours to check for occlusion and sore spots, and then every 6 months after placement of the obturator.

Discussion

Oral cancer is the sixth most common cancer worldwide. India has the highest number of oral cancer cases, accounting for one-third of the global number [6]. Every year, approximately 77,000 new cases are reported in India, accounting for more than a quarter of all global incidences, with oral squamous cell carcinoma (OSCC) accounting for

84-97 percent of cases [7,8]. OSCC is associated with tobacco consumption, particularly smokeless tobacco, betel-quid chewing, excessive alcohol intake, poor oral hygiene, a nutrient-deficient diet, and viral infections, such as the human papillomavirus [7]. Extirpation of tumors in the palate and paranasal sinus necessitates meticulous surgical planning, a strategy that provides enough lesion exposure while maintaining functional and aesthetic integrity. The prosthodontist's involvement begins as soon as possible, to maximize the reconstruction and dental rehabilitation efforts [9].

An obturator is vital for patients recovering from maxillectomy. The framework design for obturators depends on the type of defect [10]. To minimize dislodging forces, removable obturator prosthesis should follow basic prosthodontic principles, consisting of broad stress distribution, cross-arch stability, and retentive and bracing components within the arch [11]. A tripod retainer design with buccal retention and palatal bracing components was chosen for this case. To ensure the best distribution of functional load on the tissues, the complete palate major connector was designed. A T-bar clasp placed on the left first central incisor and embrasure circumferential clasps between the right first & second premolar and first & second molar provided direct retention [10-13].

Obturators should be comfortable, restore deglutition and mastication, phonetics, and be cosmetically accept-

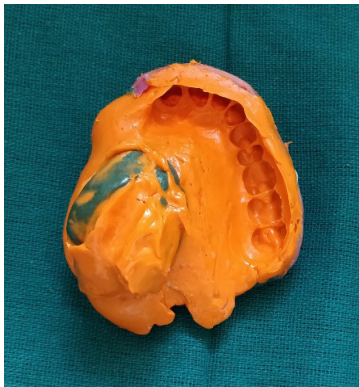


Fig. 1. Master Impression

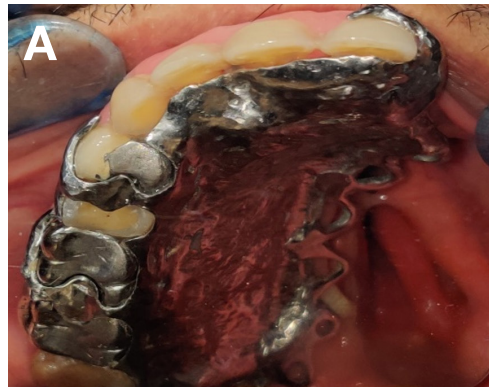


Fig. 2. A & B: Metal Framework Try-in



Fig. 3. (A) Jaw Relation (B) Try-in



Fig. 4. Intaglio surface of the obturator with closed hollow bulb extension



Fig. 5. Definitive prosthesis in situ



Fig. 6. (A) Preoperative (B) Postoperative (Smile of Confidence)

able. An obturator should have adequate support, retention, and stability to accomplish all these goals [14]. In the present case, support was provided for the prosthesis by the remaining teeth, the palate, and the rest. Rests were prepared on the right first premolar, second premolar, first molar, and second molar. Retention was achieved using a tripod design with extra coronal retainer, by the alveolar ridge, residual soft palate by achieving posterior palatal seal, residual hard palate through undercuts, lateral scar band, and height of the lateral wall. Stability was achieved by providing bracing components on the palatal side and prosthesis extension in all lateral directions.

A bulb extension is needed to enhance speech by providing resonance [15]. There are different types of bulb extension, including solid, open, and closed hollow. Hollow bulbs offer advantages such as weight reduction, retention, and comfort to the prosthesis [16]. Depending on the extent of the defect, the weight reduction of the hollow obturator prostheses ranged from 6.55 percent to 33.06 percent [17]. In this case, a closed hollow bulb obturator was designed to eliminate fluid and food retention, reduce airway room, and allow maximal extension [18].

Conclusion

The case report presents rehabilitation of Aramany's Class II defect using a tripod configuration of retainers for sup-

port and stabilization. One-piece closed-hollow bulb cast partial obturator fabricated with adequate extension rehabilitated the patient by improving aesthetics and restoring the function of speech, mastication, and deglutition. The hollow bulb design improved retention, stability, and comfort by reducing weight and improving speech by providing resonance.

Authors' contribution

VS: Conceptualization, Methodology, Resources, Software, Writing – original draft, Writing – review & editing
JP: Conceptualization, Formal Analysis, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing

KKM: Supervision, Visualization, Writing – review & editing.

RLR: Supervision, Visualization, Writing – review & editing

Conflict of interest

None to declare.

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