



Case Report

Prosthodontic rehabilitation of a surgically induced oro-nasal fistula with a palatal obturator: A clinical report

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Abstract

Surgical resection of oral squamous cell carcinoma often results in postoperative defects such as palatal fistulae, leading to significant functional impairments including nasal regurgitation, speech difficulty, and compromised mastication. These complications greatly diminish the patient's quality of life. In situations where immediate surgical closure is not feasible, prosthodontic rehabilitation with an obturator prosthesis plays a crucial role in restoring oral function.

Keywords: Palatal fistula, Palatal obturator, Obturator prosthesis, Oral squamous cell carcinoma, Maxillofacial rehabilitation, Heat-cure acrylic obturator, Oro-nasal communication, Prosthodontic management.

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1. Introduction

Oral cancer continues to be an important public health issue, especially in developing nations such as India, due to high levels of risk factors including chewing tobacco, smoking, and alcohol use. Of all the different subtypes, oral squamous cell carcinoma (OSCC) is the most prevalent and constitutes over 90% of the oral cancers.¹ The treatment protocols for OSCC are usually surgical excision, which is usually combined with neck dissection and pedicled or free flap reconstruction. Although such procedures save lives, they often lead to postoperative maxillofacial defects, ranging from palatal fistulae and oro-nasal communications, which significantly compromise the patient's functional and psychological status.

Maxillary defects due to tumor resection may create disturbances in normal oral functions like speech, mastication, swallowing, and facial aesthetics. Such defects, if not properly rehabilitated, cause nasal regurgitation, hypernasal speech, food lodging in the nasal cavity, and generally compromised quality of life.^{2,3} Such defects are optimally rehabilitated by a multidisciplinary team that

includes surgical, medical, and prosthodontic consultants. Where surgical closure is not practicable or feasible in an immediate manner, prosthetic rehabilitation using an obturator prosthesis is the preferred treatment.

An obturator is a prosthetic appliance used to close the opening of communication between the oral and nasal cavities, which preserves oral competence and function. Obturators may be surgical, interim, or definitive based on the timing of fabrication and function.⁴ A definitive obturator, generally made three to six months following surgery, is intended to be used as long-term rehabilitation after the tissues have healed and the defect has stabilized size and shape.⁵

The employment of an obturator well designed not only enhances speech intelligibility and swallowing but also the psychosocial condition of the patient, making it possible for reintegration into activities. There has been a great improvement in the retention, stability, and comfort of the obturators due to advances in impression materials, processing methods, and prosthetic design. In partial palatal defects, particularly in dentate patients, a heat-polymerized

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acrylic obturator may provide a cost-effective and effective alternative when surgical closure or cast metal frameworks are not possible.

This case report presents the prosthodontic management of a patient with a palatal fistula secondary to oral cancer surgery, rehabilitated successfully with a definitive heat-cure acrylic obturator.

2. Case Report

A 45-year-old male patient, Mr. Suresh Chandra, reported to the Department of Prosthodontics at Seema Dental College and Hospital, Rishikesh, with the chief complaint of nasal regurgitation of fluids while swallowing, along with difficulty in speech and mastication, persisting for the past one year. The patient expressed a strong desire for a prosthetic replacement to restore his oral function and improve esthetics. His medical history revealed that he was diagnosed with oral squamous cell carcinoma involving the left buccal mucosa a year ago. He underwent wide local excision of the lesion, segmental mandibulectomy, supraomohyoid neck dissection, and reconstructive surgery using a local flap. Post-operatively, the patient developed palatal fistulae, resulting in persistent oro-nasal communication. He also had a history of hypertension and type 2 diabetes mellitus, both under medical management. His personal history was significant for chronic gutka chewing, bidi smoking, and alcohol consumption over a period of 30 years.

Extraoral examination revealed noticeable facial asymmetry on the left side, with evidence of a reconstructed surgical flap extending from the left corner of the mouth to the palate. The left cheek appeared sunken, indicating underlying soft tissue loss (**Figure 1**). No cervical lymphadenopathy was palpated. Intraorally, two distinct palatal fistulae were noted in the left region of the palate, with surrounding scar tissue and altered mucosal contours. The surgical site appeared healed, but irregular. The patient had a partially dentate arch. In the maxilla, teeth 11 to 16 and 21 to 24 were present, while in the mandible, teeth 31 to 34, 41 to 45, and 47 and 48 were noted (**Figure 2**).



Figure 1: The left cheek appeared sunken, indicating underlying soft tissue loss



Figure 2: Partially dentate arch with maxillary teeth 11–16, 21–24 and mandibular teeth 31–34, 41–45, 47–48 present, along with two intraoral palatal fistulae

The treatment plan focused on prosthetic rehabilitation using a definitive heat-cure acrylic obturator to seal the fistulae and restore function. (**Figure 3**). A custom tray was fabricated on the maxillary cast using self-cure acrylic resin, carefully extending it to record the defect area. Border molding was carried out using low fusing compound to capture the functional extension of the soft tissues. A final impression was made with medium body polyvinyl siloxane (PVS) material to achieve accurate recording of the palatal contours and fistula margins. The master cast was poured in type IV dental stone to ensure dimensional accuracy and strength (**Figure 4**).



Figure 3: Primary impression made with irreversible hydrocolloid using a stock tray; diagnostic cast poured in Type III dental stone



Figure 4: Border molding performed with greenstick compound; final impression made using PVS for precise capture of palatal contours and fistula margins; master cast poured in Type IV dental stone

Occlusal rims were fabricated on the denture base and jaw relation was recorded in centric relation. Teeth were arranged in wax, and the try in was evaluated intraorally for esthetics, occlusal harmony, phonetics, and proper coverage of the defect area. After approval of the trial setup, the

prosthesis was prepared for processing. The waxed-up trial was invested in a traditional two-part flask using dental plaster (Fig.5).



Figure 5: Occlusal rims fabricated and jaw relation recorded in centric relation; trial obturator evaluated intraorally for esthetics, occlusion, phonetics, and defect coverage; approved wax-up invested in a two-part flask using dental plaster

After the setting of the investment, the flask was placed in boiling water to facilitate dewaxing. The mold space was thoroughly cleaned to remove any wax residues. Heat-cure acrylic resin was then mixed to a dough stage and carefully packed into the mold. A trial closure was performed to remove excess material and ensure a complete fill. The final curing cycle was carried out using a long polymerization technique at 74°C for 8 hours, followed by terminal boiling at 100°C for one hour to enhance the mechanical properties and reduce residual monomer content.

After curing, the flask was bench-cooled before deflasking to avoid warpage. The prosthesis was retrieved, trimmed, and polished using a lathe and pumice to achieve a smooth finish. The final obturator was evaluated intraorally for retention, stability, occlusion, and comfort (**Figure 6**). The patient was instructed on insertion and removal techniques, hygiene maintenance, and dietary modifications. He was advised to avoid extremely hot or hard foods during the initial adaptation period.



Figure 6: Prosthesis retrieved, trimmed, and polished with lathe and pumice; final obturator assessed for retention, stability, occlusion, and comfort

Follow-up was conducted at 24 hours, one week, and then monthly for the first three months. The patient reported complete resolution of nasal regurgitation, improved speech intelligibility, and better masticatory efficiency. Psychologically, he expressed renewed confidence and

comfort in social interactions. The prosthesis was functioning satisfactorily without any signs of tissue irritation or breakdown.

3. Discussion

Rehabilitation of maxillofacial deformities after oncologic excision is a multifaceted clinical problem that necessitates an individualized, multidisciplinary solution. This patient had a palatal fistula as a consequence of surgical excision for oral squamous cell carcinoma, treated successfully with a definitive heat-cure acrylic obturator. The prosthesis provided function and esthetics, proving the effectiveness of prosthodontic treatment in improving the quality of life of patients with post-surgical oro-nasal fistulas.

In this case, the defect was not large enough to necessitate a metal framework, and the remaining dentition of the patient gave adequate support and retention for an acrylic obturator. This is congruent with the clinical recommendations proposed by Aramany and subsequent validation by Huryn and Piro, who underscored that obturator design should be founded upon the residual anatomy and stability of the defect site.⁵ Where retention can be achieved using the remaining teeth for smaller or medium-sized defects, a well-designed acrylic obturator can hold its own compared to metal-based prosthesis, especially where cost or technical constraints are considerations.⁶

One of the most significant functional deficits owing to palatal defects, however, is nasal regurgitation at swallowing. In untreated patients, the patent communication between the oral and nasal cavities severely compromises deglutition and phonation, typically leading to malnutrition and social isolation. Kornblith et al. also opined that obturator prosthesis significantly improve patients' quality of life, particularly when the communication is sealed adequately.³ In present case, the obturator was an ideal seal, immediately resolving regurgitation and improving swallowing and speech. Speech intelligibility is another significant aspect of obturator prosthesis. Rieger et al. emphasized the positive correlation between patient satisfaction and improved speech outcome with the use of obturators.⁷ In present case, who had complained of hypernasal speech and articulatory difficulty pre-treatment, had tremendous improvement following insertion, as documented in the available literature.

We employed heat-polymerized acrylic resin in the present case to fabricate the obturator with a long polymerization cycle. With this approach, better mechanical properties, decreased residual monomer content, and increased biocompatibility were guaranteed. Oh and Roumanas demonstrated that the thickness of the obturator and polymerization regimes directly influence prosthesis comfort and patient adaptation.⁸ The long curing cycle also reduces porosity and dimensional change, leading to enhanced adaptation and prosthesis survival.

Compared to more complex obturators with metal framework or hollow bulbs, the acrylic obturator on this present case was less complex in design but deeply effective in outcome. Bahrami and Falahchai reported a case of extensive maxillary defect in which an interim immediate obturator was later replaced with a hollow bulb definitive prosthesis to minimize weight.⁹ While hollow bulb designs are very helpful in extensive defects, they require more advanced lab skills and are not always feasible in small clinical settings. The present case, with moderate defect and stable dentition, was best served by a conventional solid obturator. Aladashi et al. conducted a randomized clinical trial of surgical closure with a submental flap versus obturator prosthesis rehabilitation and found no difference in the quality of life outcome after maxillectomy, validating the efficacy of prosthetic management when surgical closure is contraindicated or delayed.¹⁰ Similarly, the present case restored function successfully without secondary surgery.

The second most important key to long-term success is patient follow-up and oral hygiene maintenance. Inadequate prosthesis care may result in candidiasis, pressure sores, or abutment tooth loss. In present case, poor hygiene was prevented by good instructions to the patient and regular follow-ups, which resulted in a good outcome. This case also illustrates patient-centered care. As Nagy et al. have pointed out, rehabilitation of the psychosocial is equally as vital as rehabilitation of the physical, and effective prosthodontic care is a significant variable in rehabilitation of social function and patient confidence.¹¹ In present case, initially withdrawn with speech and esthetic concerns, vastly improved in psychological status following rehabilitation.

Post-surgical maxillofacial rehabilitation, especially palatal fistulae following oral cancer surgery, is beneficial to restore vital oral functions and enhance the quality of life in the patient. This case illustrates that a properly fabricated heat-cure acrylic obturator is a suitable and functional option in patients with moderate defects and good dentition. The obturator effectively restored the oro-nasal partition, thus enhancing speech intelligibility, prevention of nasal regurgitation, and comfortable mastication. The prosthesis also had positive psychological and social impact on the patient, emphasizing the importance of early prosthodontic intervention. While more sophisticated prosthetics such as cast metal frameworks or implant-retained obturators could be preferable, acrylic obturators are a reasonable and affordable treatment, particularly in resource-poor settings. A multidisciplinary rehabilitation plan, precise impression technique, ideal material selection, and follow-up are crucial parameters for long-term success in such rehabilitative cases. This case emphasizes the significance of the prosthodontist's role in the continuum of care of survivors of oral cancer.

4. Conclusion

In conclusion, this case adds to the body of evidence supporting the use of heat-cured acrylic obturators in managing small to moderate palatal defects. While more complex frameworks and implant-supported options exist, conventional prosthetic techniques continue to play a pivotal role in the holistic rehabilitation of head and neck cancer patients, particularly in resource-limited settings.

5. Source of Funding

None.

6. Conflict of Interest

None.

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