



Case Report

New Obturator Fabrication for an Edentulous Patient in a single visit: A Case Report

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ABSTRACT

The obturator prosthesis serves as a crucial rehabilitation solution for patients with acquired maxillary defects. The primary objective of an obturator prosthesis is to enhance oral functions and reestablish the separation between the oral and nasal cavities, enabling patients to regain a sense of normalcy in their daily activities. This includes activities like speaking, eating, and swallowing. In this case, the fabrication of an obturator prosthesis was determined for an edentulous patient, and a strategic approach was adopted to streamline the process. The patient's existing obturator was repurposed as a custom tray, which not only expedited the procedure but also ensured a better fit and comfort during the impression-making phase. The closed mouth impression technique was employed to achieve accurate results. Additionally, the patient's bite registration was recorded using the previous prosthesis, which played a critical role in maintaining proper occlusion and functional harmony. Subsequently, during the subsequent clinical visit, the insertion of the obturator prosthesis was successfully carried out. This approach was chosen to minimize the need for frequent visits in the process of fabricating a new prosthesis, thereby saving the patient's time and effort while efficiently addressing their maxillary defect. In essence, the ultimate aim of this obturator prosthesis fabrication was not only to restore the patient's oral functions and esthetics but also to optimize their overall quality of life by enabling them to engage in daily activities with greater confidence and ease.

Keywords: Maxillary obturator, Edentulous patient, Prosthesis, Maxillary defect

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INTRODUCTION

Palatal defects can arise from various factors such as congenital abnormalities, traumatic injuries, pathological conditions, radiation exposure, or surgical interventions.¹ These maxillofacial defects can result in a range of dysfunctions, including difficulties in mastication, swallowing, speech, and even facial disfigurement, subsequently affecting psychological well-being and social interactions.² Addressing these challenges is a focal point in the field of maxillofacial prosthodontics, which is tasked with the intricate task of restoring multifaceted functions within the complex oral and facial anatomy.³

Among the strategies for reconstructing such defects, the use of obturator prostheses stands out as a widely employed method. In the “Glossary of Prosthodontics terms”, an obturator is defined as a maxillofacial prosthesis designed to close congenital or acquired tissue openings, predominantly those affecting the hard palate and contiguous alveolar/soft tissue structures.⁴ Fabricating an obturator involves adhering to fundamental prosthodontic principles, particularly in capturing resilient and unsupported tissues accurately.⁵

In cases where patients retain some natural dentition following maxillectomy, the remaining natural teeth, soft tissues, residual palate, and alveolar process collectively contribute to providing crucial support, stability, and retention.³ However, when dealing with edentulous patients, rehabilitating palatal defects becomes more intricate due to the absence of natural teeth for support and retention. In such scenarios, the challenge is met by leveraging the available defects and remaining anatomical structures to achieve the necessary stability and retention.⁵

This case report outlines a unique approach in which an existing obturator prosthesis serves as the foundation for fabricating a new one. This method, beyond its simplicity and economic viability, stands as a reliable single-visit procedure. By utilizing the old prosthesis as a reference, this technique not only streamlines the process but also effectively reduces the need for numerous visits typically associated with conventional prosthesis fabrication. This innovative approach aligns with the broader aim of enhancing patient comfort, minimizing inconvenience, and optimizing the overall rehabilitation process for individuals with palatal defects.

The rationale behind this technique lies in its potential to significantly improve patient experience and satisfaction by circumventing the challenges posed by conventional methods while maintaining the desired functional and esthetic outcomes.

CASE REPORT

A 46-year-old male patient presented to the Prosthodontics department at Punjab Dental Hospital, Lahore, with a history of Mucormycosis affecting the anterior maxilla. A maxillectomy of (Type VI) had been performed one year prior to address the condition. The resulting defect had been managed with an obturator prosthesis implanted the previous year. The patient's chief complaints were related to the instability of the old prosthesis and nasal regurgitation. Engaged in farming, he also had a medical history of diabetes. Upon extraoral examination, it was evident that the surgical defect had caused upper lip sunken appearance (Figure 1).

Intraoral assessment revealed an edentulous upper arch with multiple bilateral defects in the premaxillary area, which communicated with the nasal cavity (Figure 2A). The patient exhibited satisfactory oral hygiene, and his jaw movements were within normal parameters. The existing acrylic obturator prosthesis was noted to be ill-fitting, lacking adequate support and retention. The prosthesis also displayed irregular occlusal plane and a slight shift in the dental midline (Figure 2B and C).

Following a comprehensive evaluation, the decision was made to create a new acrylic obturator prosthesis for the patient. Given the patient's financial limitations, options involving implants or a cast partial framework were not pursued.

TECHNIQUE

The overextended or under extended borders of the old obturator were identified using pressure-indicating paste. Overextensions were addressed by reducing them using an acrylic bur. Vertical dimensions for both rest and occlusion were measured according to Niswonger's method.²

A bite registration was accomplished using an interocclusal wax wafer while the obturator was in place, capturing centric occlusion. This record was carefully preserved for future articulation.

A definitive impression using a closed mouth technique was executed using a thin layer of silicone impression material (KromopanSil, Lascod, Florence, Italy) with the existing prosthesis (Figure 3a). An alginate material (Hygedent chromatic, Shahe Town, Beijing, China) in a stock impression tray was used to take an impression of the lower arch. Both impressions were poured using type IV gypsum (ANT KevinFuk, AGS Ltd, China). An index of the labial-lingual position of the upper anterior teeth was created using a putty material with the obturator in place.

The maxillary and mandibular casts, along with the old obturator, were articulated based on the interocclusal wax record. The old obturator was returned to the patient to be worn until the new obturator's fabrication. After surveying the maxillary cast, suitable bony and tissue undercuts were identified to establish an appropriate path of insertion for the new obturator.

A teeth setup for the complete arch on the articulated maxillary cast was completed, referencing the lower arch. Due to the absence of a separate jaw relation step, the placement of the anterior teeth according to the smile line was not feasible. The teeth were arranged with minimal overjet and overbite to ensure denture stability. The final obturator design was harmonious with the smile line. Posterior semi anatomic teeth were set in maximum interception with the opposing teeth; the occlusal scheme incorporated in this case was balanced occlusion, (Figure 3B).

The post-dam area was carved, and a wax-up was created for full palatal coverage. The decision to construct a hollow bulb

obturator was not made since the defect did not require significant depth, and the prosthesis's retention would not be compromised by its weight or bulk. After completing laboratory procedures, including finishing and polishing, the new obturator was inserted during the subsequent clinical visit (Figure 3C). At the time of insertion, pressure-indicating paste was applied to the intaglio surface of the obturator to ensure proper tissue contact. Any occlusal premature contacts were eliminated. The patient received guidance on maintaining hygiene, and a follow-up appointment was scheduled for one week later.

During the follow-up, the obturator's performance was assessed, hygiene instructions were reinforced, and a plan for a six-month recall visit was arranged. After the six-month follow-up, the patient expressed satisfaction with the new obturator.

The described case report outlines the comprehensive assessment, planning, and execution of a new obturator prosthesis for a patient who had undergone maxillectomy due to Mucormycosis. The detailed technique employed showcases a patient-centered approach that takes into account both the clinical condition and the patient's financial constraints.



Figure 1. Frontal view of patient

Figure 2. (A) Intraoral defect (B) Old prosthesis in situ (C) Occlusal surface of old prosthesis**Figure 3.** (A) Definitive impression (B) New obturator in situ (C) Occlusal surface of new obturator

DISCUSSION

Following maxillectomy procedures, the loss of bone and soft tissue can lead to significant facial disfigurement, posing a challenge for reconstructive surgeons attempting to restore such critical structures.⁶ Among the strategies employed, obturator prostheses have emerged as a common solution for rehabilitating maxillectomy patients. These prostheses play a crucial role in reestablishing separation between the nasal and oral cavities, thereby supporting soft tissues and facilitating oral functions. Additionally, they contribute to enhancing midfacial aesthetics.⁷ In the context of this case report, an edentulous patient with a maxillary defect was provided rehabilitation through an obturator prosthesis. The patient's dissatisfaction with his loose old obturator, coupled with financial limitations, precluded options like cast frameworks or dental implants, directing the treatment towards a conventional acrylic prosthesis.

In maxillectomy defects, elastomers have emerged as the preferred impression material. Their hydrophobic nature is advantageous, particularly for xerostomia patients with

maxillary defects.² In the present case, elastomers of light viscosity were selected for impression-taking, considering the presence of tissue and bony undercuts. This choice is well-suited for capturing fine tissue details even with thin film thickness (0.5-1mm), thus ensuring close contact between the obturator and denture-bearing areas. This attribute enhances support and retention.⁸ Bite registration was achieved with an occlusal wax wafer, facilitating the subsequent mounting of casts.

The fabrication of the obturator adhered to fundamental principles, with the denture base extending to its maximum for optimal support and multiple undercuts harnessed for enhanced retention. The incorporation of a post-dam area served to bolster the palatal posterior seal. A notable limitation of this method is the omission of a tooth try-in step. However, given the preferences of maxillofacial defect patients for concise procedures that minimize multiple visits, and considering the societal challenges they often face, a streamlined approach is warranted to provide timely rehabilitation.^{9,10}

While the case report demonstrates the successful rehabilitation of the patient's maxillary defect, it is important to acknowledge certain limitations that need to be considered. One notable limitation is the absence of a tooth try-in step during the prosthesis fabrication process. This omission could potentially result in challenges related to achieving optimal esthetics and occlusal harmony. Incorporating a tooth try-in step could have allowed for real-time adjustments to ensure that the artificial teeth's placement aligns with the patient's smile line and occlusal dynamics. This aspect should be carefully addressed in future cases to achieve the best possible functional and esthetic outcomes.

Additionally, the lack of a comparative analysis with alternative treatment methods restricts a comprehensive assessment of the chosen approach's superiority. Comparing the presented technique with alternative prosthetic solutions, such as cast frameworks or implant-supported prostheses, would provide valuable insights into the relative advantages and disadvantages of each approach. This could contribute to evidence-based decision-making and help tailor treatment plans to individual patient needs and financial constraints.

Despite these limitations, the case report exhibits notable strengths that warrant acknowledgment. One of the strengths lies in the patient-centered approach that effectively balances clinical efficacy with the patient's financial limitations. By selecting a conventional acrylic prosthesis over more complex and costly alternatives as if cast frameworks or dental implants, the treatment plan takes into account the patient's specific circumstances and preferences, ensuring a practical and feasible solution.

The utilization of elastomers for impression making is another strong point of the presented approach. Elastomers, being hydrophobic, offer advantages for patients with maxillectomy defects who might also suffer from xerostomia. This choice ensures accurate impressions in potentially challenging clinical situations. The incorporation of tissue and bony undercuts further demonstrates the precision achieved in capturing intricate details necessary for an optimal prosthesis fit.

In terms of future recommendations, it would be beneficial to conduct long-term follow-up studies to assess the performance and durability of the presented technique over an extended period. Such studies could shed light on the

prosthesis longevity, comfort, and overall patient satisfaction. Furthermore, exploring digital technologies in the realm of maxillofacial prosthetics could be a promising direction. Incorporating digital impressions, CAD/CAM techniques, and 3D printing could enhance both the accuracy and efficiency of the prosthesis fabrication process.¹¹

To advance the field, efforts should be made to standardize protocols for maxillofacial defect rehabilitation. Establishing guidelines and best practices would ensure consistent and high-quality care across different clinical settings. Collaborative research endeavors could also contribute to expanding the knowledge base and improving treatment outcomes for patients with similar challenges.

CONCLUSION

This case highlights the importance of obturator prostheses in maxillary defect rehabilitation, restoring functions and aesthetics. The patient-centered acrylic prosthesis choice, despite financial limitations, demonstrates the balance between efficacy and individual preferences.

The use of tailored elastomers emphasizes precision, while acknowledging limitations and simplifying procedures aligns with patient preferences. Future directions involve validation, comparative studies, digital innovations, and protocol standardization, advancing maxillofacial prosthetics and quality of life.

Author's contribution

N.S., Conceptualization of study design, performed the procedure; M.A., Proof reading; S.A., Literature search, Data analysis; N.A., Data interpretation, write-up.

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Institutional ethical board approval

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Informed Consent

The written consent was obtained from the patient in this case

Conflict of Interest

The authors report no conflict of interest

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