

Case Report: A Method of Impression-Making for Massive Maxillectomy Defects



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ABSTRACT

Maxillary defects occur for various reasons, such as congenital malformations, cancer, pathological changes, radiation burns or surgical interventions. Patients with large defects, progressive disease and those undergoing post-operative chemotherapy or radiotherapy must be rehabilitated by obturator prostheses. Making a well-extended impression for obturator prostheses may be difficult in the case of massive defects. This article presents a method for making impressions of massive maxillary defects using a special tray with a wide opening in the palatal region.

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Case Report

Maxillary defects occur for various reasons, such as congenital malformations, cancer, pathological changes, radiation burns or surgical interventions. (1)

Maxillary defects can lead to nasalized speech, dysphasia, liquid permeation to nasal cavity, loss of support of the cheek and lip, compromised esthetic and impaired mastication.(2)

Prosthetic or surgical procedures may be implemented to treat this situation. Patients with large defects, progressive disease and patients undergoing post-operative chemotherapy or radiotherapy must be rehabilitated by obturator prostheses.

An obturator prosthesis is defined as "a maxillofacial prosthesis used to close a congenital or acquired tissue opening, primarily of the hard palate and/or contiguous alveolar or soft tissue structures". (3,4,5)

The vertical segment of the prosthesis provides retention, stability, oronasal separation and improves speech. (6)

Accurate and properly-extended impression of areas correlated to the vertical segment is necessary for achieving satisfactory results. Meanwhile, making a well-extended impression may be difficult in the case of massive defects. This article introduces a technique for making impressions of obturator prostheses in large maxillary defects.

A patient with massive maxillary defect was referred to a private dental office to receive obturator prosthesis. Premaxilla, alveolar ridges and hard palate were fully resected with the exception of the left third molar and surrounding alveolar bone (Figure 1). The primary impression was obtained using irreversible hydrocolloid (Blueprint Dentsply Sirona, Germany). The lesion boundaries were marked on the study cast (Figure 1).



Figure 1. Study cast. The lesion borders are marked.

The special tray was fabricated from autopolymerizing acrylic resin (Special Tray Material, Dentsply). A wide opening was prepared in the palatal region of the tray, in front of the center of the maxillary defect (Figure 2).



Figure 2. Tray and central wide opening.

High-fusing compound (Kerr Impression Compound) was used in the first stage of the border molding procedure. For the bulb area, the compound was applied on the tray tissue surface and the tray was carried into the mouth; then, the index finger was used through the tray opening to push the softened material into the surrounding structures: The bony undercuts of maxillary sinuses laterally, nasal floor anteriorly, and pharyngeal surface of the soft palate posteriorly (Figures 3a and 3b).

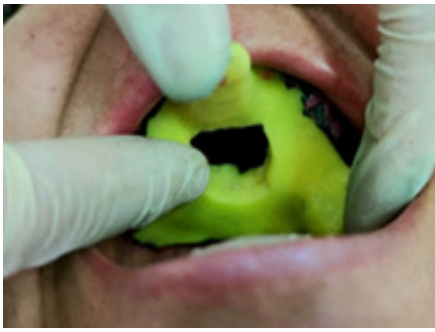


Figure 3a: Finger access through the opening.



Figure 3b: Compound is extended into the lesion by finger.

The procedure was performed step by step to fully capture the bulb area and retentive structures. Compound extensions were assessed in each step and the necessary relief was taken to prevent locking of the tray in the undercuts. After completion of the border molding, the high-fusing compound was reduced by 1 mm on the surface and relined by low-fusing compound (Iso Functional Compound, GC America) in the second step (Figure 4a). The tray opening was closed by the high-fusing compound for testing the seal before taking the final impression (Figure 4b). The final impression was made with light-bodied condensation silicone (Speedex, Coltene, Switzerland) (Figure 4c).

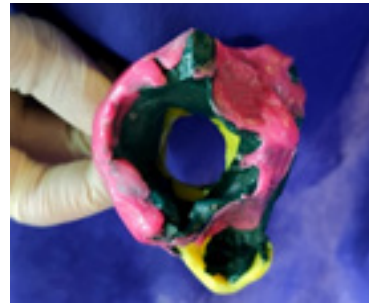


Figure 4a: Finalized border molding

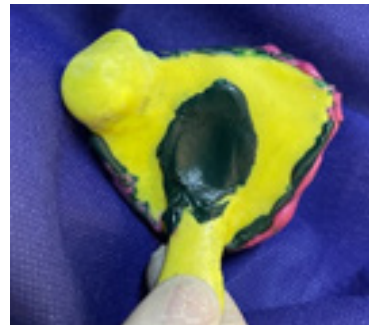


Figure 4b: The tray opening closed by the compound.

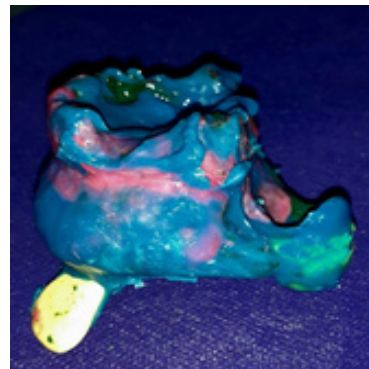


Figure 4c: Final impression

The final prosthesis is shown in Figures 5a and 5b.



Figure 5a: Final prosthesis

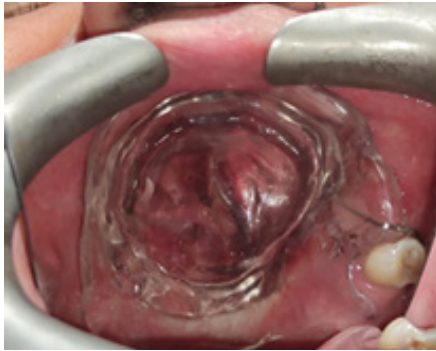


Figure 5b: Final prosthesis

Discussion

When the maxillary defect extends from the nasal cavity to the maxillary sinus, taking an exact impression can be difficult depending on the shape, size, position, and surrounding tissues.

An obturator prosthesis impression should provide proper extension into the internal structures of the maxillary defect to provide optimum retention, stability and support. Carrying the impression compound into the lesion to properly capture the undercuts may be difficult and time-consuming. The opening in the palatal area of the tray provides 360-degree access to the internal structures of the defect and enables carrying the compound directly by the finger, thus making the procedure easy and fast and facilitating optimum extensions.

In 2011, Bhasin et al. treated a patient with a large maxillary defect using a closed, hollow bulb obturator to improve the retention and stability of the obturator. Their applied mechanism consisted of reducing the cantilever forces of the suspension and preventing overloading of the remaining support structures. (7)

Contrary to this study, in 2017, Parameswari et al. described two maxillectomy patients with large defects who were rehabilitated by a two-piece hollow bulb obturator that was retained with magnets. They suggested that rehabilitation by fabricating two-piece obturators provides light-weight prosthesis that can be easy to use, as its segments involve the undercut

that improves retention. (8)

In 2023, Colvenkar et al. treated a patient with palatal cleft by fabricating complete denture with obturator bulb. They also emphasized the importance of a good extension and exact impression for achieving proper retention to improve the patient's quality of life. (9)

Conclusion

Maxillofacial prosthetics can strongly improve quality of life in patients with maxillectomy.

Given the results of this report, it can be argued that the use of this method can enable easy, fast and optimum impression-making for massive maxillary lesions.

Nevertheless, it is not possible to state the exact preferred method based on the results of a single case report, and future studies with larger sample sizes and longer follow-up periods are required.

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None

Authors' contributions

Fatemeh Salehi: Conceptualization, Methodology, Writing - Review & Editing
Farbod Manshaee: Writing - Original Draft, Data Curation, Supervision
Majid Abolhasani: Resources, Investigation, Visualization

Conflict of interest

The authors declare no conflict of interest.

Ethical declarations

Not applicable

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Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

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