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Fabrication of an Interim Obturator for a Patient with a Maxillary Defect and Restricted Mouth Opening

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Abstract: Maxillectomy defects can lead to oroantral communication, causing difficulties with chewing, swallowing, speech, and facial appearance. Prosthodontists play a crucial role in rehabilitating such defects using obturators[1]. The fabrication of an interim obturator with acrylic framework for a patient who had an acquired maxillary defect. In this clinical report, the patient with very limited mouth opening and an alternative impression making was done, retention was achieved by utilizing the remaining teeth, employing one circumferential clasp on the right lateral and two ball end clasp on canine and first premolar. A complete palate was designed to ensure optimal load distribution to the surrounding tissues.

Keywords: *Palatal Defect, Obturator, Definitive Obturator, Partial Maxillectomy, Prosthodontics.*

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I. INTRODUCTION

The maxilla is a vital component of the craniofacial skeleton, playing a key role in mastication, deglutition, speech, esthetics, and facial harmony. Surgical resection of the maxilla, commonly performed for the management of maxillary tumors, trauma, or infections such as mucormycosis, often results in a communication between the oral and nasal cavities.[1] This anatomical discontinuity leads to severe functional and psychological impairment including nasal regurgitation of food and fluids, hypernasal speech, impaired mastication, and facial disfigurement. The resulting defect not only compromises oral functions but also impacts the patient's self-esteem, social interactions, and overall quality of life.[2]

Maxillary defects are created by surgical treatment of benign or malignant neoplasms, congenital malformation and by trauma. Rehabilitation of such defects aims to restore the separation between the oral and nasal cavities, regain normal oronasal function, and re-establish facial esthetics.[3] The size and location of the defects influence the degree of impairment and difficulty in prosthetic rehabilitation. Lack of support, retention, and stability are common prosthodontic treatment problems for patients who have had a maxillectomy[4].

A prosthesis used to close a palatal defect in a dentate or edentulous mouth is referred to as an obturator. An obturator is a well-documented, time-tested, and cost-effective method for restoring such defects, especially when surgical reconstruction is contraindicated or delayed. Obturators are typically classified into surgical, interim, and definitive types, depending on the stage of healing and the nature of the defect. The interim obturator is fabricated and delivered after initial wound healing and before definitive prosthesis fabrication, serving as a transitional prosthesis that restores function, supports tissue healing, and maintains the contours of the defect site.

However, the fabrication of an obturator can be particularly challenging in patients presenting with restricted mouth opening (trismus). Limited inter-arch space restricts proper access for impression making, tray insertion, and prosthesis placement, often resulting from postoperative scarring, fibrosis, or radiation therapy.[5] Conventional impression techniques using standard trays become impractical, necessitating modifications in approach and material selection. In such situations, sectional impression techniques, flexible trays, and sectional obturator designs have been advocated to overcome these limitations.[6]

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The primary objectives in managing such cases are to achieve an accurate impression of the defect and supporting tissues, ensure proper fit and comfort of the prosthesis, and restore essential oral functions while accommodating the restricted access. The interim obturator not only restores immediate function but also conditions the soft tissues and helps the patient adapt psychologically and functionally before the delivery of the definitive prosthesis.[7]

This article presents a clinical case detailing the step-by-step fabrication of an interim obturator in a patient with a maxillary defect and restricted mouth opening. The report highlights the challenges encountered in impression making and prosthesis design, as well as the innovative modifications adopted to achieve functional and esthetic rehabilitation. The clinical outcome emphasizes the importance of individualized treatment planning and the adaptability of prosthodontic techniques in managing complex maxillofacial rehabilitation cases.

II. CASE REPORT

An 84-year-old female patient was referred to the Department of Prosthodontics, Sri Hasanamba Dental College and Hospital, Hassan, Karnataka, with a chief complaint of leakage of fluids and food accumulation through the nose while eating and drinking.

The patient had a history of left partial maxillectomy and segmental mandibulectomy with PMMC flap reconstruction, followed by radiation therapy two years ago, due to squamous cell carcinoma of the left maxillary sinus.

Extraoral examination revealed gross facial asymmetry on the left side as a result of the partial maxillectomy (Figure 1) and segmental mandibulectomy. The patient also presented with restricted mouth opening (1.4 cm) due to fibrosis of the masticatory muscles (Figures 2 and 3).

Intraoral examination revealed a surgical defect on the left side of the hard palate resulting from the left maxillectomy. According to Aramany's classification of maxillary defects, the defect was categorized as Class IV (Figure 4). The gingiva on the intact side appeared swollen and erythematous with generalized gingival recession. The remaining maxillary teeth (12, 13, 14, and 15) exhibited plaque accumulation and blackish stains.

The mandible was completely edentulous, and a left segmental mandibulectomy was noted.

➢ *The Diagnosis Included:*

- An acquired palatal defect resulting from surgical tumor resection,
- Generalized plaque-induced gingivitis,
- Acquired tooth loss, and
- A suboptimal maxillary obturator causing oroantral communication during eating.

The primary treatment goal was to close the communication between the oral and nasal cavities using an interim obturator, thereby preventing the uncontrolled passage of food, liquids, and air between the two cavities. Following this, a removable partial obturator for the maxilla was planned to restore function and esthetics.

➢ *Treatment Procedure*

Considering the patient's functional and esthetic needs, a partial obturator for the maxillary arch was planned. The restricted mouth opening made impression making difficult, and the tissues on the operated side were taut and lacked normal flexibility, which complicated the insertion of stock trays.

The maxillary impression was made in two steps. First, baseplate wax was softened in warm water (41°C) and adapted to the maxillary arch to record the basic anatomy. After applying tray adhesive to the wax, elastomeric impression material (medium and light body, SPEEDEX) was used to capture the final details, including the depth and width of the defect area (Figure 4). The impression was poured using Type IV dental stone to obtain a definitive cast.

The maxillary cast was duplicated for future reference. The study cast was surveyed to determine the design of the acrylic framework and clasp assembly. Undercuts were blocked out using modeling wax. After wax-up of the prosthesis and clasp adaptation, dewaxing was performed (Figure 5). The mold was packed with heat-cure acrylic resin, and the prosthesis was processed and finished with a bulb extension for the obturator (Figures 6 and 8).

The obturator was inserted into the defect and checked for comfort and retention (Figure 9). The patient was instructed on home care and prosthesis maintenance. She was advised to gently clean the wound area using a cotton swab soaked in 5% Betadine solution and to clean the intaglio (tissue-contacting) surface of the prosthesis once daily.

A post-insertion follow-up was scheduled three days after insertion. At this appointment, the surgical area was evaluated for tissue health, and necessary adjustments were made to relieve any pressure areas and to ensure proper fit. Emphasis was placed on maintaining hygiene and following home care instructions. The patient was subsequently placed on a three-month recall schedule for evaluation, maintenance, and monitoring for any signs of recurrence.

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Fig 1 Preoperative View of Patient.

Fig 2 Neck View of Patient.

Fig 3 Extra Oral View Showing Restricted Mouth Opening.

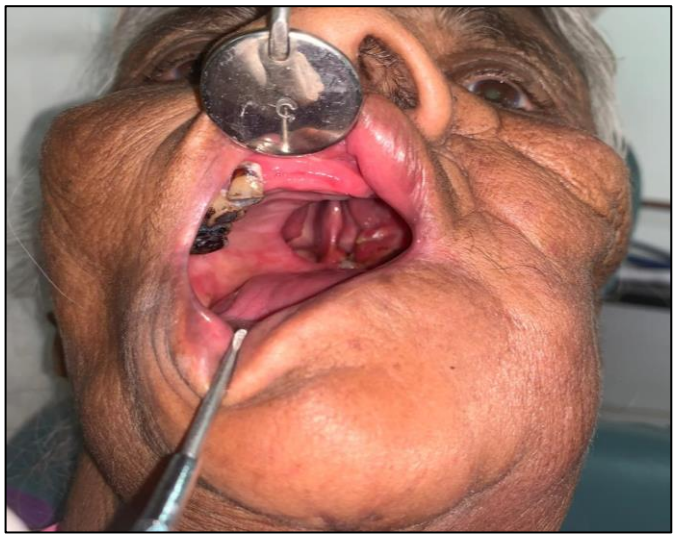

Fig 4 Intraoral view of Maxilla Showing the Site of Defect.

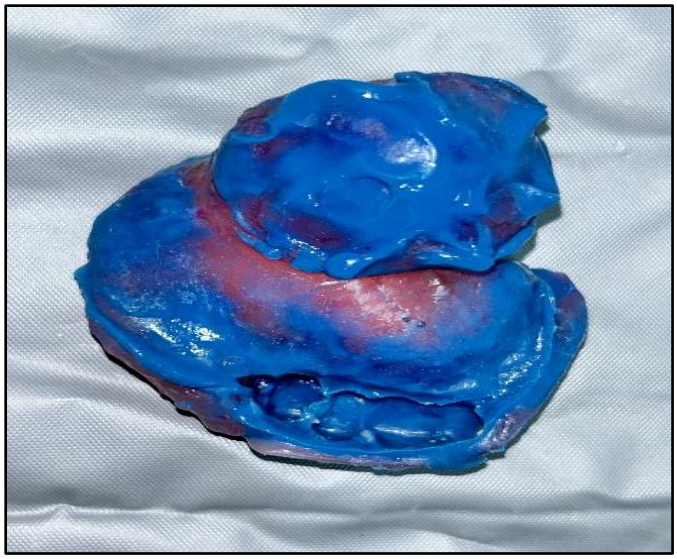

Fig 5 Primary Impression of Maxilla.

Fig 6 Maxillary Master Cast

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Fig 7 Polished Surface of Finished and Polished Prosthesis.

Fig 8 Intaglio Surface of Finished and Polished Prosthesis.

Fig 9 Intra Oral View of Maxilla Before and After Placement of Obturator

III. CONCLUSION

Rehabilitation of patients who have undergone surgical oncology procedures or trauma is a challenging task to rehabilitate as the treatment should address both functional and aesthetics aspects of head and neck region. Maxillofacial prosthodontist, as a member of interdisciplinary oncology team plays a pivotal in the prosthetic rehabilitation of maxillofacial defect. Many devices have been fabricated for the rehabilitation of such defect but obturators have been used commonly is most of the patients. This clinical case report describes a method for prosthetic rehabilitation of a patient with squamous cell carcinoma of the maxilla following partial maxillectomy with restricted mouth opening. Rehabilitation with obturator prosthesis restored the separation between the oral and nasal cavities, enabling the patient to swallow, masticate, supporting the soft facial tissues and reestablishing speech.

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