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Prosthetic Rehabilitation Of A Maxillectomy Patient Using Surgical, Interim, And Definitive Obturators: A Case Report

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Summary
We report the prosthodontic rehabilitation of a female patient in her 40s diagnosed with aggressive squamous cell carcinoma involving the anterior maxilla (premaxilla). Surgical resection of the anterior maxillary segment was carried out to achieve oncologic clearance. A surgical obturator was fabricated preoperatively to provide immediate intraoral closure post-surgery. An interim obturator without teeth was delivered 3 months post-resection, followed by a definitive obturator prosthesis with teeth 6 months postoperatively. Functional rehabilitation was prioritized alongside esthetics, resulting in significant improvement in speech, mastication, and overall quality of life. This case highlights the critical role of staged obturator therapy in the management of maxillary defects following oncologic surgery.

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I. Background

Oral squamous cell carcinoma (OSCC) of the maxilla, although less common than mandibular tumors, poses a unique challenge due to its anatomical complexity and central role in speech, mastication, and facial aesthetics. The premaxillary region, in particular, when involved by carcinoma, necessitates aggressive surgical resection to ensure clear margins. This often leads to significant oronasal communication, loss of anterior support, and impaired speech, swallowing, and psychological well-being.

Maxillary defects post-resection are classified by Aramany. These defects present with central loss of support and require meticulous prosthetic design to restore function and facial balance. Staged obturator prostheses—starting with a surgical obturator, followed by an interim and then a definitive prosthesis—form the cornerstone of prosthodontic rehabilitation in such cases. Immediate intraoperative obturators provide essential separation of the oral and nasal cavities, support surgical packing, and assist in early speech and swallowing. Interim obturators accommodate healing changes, and definitive obturators restore form, function, and esthetics.

II. Case Presentation

A 42-year-old female presented to the Department of Prosthodontics and Crown & bridge with a diagnosis of aggressive OSCC involving the premaxillary segment. Preoperative imaging and clinical examination confirmed localized invasion requiring segmental maxillectomy from premolar to premolar region. The patient was anxious about her appearance and the potential loss of oral function post-surgery.

Preoperative dental impressions were made in irreversible hydrocoloid to fabricate a surgical obturator. The obturator was designed to conform to the anticipated surgical defect and included an acrylic base with wire clasps for retention from remaining posterior teeth.

Surgical Phase:

The patient underwent resection of the anterior maxilla including the premaxilla and associated soft tissues under general anesthesia. The surgical obturator was fabricated prior to the surgery using clear heat

polymerizing polymethyl methacrylate with holes along the labial flange area and C-clasps around 16 and 27 and ball end clasp between 17 and 18 to aid in retention. Immediate surgical obturator was inserted intraoperatively and retained using clasps and sutured to the mucosa of the lip. The patient was instructed on hygiene and soft diet. She was reviewed regularly to monitor healing, speech adaptation, and nasal regurgitation.

Once soft tissue healing had progressed and inflammation subsided, an interim obturator was fabricated. The defect was blocked with gauze coated with petrolatum to prevent excess material in the defect. A stock metal tray of appropriate size was used and putty and light-body addition silicone were employed to record the defect boundaries accurately. The immediate obturator prosthesis was fabricated in heat polymerizing polymethyl methacrylate. The prosthesis did not include teeth to avoid premature occlusal loading and allowed for better mucosal adaptation

Following complete soft tissue maturation, a definitive obturator was planned. The design included replacement of missing teeth and esthetic labial flanges. A heat-cure obturator was processed, incorporating semi-anatomic acrylic teeth arranged to match the patient's facial profile and phonetic requirements. Jaw relations were established using occlusion rims and patients existing teeth and the prosthesis was processed after trial insertion verification.

Treatment Outcome And Follow-Up

The patient adapted well to each phase of the prosthesis. By the final stage, she reported significant improvement in speech clarity, mastication, and self-confidence. Esthetically, the labial support restored her preoperative appearance to a great extent. She resumed a normal diet and social interactions with ease.

Regular follow-up was conducted every 3 months to assess prosthesis fit, mucosal health, and occlusal harmony. Minor relining was performed at the 1-year follow-up. The obturator remained functional, and the patient continued to maintain satisfactory hygiene with no evidence of recurrence or tissue breakdown.

III. Discussion

Rehabilitation of acquired maxillary defects following oncologic surgery is a multidimensional challenge. In the absence of surgical reconstruction, the responsibility of restoring oral function, facial esthetics, and psychosocial confidence falls squarely on prosthodontic intervention. This case report describes the staged prosthodontic management of a 43-year-old female patient with a squamous cell carcinoma involving the anterior maxilla. The resection resulted in an Aramany Class VI defect—a pattern defined by anterior segment loss with preservation of bilateral posterior teeth—which provides favourable biomechanics for prosthetic rehabilitation.

The premaxillary segment plays a central role in esthetics, speech articulation (especially labiodental and sibilant sounds), and anterior guidance during occlusion. Resection in this region results in oronasal communication, compromised lip support, nasal regurgitation, and facial disfigurement. Despite these complications, Aramany Class VI defects offer excellent prosthetic prognosis due to the preservation of posterior abutment teeth on both sides of the arch[1].

Aramany's classification (1978) remains the cornerstone for designing obturator prostheses for partially edentulous maxillary defects. Class VI defects allow for cross-arch stabilization and optimal distribution of occlusal forces through bilateral abutment support. This biomechanical advantage reduces prosthesis displacement and permits more esthetic tooth positioning[1,2].

A three-phase obturator protocol is considered best practice for managing maxillary defects, especially in oncology patients where soft tissue healing and surgical outcomes are unpredictable[3]. Fabricated preoperatively and inserted immediately post-resection, the surgical obturator acts as a barrier between the oral and nasal cavities and supports the surgical dressing. In this case, the surgical obturator was designed with retention elements including C-clasps on 16 and 27, a ball-end clasp between 17 and 18, and labial perforations to allow fixation via sutures—a well-supported approach to enhance prosthesis stability and tissue adaptation in the early healing phase[3,4].

After adequate mucosal healing, a tissue-fitting interim obturator was fabricated. This prosthesis did not incorporate teeth, avoiding premature occlusal loading during the healing process. Unlike hollow bulb designs, a solid obturator was intentionally used to maintain strength and hygiene ease, given the relatively shallow anterior defect and the presence of supportive abutments bilaterally. Literature supports both hollow and non-hollow obturators, with the choice guided by defect size, weight, retention needs, and hygiene concerns[5].

A definitive acrylic resin obturator with prosthetic teeth was fabricated following soft tissue maturation. The design included bilateral clasping and a full palatal plate for rigidity. Tooth arrangement focused on restoring esthetics, lip support, phonetics, and occlusal harmony. Use of a non-hollow, solid anterior prosthetic base helped maintain facial contours without complicating hygiene. Retention in obturator prostheses relies on a combination of mechanical and anatomical factors. In this case:

- Direct retainers on 16, 27, and between 17–18 provided active mechanical retention.
- Full palatal coverage distributed occlusal load and enhanced support.

- A labial flange restored lip support and prevented facial collapse.

Unlike large posterior or bilateral defects where weight is a major concern, anterior Class VI defects often permit solid prosthesis design without compromising comfort or function. Furthermore, the patient's high motivation and good oral hygiene minimized the risk of mucosal complications or prosthesis-related infections.

Beumer et al. emphasized that early prosthetic intervention following maxillary resection dramatically improves oral function and patient morale, particularly in younger or female patients with visible facial changes[3]. Chalian and Drane further noted that psychological rehabilitation is as vital as physical restoration, making timely delivery of even interim prostheses a clinical priority[6]. Additionally, studies by Desjardins and others have demonstrated that in anterior defects, neutral zone recording and phonetic assessments during try-in phases can improve stability and speech intelligibility, even without bulb extensions[8].

IV. Conclusion

This case reaffirms that Class VI maxillary defects—though esthetically and functionally impactful—can be successfully rehabilitated using a structured, staged prosthetic approach. Strategic design decisions, such as opting for a solid obturator, leveraging bilateral abutment support, and maintaining palatal coverage, led to a successful outcome in this patient. Patient satisfaction, functional recovery, and esthetic results were achieved without the need for complex reconstruction or hollow bulb modification.

Learning Points / Take-Home Messages

- Staged obturator therapy (surgical, interim, and definitive) provides effective rehabilitation in maxillary resections.
- Regular follow-up and patient education ensure long-term prosthesis success.

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Fig: Impression for fabrication of surgical obturator

Fig: Modified cast for fabrication of surgical obturator

Fig: Surgical obturator

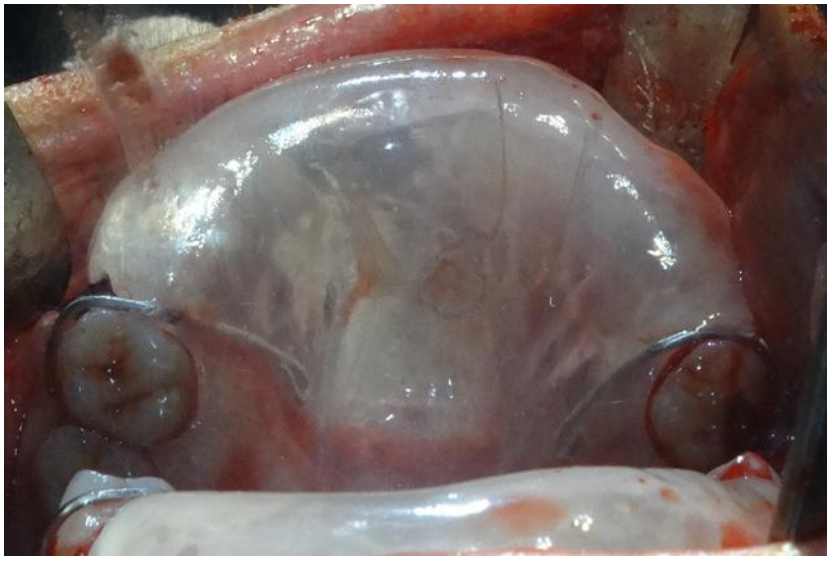

Fig: insertion of surgical obturator after surgical resection

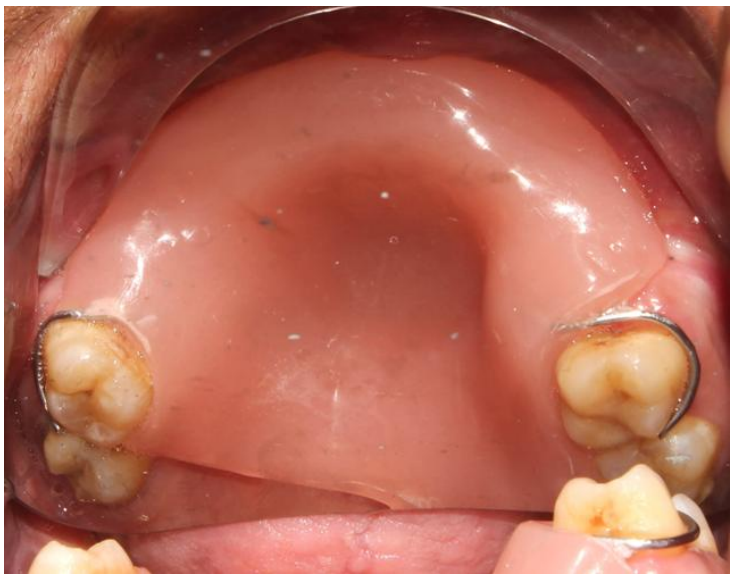

Fig: Interim obturator

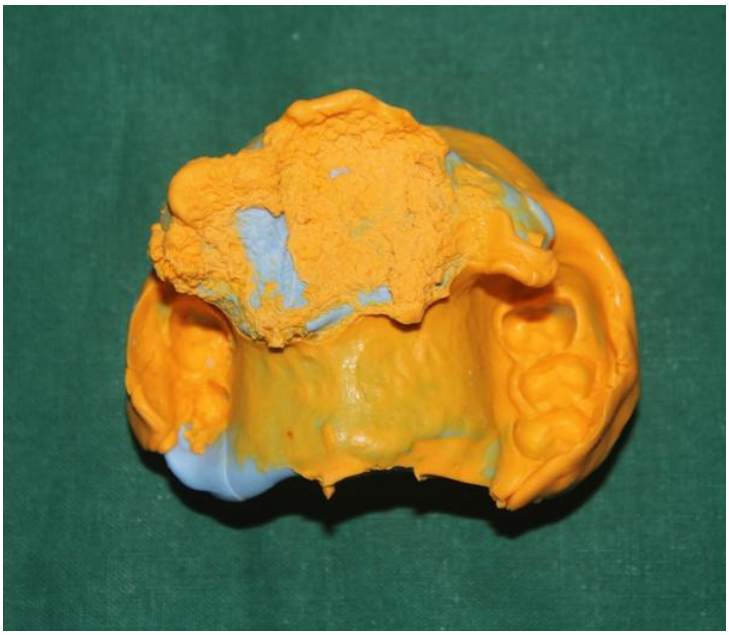

Fig: Impression for fabrication of definitive obturator

Fig: Post-operative extraoral