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Prosthodontic management of subtotal maxillectomy with minimally invasive interim obturator: a case report

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Abstract

The interim obturator serves as a pathway between the immediate or surgical obturator and the final prosthesis, offering functional and aesthetic benefits until the delivery of the definitive prosthesis. Furthermore, it acts as a guide during the fabrication of the definitive prosthesis, influencing aspects such as prosthesis extension, teeth arrangement, and the positioning of retentive aids. These aids may encompass orthodontic wiring, surgical suturing, and other non-invasive techniques. This case report details a conservative and less invasive method for retaining an interim obturator in maxillectomy patients, providing an alternative approach in prosthodontic care.

Keywords: Interim obturator, Intraoral defects, Maxillectomy, Squamous cell carcinoma.

1. Introduction

Intraoral defects refer to abnormalities affecting the hard and soft tissues within the oral cavity and its surrounding structures. These defects may arise from congenital, developmental, acquired, or traumatic causes. Maxillectomy, the surgical removal of a portion or the entirety of the maxilla, results in acquired intraoral defects. Such defects can be a consequence of trauma, intraoral cancer, tumours, or, in the post-COVID era, an elevated incidence of opportunistic infections like mucormycosis, ultimately necessitating maxillectomy.

In India, oral cancer exhibits the highest incidence rate, with squamous cell carcinoma ranking as the third most prevalent type. This occurrence is frequently observed in individuals from low socioeconomic backgrounds, attributed to the rising prevalence of habits like tobacco and pan chewing. The lateral wall of the tongue is the most commonly affected site, followed by the maxilla [2].

The gold standard treatment option for squamous cell carcinoma affecting the maxilla is maxillectomy, and these maxillectomies can be classified under five categories based on the structures involved [3,4]. The five categories include, Medial maxillectomy (Maxilla that is next to the nose is removed), Infra structure maxillectomy (Removal of hard palate, lower portion of maxilla and teeth), Supra structure maxillectomy (Removal of upper portion of maxilla and the orbital floor), Subtotal maxillectomy (Removal only a part of maxilla), and Total maxillectomy (Removal of entire maxilla on one side along with hard palate and floor of orbit one side).

In 1987, Armany introduced a classification system for Maxillectomy defects, as depicted in Figure 1 [5]. This system categorizes the defects into six groups, considering the relationship between the defect and the abutment teeth. This classification is widely acknowledged and holds significant clinical acceptance.

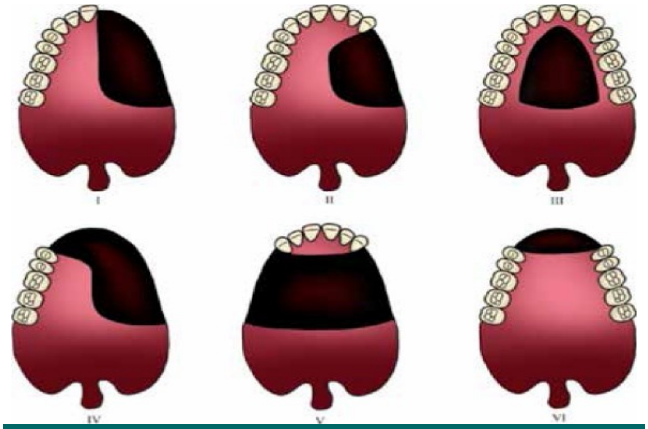

Figure 1. Armany's Classification for Maxillectomy Defects

Class I: The resection is performed in the anterior midline of the maxilla, with abutment teeth present on one side of the arch.
Class II: The defect in this group is unilateral, retaining the anterior teeth on the contralateral side.
Class III: The palatal defect occurs in the central portion of the hard palate and may involve part of the soft palate.
Class IV: The defect crosses the midline and involves both sides of the maxilla, with abutment teeth present on one side.
Class V: The surgical defect is bilateral and lies posterior to the abutment teeth. Labial stabilization may be needed.
Class VI: Anterior maxillary defect anterior with abutment

teeth with abutment teeth present bilaterally in the posterior segment.

2. Case Report

A 60-year-old female patient reported to the Department of Prosthodontics, G Pullareddy Dental College, Kurnool, Andhra Pradesh, India, presenting a chief complaint related to the recent surgical removal of the upper jaw. A detailed history revealed the subtotal maxillectomy of the right side one month ago. The patient, currently utilizing a Ryles feeding tube (Figure 2), expressed concerns about challenges in swallowing food, speech impediments, and nasal regurgitation.

During the examination, a clear oro-nasal communication was observed, characterized as Armany's class I. The mucosa surrounding the lesion displayed signs of healing, with no apparent signs of recurrence (Figure 3).

The primary objective in this case is not solely to provide an obturator to address the maxillary defect but also to transition the patient from relying on a feeding tube to resuming normal oral feeding. While the treatment plan is straightforward, focusing on delivering the obturator to close the defect, the challenging aspect lies in achieving effective retention. Various treatment options were discussed with the patient, including the possibility of an interim prosthesis followed by an implant-supported definitive obturator or a cast partial definitive obturator. Due to the patient's low socioeconomic status, she opted for an interim prosthesis for a specific duration.

3. Treatment plan

The patient preferred a prosthesis that would enhance her swallowing function, eliminating regurgitation, and opt not to have the prosthesis permanently retained in her mouth. Hence, a planned approach involved designing a prosthesis that could be worn during feeding and removed at other times to promote soft tissue healing.

The initial impressions were crafted using the alginate impression material (Algitex, India). The stock tray's fit was verified, and it was loaded with the impression material. To safeguard against inadvertent aspiration of the impression material during the impression-making process, a sterile gauze soaked in saline was positioned in the defect area, and dental floss was secured as an extra safety precaution. Following the setting of the impression, it was cautiously removed. Subsequently, the primary cast was created using type III dental stone (Kalabhai Kalstone, India).

A custom tray was made on the primary cast. A single-step border molding and subsequent secondary impressions were made using polyether impression material (3M ESPE Impregum F, USA) and light body addition silicone impression material (Dentsply Reprosil, Germany), respectively. Following these impressions, pick-up impressions were obtained using alginate. The working master cast was then made using type IV dental stone (Kalabhai Kalrock) (Figure 4). A thermoplastic sheet (3A MEDES, South Korea) with 2mm thickness was adapted carefully on the stone cast (Figure 5). The adapted thermoplastic sheet was then trimmed and placed in the patient's mouth and checked for fit. After trimming and verifying the fit in the patient's mouth, the prosthesis was delivered (Figure 6).

Post insertion instructions were given to patient and recalled for regular recall check-ups, which showed an improvement in speech and swallowing.

Figure 2. Patient with Ryles feeding tube

Figure 3. lesion showing signs of healing

4. Discussion

Various types of obturators, featuring distinct designs, are employed in rehabilitation, with recent advancements including hollow bulb obturators, sectional obturators, and CAD/CAM-designed obturators [6]. Sectional obturators find application primarily in cases with limited mouth opening [7]. The fabrication process limits the use of hollow obturators to definitive prosthesis cases, and considering the healing period, a simple obturator design was chosen for its less invasive procedure, reduced chairside time, and retentive method that doesn't impede healing.

Figure 4. Master cast, Figure 5: Thermoplastic sheet adapted, and Figure 6. Thermoplastic fit check done.

This case report highlighted the utilization of a thermoplastic sheet for mechanical retention, allowing easy removal and placement by patients. The interim obturator serves as a temporary substitute for a definitive prosthesis until reconstruction is planned. While acrylic resins are commonly used for such purposes, various types, including microwave resins [8], light cure resins [9], and heat cure resins, have been employed. This case report showcased the cost-effective use of thermoplastic sheets for interim prosthesis fabrication, emphasizing their flexibility and ability to retain natural teeth for optimal retention, comparing favourably to the cost-effective nature of silicone against harder and cheaper acrylics [10].

5. Conclusion

The diverse landscape of obturator designs offers rehabilitation options ranging from hollow bulb and sectional obturators to CAD/CAM-designed counterparts. The choice hinges on factors like patient condition, procedural simplicity, and non-interference with healing. In this case report, a simplified obturator design using a thermoplastic sheet emerged as a pragmatic solution, ensuring mechanical retention while being minimally invasive. This approach not only facilitated easy patient use but also considered cost-effectiveness.

The interim obturator's pivotal role as a temporary substitute until definitive reconstruction cannot be overstated. While acrylic resins are conventional, this report highlighted the economical use of thermoplastic sheets, showcasing their flexibility and retention capabilities, especially compared to silicone and other resin materials. Ultimately, tailoring obturator choices to individual patient needs, considering functionality, and cost-effectiveness remains paramount in successful rehabilitation strategies.

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