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PROSTHETIC REHABILITATION OF AN ARAMANY CLASS II MAXILLARY DEFECT USING A HOLLOW BULB CAST OBTURATOR: A CASE REPORT

Dentistry

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ABSTRACT

Background: Managing maxillary defects presents a significant challenge in prosthodontics, requiring careful consideration of function, aesthetics, and patient comfort. A hollow bulb cast obturator is an effective prosthetic solution for individuals with partial maxillectomy, particularly those classified under Aramany Class II defects. **Case Presentation:** This report outlines the prosthetic rehabilitation of a patient with a partial maxillary defect using a hollow bulb cast obturator. A cast partial denture framework was designed, incorporating a hollow bulb to enhance its functionality. The lightweight structure contributed to improved mastication, speech clarity, and aesthetic appeal while ensuring greater comfort for the patient. **Conclusion:** The hollow bulb cast obturator serves as a dependable and effective prosthetic option for restoring maxillary defects. Its lightweight design enhances retention and comfort, significantly improving oral function and overall quality of life. Precise planning and fabrication techniques are essential for achieving successful outcomes in maxillofacial prosthetic rehabilitation.

KEYWORDS

Hollow Bulb Obturator, Class II defects, Rehabilitation

INTRODUCTION

Rehabilitating individuals with maxillofacial defects presents a significant challenge in stomatognathic therapy. The primary objective of treatment is to manage the underlying condition while enhancing the patient's overall well-being. After surgical resection, the conventional approach includes placing a surgical obturator during the procedure to support both functional and aesthetic recovery[1].

Within 5 to 10 days following surgery, the surgical obturator is taken out, and a removable interim obturator is created to aid in the healing process. After approximately 3 to 6 months, once the tissues have stabilized, a definitive obturator is designed and fitted to provide long-term functional and aesthetic restoration[2].

This article presents the prosthetic rehabilitation of a patient with an Aramany Class II [3-5] maxillary defect, where definitive prosthetic management was achieved using a cast open-bulb obturator.

Clinical Report

A 54-year-old patient visited the Prosthodontics clinic, reporting difficulty eating due to a defect in the maxillary arch.

Clinical Examination

Intraoral examination revealed a defect on the left side of the maxilla [Fig. 1], extending from the canine region anteriorly to the posterior aspect of the hard palate. Medially, the defect stretched from the mid-palatine region to the buccal mucosa laterally. The patient had missing teeth in relation to 22, 23, 24, 25, 26, and 27, along with generalized attrition in both the maxillary and mandibular arches.

Treatment Plan

A maxillary cast open-bulb obturator prosthesis was planned. Diagnostic impressions of the upper and lower arches were taken using irreversible hydrocolloid impression material (Vignette Chromatic Alginate, Dentsply Sirona) [Fig. 2]. To prevent the impression material from entering the defect, wet gauze was used to cover the affected area. The impressions were then poured in dental stone (Kalstone), and a special tray was fabricated.

Impression and Framework Design

Border molding was performed using DPI Green Stick, followed by a final impression with ZhermackOranwash L light-body impression material [Fig. 3]. A master cast was then poured and surveyed. After surveying, two embrasure clasps were planned—one positioned between the first and second premolars and the other between the first and second molars.

A 3mm thick wax pattern was designed for the bulb of the prosthesis, extending up to the upper edge of the lateral wall. To create a hollow bulb, dental plaster was poured into the wax, stopping 2mm short of the framework's border. A wax layer was added beneath the framework to enhance retention. After placing the framework on the cast and waxing it, putty impression material was used to block undercuts. The cast was then invested, and the bulb was fabricated using heat-polymerized acrylic resin.

Prosthesis Fabrication and Fitting

The bulb and framework were evaluated intraorally for proper extension. The patient's vertical and horizontal occlusal dimensions were recorded, and the casts were articulated. Artificial teeth were arranged and assessed for fit and aesthetics. The final prosthesis was fabricated using heat-polymerized denture base acrylic resin, then trimmed and polished. Intraoral adjustments were made as necessary [Fig. 4-7].

Post-Treatment Care

The patient was provided with oral hygiene instructions and scheduled for follow-up visits every 3 to 6 months to monitor the prosthesis and overall oral health.

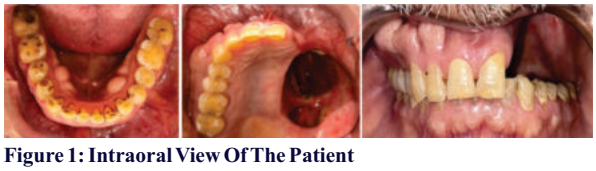


Figure 1: Intraoral View Of The Patient

Figure 2: Primary Impression

Figure 3. Final Impression

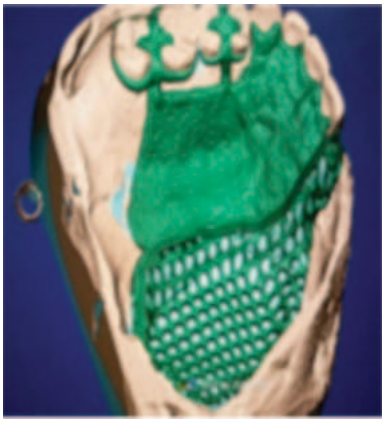
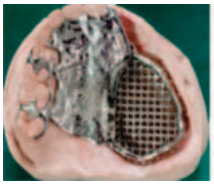


Figure 4. Digital Designing



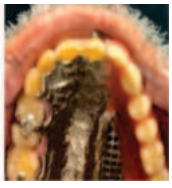


Figure 5a Framework Trial **Figure 5b Teeth Setting Trial**

Figure 6. Final Prosthesis

Figure 7. Final Prosthesis Insertion

DISCUSSION

The management of maxillary defects depends on several factors, such as the presence of remaining teeth, the extent of the available support area, and the nature of the defect. When these factors pose limitations, achieving successful prosthetic rehabilitation becomes more challenging. Ensuring proper retention of the prosthesis is essential for a positive treatment outcome. Additionally, the prosthesis must be designed to integrate well with the surrounding tissues in the resected area.

The weight of the prosthesis significantly affects both retention and patient comfort. To improve functionality and ease of wear, a lightweight design is preferred, which can be achieved by creating a hollow obturator bulb. Hollow obturators can be categorized as either open or closed bulbs. The open hollow obturator offers multiple benefits, including reduced weight, easier maintenance, simplified fabrication, and enhanced speech quality.

Several methods have been proposed for fabricating hollow bulb obturators, and various materials have been explored for filling the defect. Parel and La Fuente developed a technique where the hollow section of the obturator was filled with sugar and then sealed with acrylic resin. Once the resin set, an opening was created in the acrylic lid to dissolve and remove the sugar, leaving a hollow space inside the obturator[6]. Elliotts used clay instead of sugar, which was later removed in the same fashion[7]. El Mahdy introduced fabricating of hollow bulb obturator using two flasks technique[8]. Challian and Barnett used a double flask technique to construct one piece hollow obturator[9]. Aaron Schneider used crushed ice to fill the defect, which was covered by acrylic resin. Once the resin was processed, openings were made on acrylic lid to drain the water, which were later sealed with autopolymerizing resin[10]. Ashok Jhanji and Steve T Stevens presented a technique to make a one piece obturator using silicone putty[11].

For maxillary defects, the two-step altered cast impression technique allows for precise recording of functional tissues, promoting a better adaptation between the defect, surrounding soft tissues, and remaining teeth. Using a metal framework during the impression process helps reduce discrepancies in jaw relation and enhances the final fit of the prosthesis. This approach ensures effective sealing of the maxillary defect with the obturator, leading to improved oral function, speech, and aesthetics.

CONCLUSION

This case report presents the prosthetic management of a patient who underwent a partial maxillectomy, resulting in an Aramany Class II defect. A hollow bulb cast obturator was utilized for rehabilitation, incorporating a cast partial denture framework with an integrated hollow bulb. This design enhanced chewing efficiency, improved speech by supporting vocal resonance, and restored facial aesthetics. Furthermore, the lightweight nature of the hollow bulb obturator increased patient comfort, making it a practical and effective solution for rehabilitating maxillary defects.

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