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CASE REPORT

Rehabilitation of a Patient with Acquired Maxillary Defect using CPD with Extra-Coronal Attachment - A Cost-Effective and Time-Saving Procedure

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ABSTRACT

The prosthodontic management of maxillary defects put forwards a complex challenge. Achieving optimal retention and stability is particularly difficult when significant portions of the maxilla, including supporting structures, are missing. A thorough understanding of the anatomical alterations caused by surgical resections and the biomechanics of the remaining structures is crucial for designing effective prosthetic solutions. This case report explains the restoration of an individual having an acquired defect involving maxilla using a cast partial denture attachment system that enhances retention and improves overall functional outcomes.

Keywords: Precision attachments; Definitive obturator; Maxillary defect rehabilitation

1 INTRODUCTION

Maxillary defects caused by surgical resection disrupt essential functional and aesthetic components of oral and facial anatomy. Patients experience a range of problems, including oroantral communication, nasal regurgitation, altered speech, and impaired mastication, which severely affect their psychological and social well-being[(1)]. Nutritional deficiencies resulting from feeding difficulties further compromise immunity and can perpetuate a cycle of systemic health decline. Obturator prostheses play a critical role in rehabilitating such defects by restoring speech, deglutition, esthetics, and structural support for orbital contents[(2)]. In cases of extensive maxillary defects, however, challenges such as the increased weight of prostheses, poor retention, and psychological discomfort often arise. Precision attachments, particularly semi-precision systems, offer an advanced solution to enhance retention and stability, thereby improving prosthetic efficacy and patient satisfaction.

This case report presents the treatment approach of an acquired maxillary defect in a patient classified as Aramany Class I defect[(3)], utilizing a CPD obturator with cast partial denture attachments to enhance retention and reduce weight-related challenges.

2 CASE DETAILS

A male patient aged 32-year was referred from the Department of ENT to the Department of Prosthodontic and crown and bridge. The patient was diagnosed with squamous cell carcinoma (SCC) and the resection of maxilla along with the palate and maxillary sinus was planned. The diagnostic impression (Figure 3) was recorded, and surgical obturator was fabricated on the cast at the anticipated resection area and insertion of surgical obturator was done and this was followed by the fabrication of interim acrylic obturator. After few weeks patient was not satisfied with the aesthetics of fabricated interim obturator (Figure 4). His existing acrylic interim maxillary obturator was found to be bulky, lacking retention, and cosmetically unappealing. Clinical evaluation identified an Aramany Class I defect, characterized by the missing teeth on the left side of upper jaw. Patient's existing prosthesis utilized direct wire retainers on abutment teeth

(11, 15, and 16) but did not provide adequate function or aesthetics. Also, patient's left upper central incisor (21) was periodontal compromised and was planned for extraction. To enhance retention and appearance, a CPD obturator with extra coronal partial denture attachments was planned. The male components were to be integrated into the prepared abutment teeth (11 and 12), while the corresponding female components would be incorporated into the cast partial denture framework.

Fig. 1: Pre-op frontal view

Fig. 2: Post-op intra-oral view

Fig. 3: Diagnostic cast

Fig. 4: Interim Obturator inserted

3 PROCEDURE

The procedural steps began with the tooth preparation of central and lateral incisor to obtain porcelain fused to metal fixed dental prosthesis incorporating the male components of extra-coronal attachments. Impressions were made using rubber base material, and the casts were poured to fabricate the required prosthesis (Figure 5). The cast was poured from the primary impression followed by surveying of primary cast (Figure 6) and subsequently extra coronal partial denture attachments were placed (Figure 8). This was followed by recording the maxillo mandibular relation (Figure 10) and teeth arrangement on a mean value articulator (Figure 11). A cast partial denture framework was designed, incorporating the female housings of the semi-precision attachments within the prosthesis structure. The framework was trialed for fit and function before completing the prosthesis (Figure 12).

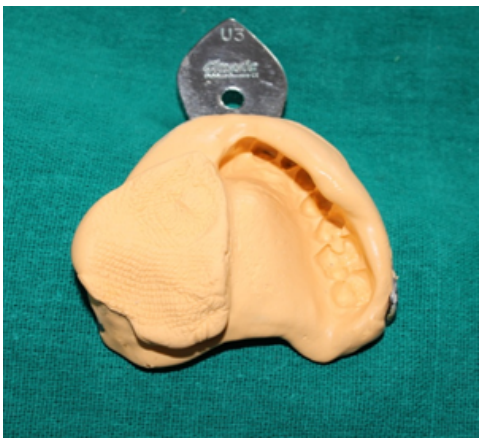

Fig. 5: primary impression

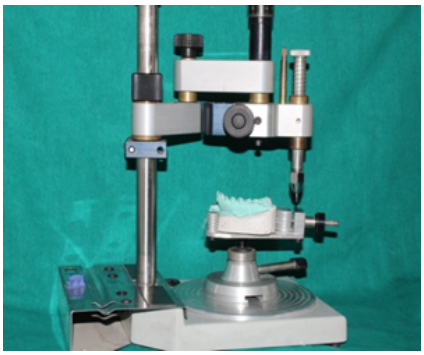

Fig. 6: Surveying of primary cast

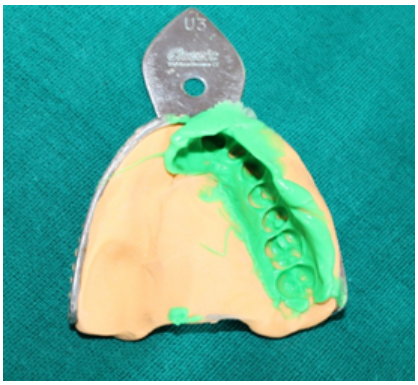

Fig. 7: Secondary impression

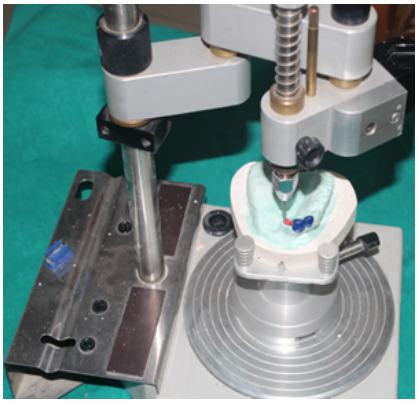

Fig. 8: Placement of attachments using surveyor

Fig. 9: Recording Maxillo mandibular relation

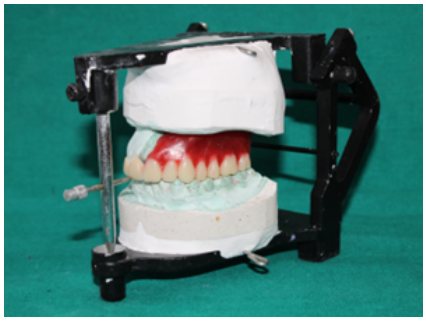

Fig. 10: Teeth arrangement on mean value articulator

Fig. 11: Try in

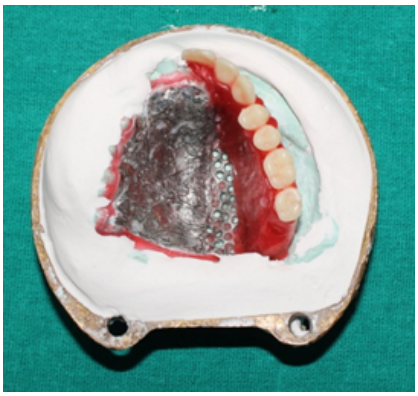

Fig. 12: Flasking of cast partial obturator

Fig. 13: Mould after de waxing

Fig. 14: Occlusal view of prosthesis in mouth

Fig. 15: Pre insertion photograph

Fig. 16: Post insertion photograph

4 DISCUSSION

Managing maxillofacial defects, especially those involving significant structural loss, requires an integrated approach that balances retention, stability, and esthetics. Semi-precision attachments offer a superior alternative to conventional direct retainers, as they distribute functional stresses more evenly and minimize adverse effects on the abutment teeth. Prefabricated attachments, known as precision attachments, are readily available, whereas those custom-made in a laboratory are classified as semi-precision attachment. These attachments aid in making use of the support provided by already present dental structures. This cast partial denture attachment system includes a male and a female unit. The male unit consists of a metal receptacle positioned on a contoured abutment and a female unit integrates into a CPD obturator[4]. Engineered as an alternative to conventional clasp-retained partial dentures, these attachments replace the occlusal rest, bracing arm, and retaining arm while ensuring retention, stability, and support for the removable partial denture. Precision attachments, true to their name, provide highly accurate and effective retention solutions[5]. A study was conducted to evaluate and measure changes in retentive ability and weight over time[6]. Their findings suggested that partial denture attachments help protect fixture teeth and the alveolar bone, particularly when two abutment teeth were splinted together. In this case, central and lateral incisors were splinted to distribute forces evenly when utilizing extra coronal cast partial denture attachments which enhances the cantilever mechanics of the suspension and prevents excessive loading on the remaining supportive structures[7]. The long-term success of an obturator prosthesis depends on the patient's commitment to maintaining proper oral hygiene and carefully adhering to post-operative guidelines. Additionally, regular follow-up visits are emphasized to ensure timely replacement of worn- out rubber housings.

5 CONCLUSION

The use of extra-coronal semi-precision attachments in the rehabilitation of maxillary defects offers substantial benefits in terms of improved prosthesis retention, stability, and patient satisfaction. Thorough planning, precise implementation, and consistent long-term monitoring are crucial for achieving the best possible results.

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