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Enhancing distal extension cases with precision attachments: An innovative concept

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Abstract

Effectively restoring a patient who has partially edentulous situation can pose challenges, particularly in cases where the unilateral and/or bilateral posterior region teeth are missing. A successful restoration can be accomplished through a range of treatment options which are conventional and contemporary. Attachment-retained cast partial dentures stand out as one such treatment modality.

This paper presents a case report detailing the restoration of a patient with a maxillary bilateral distal extension edentulous span. The restoration was accomplished using a cast partial denture featuring an extra coronal cashable.

Keywords: Distal extension cases, innovative concept, bilateral posterior region teeth

Introduction

Achieving both esthetic and functional success in prosthetic rehabilitation demands thorough attention and precise treatment planning. The restoration of partially edentulous arches poses a notable challenge, especially in distal extension scenarios categorized under the classification Kennedy's Class I and Class II [1]. In scenarios where a fixed dental prosthesis is not viable because of the absence of a terminal abutment, and implant-supported prostheses face limitations related to insufficient bone volume and economic considerations, the preference frequently shifts towards either an acrylic removable partial denture or removable partial denture with a cast metal framework [2].

The pursuit of a delicate equilibrium between functional integrity and esthetic excellence in removable partial dentures has driven the evolution of Precision Attachments. Since their inception, Precision Attachments have remained enigmatic. Leveraging Precision Attachments for partial denture retention not only serves as a practice builder, elevating the standards of dentistry, but also contributes to enhancing the overall quality of partial denture prosthetics [3]. The flexibility inherent in precision attachments renders them advantageous; however, their adoption has been historically overlooked, primarily attributed to significant costs and a limited understanding of their application [4].

Research findings indicate a survival rate of 83.35% over a 5-year period, 67.3% up to 15 years, and a projected rate of 50% when extrapolated to a 20-year timeframe [5, 6].

Case report

A 58 year old man reported to department of prosthodontics, Government dental college and hospital, Sambhaji Nagar, The patient presented with the main complaint of absence of teeth in mandibular posterior region.

The patient's previous medical records were meticulously examined, disclosing no relevant medical conditions that might influence prosthodontic treatment. A subsequent intraoral examination revealed well-formed maxillary and mandibular ridges with a Class I ridge relationship. Observations revealed the absence of the right mandibular 1st, 2nd, and 3rd molars unilaterally, classifying the case as Kennedy's Class II with distal extension. Despite the patient's reluctance towards a removable prosthesis and the unsuitability of implant placement due to compromised bone width, the chosen treatment option involved an attachment-retained

removable partial denture.

Following a comprehensive clinical and radiographic examination, a prosthetic treatment plan was formulated. For the mandibular unilateral distal extension arch, a combined prosthesis incorporating an extra coronal precision attachment (Rhein 83-matrix part and its sleeve matrix) was planned. This choice was influenced by the satisfactory abutments crown height, deemed suitable for a partial removable denture with an extra coronal attachment (Rhein 83) for the mandibular distal extension.

Following the root canal treatment of the abutment teeth, tooth preparation was carried out with respect to teeth 44 and 45 in order to accommodate PFM crowns. Temporization was done with respect to prepared abutments following which definitive impressions were made.

Following the metal trial, a jaw relation was established using a bite block. Subsequently, joint crowns with attachments were crafted in a laboratory, following which a trial was conducted in order to ensure the precise fit of the crowns. Abutments were then coated with ceramic powder, and ceramic firing was carried out.

The fixed component including matrices was placed in the patient's mouth, and a final impression was created using Polyvinylsiloxane impression material.

The crown cementation done using GIC, and the acrylic prosthesis was attached with a ball attachment. Occlusal contacts were assessed in both centric and eccentric positions. The patient was scheduled for a follow-up appointment after one week for post-insertion evaluation, during which they received instructions on maintaining proper oral hygiene.



Fig 1: Crowns with extracoronary attachment (Rhein 83)



Fig 2: Removable partial denture with precision attachment



Fig 3: Intraoral view after cementation of crowns



Fig 4: Intraoral view after placement of removable partial denture with precision attachments

Discussion

The precision attachment is occasionally described as a connecting link between fixed and removable types of partial dentures, as it integrates features that are characteristic of both construction methods [7].

Rehabilitating a partially edentulous patient with distal extension becomes challenging when the patient is unsuitable for both implant placement and a removable partial prosthesis.

Since a fixed dental prosthesis is not viable without a distal abutment, the optimal solution for this critical scenario is a combined prosthesis. This approach offers the benefits of a fixed prosthesis without the need for surgical intervention. In a combined prosthesis, a removable acrylic prosthesis is secured with an extra coronal attachment to a tooth [8,9].

The primary benefit underlying the choice to incorporate precision attachments in a patient with removable partial prostheses lies in their ability to enhance retention, aesthetics (eliminating the need for clasps), support (Resisting tissue ward movement of the prosthesis), stabilization (opposing horizontal movement of the prosthesis in horizontal direction), and fixation (Preventing separation of the removable partial denture) [10].

This type of prosthesis, characterized by distal extension, is often referred to by the name associated with this particular design. Attachments function as a substitute for clasps in removable partial dentures, addressing both functional and

aesthetic goals.

A retained attachment system in a removable partial dentures stands out as a treatment approach that can assist prosthodontists in achieving improved functions and aesthetics during the replacing the missing teeth and oral structures. Precision attachments are frequently suggested for situations involving long-span edentulous arches, distal extension bases, and non-parallel abutments (Gupta *et al.*, 2013)^[8].

A precision attachment is a connector composed of two or more parts, with one part linked to the root, tooth, or implant and the other part to the prosthesis. In this case, an extra coronal attachment system (Rhein 83) is employed, positioned on the distal surface of the crown as an extension. The concept of fixed removable prosthesis was initially introduced by Dr. James Andrews (Munot *et al.*, 2017, Jain, 2013)^[10, 11]. With careful case selection, accurate diagnosis, and a well-thought-out treatment plan, a precision attachment denture emerges as a viable treatment option. However, it's essential to acknowledge the limitations associated with this attachment. The fabrication process demands skilled lab technicians, and over time, wear and tear may necessitate the replacement of parts of the attachment (Angadi *et al.*, 2012)^[7].

Conclusion

This case report elucidates the decision-making challenge between providing a fixed or removable prosthesis when faced with a missing distal abutment. The combined prosthesis emerges as a strategic solution for addressing distal extension cases without resorting to surgery.

A thorough assessment, coupled with a sequential treatment plan, harmonized with the patient's aesthetic preferences and perceptions, along with regular recalls every three months and preventive therapy, is crucial for achieving a long-term successful outcome with a precision attachment retained removable partial denture.

Achieving success in prosthodontic rehabilitation necessitates a subtle equilibrium between modern and conventional treatment techniques. Attachment-retained partial dentures serve as a paradigm of a prosthodontic rehabilitation technique that skillfully navigates this balance.

Conflict of Interest

Not available

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