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Case Report

Kennedy's Class I rehabilitation with Rhein OT 83 attachment and CPD – blending function with aesthetics

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Abstract

Prosthetic rehabilitation of partially edentulous arches, particularly Kennedy's Class I distal extension cases, poses significant clinical challenges. Conventional fixed partial dentures are contraindicated due to lack of distal abutments, and implant therapy may not always be feasible. Cast partial dentures with precise attachment retention offer a practical and fashionable substitute. Treatment of a 52-year-old male with bilateral mandibular distal extension using extracoronal Rhein OT 83 precision attachments is being presented in this case report. Digital designing was employed to integrate the male component with abutment crowns, ensuring retention, stability, and stress distribution. The treatment achieved satisfactory function, aesthetics, and patient comfort.

Keywords: Precision attachment, Rhein OT 83, Cast partial denture, Extracoronal attachment, Digital designing, Kennedy's Class I.

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1. Introduction

In addition to careful consideration and methodical treatment planning, successful prosthetic rehabilitation necessitates restoring appropriate function and appearance. Common prosthodontic treatment techniques for replacing lost teeth include implant prostheses, fixed partial dentures (FPDs), and removable partial dentures (RPDs). Rehabilitating a partially edentulous arch, however, can be very difficult, particularly in Kennedy Class I and Class II distal extension scenarios.[1] Occlusal rehabilitation in distal extension cases is considerably more difficult when it has place against an edentulous arch.

The lack of a posterior abutment in distal extension situations makes it impossible to fabricate a traditional fixed partial denture. Even though an implant-supported prosthesis might be explored, insufficient or unfavorable bone conditions may make its insertion impractical.

A cast or acrylic partial denture is usually preferred in such circumstances. Precision attachment components and direct and indirect retainers are used to make cast partial dentures retentive.[2]

In prosthodontics, attachments may be extracoronal or intracoronal. Missing teeth can be replaced both aesthetically and functionally using attachment-retained cast partial dentures. Reported survival rates are approximately 83.35% at five years, 67.3% at fifteen years, and 50% at twenty years in studies by different authors.[3,4]

A patient with Kennedy's class I mandibular bilateral distal extension is described in this article. The patient was prosthetically rehabilitated using a cast partial denture retained on the mandibular natural teeth with an extra-coronal precision attachment (Rhein OT 83), incorporating a minor modification.

2. Case Report

A male patient, 52, came to the prosthodontics department complaining of eating difficulties and a dissatisfied grin, which he attributed to the loss of his mandibular posterior teeth.

He gave a history of gradual tooth loss in the lower back region over the past few years, resulting in poor mastication and functional limitations. No significant systemic illness was reported, and his dental history revealed occasional dental treatments in the past.

On intraoral examination, the patient was found to be missing the 36, 37, 46, 47, corresponding to a Kennedy Class I situation. Additionally, maxillary tooth 26 required endodontic treatment.

Diagnostic casts were made and mounted in tentative centric relation for diagnosis. Inter-ridge distance was measured. Clinical crown height was measured on 34,35,44,45.

Using Brodrick's occlusal plane analyzer, the mandibular occlusal plane was ascertained.

1. Following a thorough clinical and radiological evaluation, a prosthetic treatment plan was established. On joint metal ceramic crowns with wrt 34, 35, and 44, 45, a bilateral distal extension. The rehabilitation plan called for a cast partial denture with extracoronal precision attachments. Prior to starting therapy, the patient gave their written informed permission.
2. Porcelain-fused-to-metal (PFM) crowns were cemented on abutment teeth 34, 35, 44, and 45 after they had been prepared for extracoronal attachment.
3. After gingival retraction, putty and silicone material for light body addition were used to create impressions. (Densply Aquasil Addition Silicone) (**Figure 3**: Teeth Preparation for PFM Crowns with Regard to 34, 35, 44, 45, and Cord Packing Done Before Impression).
4. The temporary restoration was plundered.



Figure 1: Pre-operative intraoral presentation



Figure 2: Pre op OPG



Figure 3: Tooth preparation WRT 34, 35, 44, 45 & showing gingival retraction



Figure 4: Pick up impression

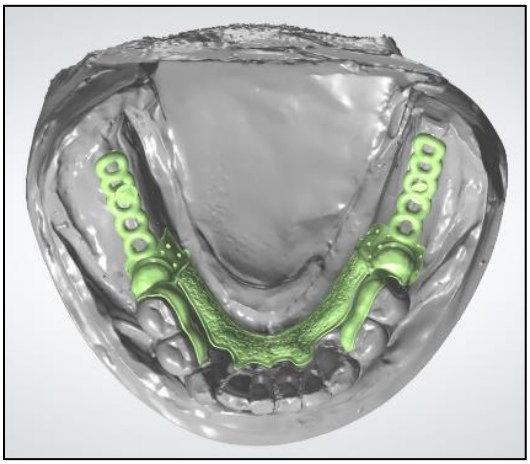


Figure 5: Designing



Figure 6: Rhein OT 83 attachment

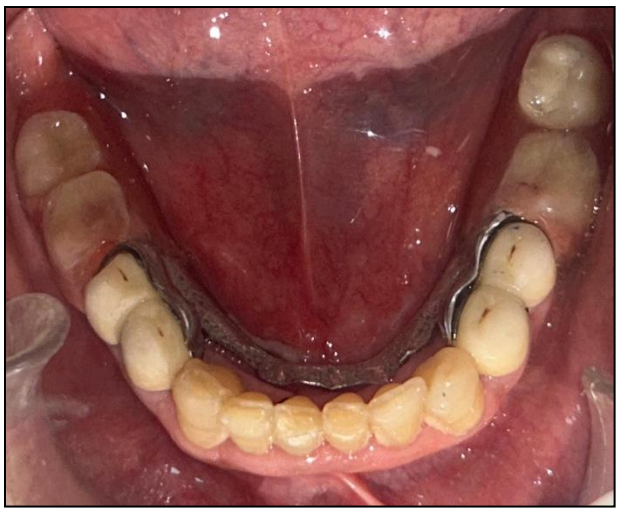


Figure 7: Final prosthesis insertion



Figure 8: Post op view

2.1. Lab Procedure

Digital designing of abutments 34, 35, 44, and 45 was carried out using CAD software. The male component of the attachment structure (RHEIN OT 83 ATTACHMENT) was virtually designed and integrated into the abutment framework a rest seat was provided at the cervical end of the crowns so that the CPD attached to it gets extra support and stability. The finalized design was then processed for milling/casting along with the copings of the abutments. (**Figure 4** showing digital design for joint metal coping with attachment).

2.2. Clinical Procedure

To assess how well the copings and attachments fit together overall, a metal try-in was conducted.

To guarantee proper occlusion in a centric relationship, the maxillary trial denture base was compared to the finished porcelain fused to metal (PFM) joint crowns with extracoronal attachment on 34, 35, 44, and 45 after the metal trial.

The PFM crown with the male component attached at points 34, 35, 44, and 45 is seen in **Figure 5**.

2.3. Cast Partial Denture (CPD) Design and Fabrication

The female component of the attachment was incorporated into a custom-designed cast partial denture framework, fabricated after thorough planning and surveying.

1. To verify an accurate fit, the metal framework was trialed intraorally.
2. The stability and precision of the cast framework were carefully evaluated.
3. The patient was guided into centric relation before recording the wax occlusal registration.

2.4. Wax up trial

1. For the mandibular cast partial denture, tooth setting was completed.
2. The patient's mouth was used for teeth waxing and teeth setting trials.

To finish the cast partial denture, the trial denture was sent for acrylization.

2.5. Implanting a prosthesis

1. The completed prosthesis was trial-seated to ensure occlusion, fit, and retention.
2. Joint crowns were cemented using Type 1 Glass Ionomer cement.
3. After the PFM crowns with attachments were placed, the attachments were lightly covered with petroleum jelly (Vaseline) to make it easier to remove the cast partial denture. After that, the female parts were placed extraorally into the cast partial denture framework. A PFM crown with the luted male component and a cast partial denture with the female component are shown in **Figure 6**.
4. The patient was called back for a post-insertion examination after a 24-hour period.

3. Discussion

A connector with two or more parts is called a precision attachment. Attaching one part to a tooth, root, or implant and the other to the prosthesis creates a mechanical connection. The benefits of both fixed and removable restorations can be combined with prosthesis thanks to these attachments.[39] Early in the 20th century, Dr. Herman Chayes introduced the idea of attachments.[39]

A metal enclosure (matrix) and a closely fitting component (patrix) make up a precise attachment, per GPT-9. The patrix is attached to a removable partial denture or pontic, whereas the matrix is usually integrated into the crown's contours on the abutment tooth or implant.

Semiprecision attachments, which fit into a matrix in a cast restoration and provide restricted movement between the parts, are hard metallic patrix components of permanent or removable partial dentures that are manufactured in a laboratory. Even if they are prefabricated rather than lab-fabricated, attachments containing plastic components are frequently referred to as semiprecision attachments.[7]

Detachable prosthesis with attachments provide various benefits, such as better appearance, less postoperative modification required, better retention, and more patient comfort. They are especially recommended for long-span edentulous arches, distal extension bases, and nonparallel abutments.[8]

From partial dentures to implant-supported prostheses, a broad range of attachments are available for various prosthodontic rehabilitation procedures. By examining radiographs and study models, clinicians make crucial decisions on attachment selection, which have a big impact on the result. Dental technicians need to have excellent technical skills and training in order to fabricate attachments. Additionally, because of wear or damage, attachment components usually need to be replaced on a regular basis.[9]

In detachable prosthodontics, the Rhein OT 83 attachment system is an extracoronal precision attachment that offers robust retention and stress-breaking action. It is made up of a removable nylon female cap and a spherical male component (OT ball) that is placed on the distal side of crowns or implant abutments. Because of its small size and low vertical space requirements, the ball attachment maintains both functionality and appearance. Standard, reduced, and extra-soft retention nylon female caps are color-coded to offer different retention levels based on clinical need. These caps are simple to replace after use, guaranteeing patient comfort, contentment, and long-term functionality.

4. Conclusion

For patients who cannot afford or are not a good fit for an implant-supported fixed prosthesis, attachment-retained removable prostheses are a possibility. Insufficient expertise in this area and limited understanding of how to use these attachments, however, deprive patients of this therapeutic alternative.

Declaration of Patient Consent

Written informed consent was obtained from the patient for publication of this case report and images. Anonymity has been maintained.

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None.

Conflict of Interest

None.

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