

Rehabilitation of Partially Edentulous Mandibular Arch with Semi-Precision Extracoronary Attachments - A Case Report

Dr. Maria Jenifer Sabita¹, Dr. Dipin P P²

¹MDS, Rajarajeswari Dental College and Hospital, Bangalore, India
Email ID: [jendent92\[at\]gmail.com](mailto:jendent92[at]gmail.com).

²MDS, Mahe Institute of Dental Sciences & Hospital, Kerala, India
Email ID: [dipin093\[at\]gmail.com](mailto:dipin093[at]gmail.com)

Abstract: *The restoration of a partially edentulous arch can be a great challenge when there is a Kennedy's class I or class II situation with unilateral or bilateral posterior teeth that are completely missing. Successful restoration can be done with various conventional and contemporary treatment options. One such treatment modality is extracoronary attachment retained cast partial dentures. This article describes a case report with mandibular bilateral distal extension case with resorbed ridges rehabilitated with a cast partial denture having an extracoronary semi precision attachment (RHEIN 83 attachment system)*

Keywords: Extracoronary attachments, Combined prosthesis, Removable partial denture, Semi precision attachments, Distal Extension Denture

1. Introduction

Removable partial dentures (RPD) for a Kennedy class I or class II situation is one treatment modality where in the success of it is determined by proper and meticulous treatment planning for improved aesthetics and function of the same.^[1] Fixed partial denture would not be favorable when there is a missing posterior abutment tooth. Implant supported prosthesis can also be a treatment option but due to the residual bone resorption and economic reasons it is not always feasible. In such case an acrylic or cast a partial framework is preferred. Cast partial dentures are made retentive using precision or semi precision attachments. An attachment is a connector where one component is connected to the tooth, tooth-root or an implant and the other component is connected to prosthesis.^[2] Semi-precision attachments are usually available in plastic forms and are casted. To improve the retention nylon grips are provided thus are more resilient, easy to repair and less expensive.^[3] This paper describes a case report of a patient with mandibular bilateral distal extension (Kennedy's class I) condition which is prosthetically restored by a cast partial denture retained using an extracoronary semiprecision attachment (Rhein 83 OT cap attachment systems)^[4].

2. Case Report

A 57 years old female patient reported with a chief complains of difficulty in chewing due to missing teeth. On intraoral examination, the patient had partially edentulous maxillary arch and mandibular arches (Kennedy's class I) with clinically missing 13, 14, 15, 16, 17, 24, 25, 26, 27, 35, 36, 37, 46, 47 (Fig 1). The patient underwent uneventful extraction of her teeth due to periodontal disease at various intervals over a period of one year. The remaining teeth which were both in maxillary and mandibular arches were period on tally stable.

After complete clinical and radiographic examination (Fig 2), a prosthetic treatment plan was done. Combined prosthesis with extracoronary semi precision attachment was planned for mandibular arch and a conventional acrylic partial denture was planned for the maxillary arch. Maxillary and mandibular Preliminary impressions were made using irreversible hydrocolloid (Algitex, India). Teeth preparation was done in relation to 33, 34 & 44, 45 (Fig 3) which were chose as abutment teeth due to good crown root ratio and with excellent bone support after radiographic assessment of the abutment teeth and Final impression was made using silicone impression materials. The temporization of the prepared abutment teeth was done. Wax pattern was fabricated (Fig 4) using inlay wax type 1 using indirect technique and the extracoronary rhein stud attachment was attached to the wax patterns using a surveyor with the help of a parallelometer mandrel (Fig 5). The fabricated wax pattern along with the attachment was casted using Ni- Cr alloys. A Metal try-in in relation to 33, 34 and 44, 45 with extra coronal attachments incorporated was checked for margin fit and accuracy later ceramic application followed by porcelain firing was done (Fig 6). The Metal ceramic crowns with the extracoronary attachment comprise the primary component of the prosthesis (Fig 7).

The Fabrication of wax pattern for the secondary component (Fig 7) that comprises the distal extension cast partial framework having lingual bar as major connector consisting of mesh wax pattern and the matrix part of the attachment was attached to the matrix part followed by casting of the framework was done.^[4] The finished and polished metal framework was tried into the patient's mouth checking for fit and accuracy (Fig 8). The inner surface of the OT cap was protected using black lab caps during the entire try-in and finishing procedure. The metal ceramic crowns in relation to 33, 34, 44 and 45 were cemented using GIC Type 1 luting consistency (GC Fuji).

The secondary component was placed into the patient's mouth and a bite registration was recorded (Fig 9) with help of wax rims on the edentulous span in relation to both maxillary and mandibular arches. Teeth arrangement was done using acrylic teeth and a final try in was done with both the primary and secondary components in place (Fig 10). The trial denture was processed and the cast partial denture was finished and polished for denture insertion.

Both the maxillary conventional partial denture and the mandibular cast partial denture with extracoronal attachments (Fig 11) were inserted and delivered to the patient with proper post insertion instructions (Fig 12). A 24 hours follow up was done and post insertion checkup was performed.

3. Discussion

Rehabilitation of the patients with distal extension partially edentulous arches is one of the most challenging situations that a dentist encounters in clinical practice.^[4] There is no doubt that the implant supported fixed partial denture would be the optimum treatment option but due to surgical and financial limitation many patients are reluctant for implant supported partial denture prosthesis. In such cases semi precision and precision attachments would be viable options^[5].

With only the cast partial framework for distal extension cases where in having the clasp assembly near the aesthetic zones would compromise the aesthetics with metal exposure. In such situation attachments would be a superior option of choice.^[6] Attachments for distal extension cases have to be resilient that permits both vertical and lateral movements^[7]. Also the forces should be transferred equally to both the tissue and the principal abutment tooth. The major connector along with its clasp assembly would aid in stability of the cast partial denture.

The construction of the attachment is technique sensitive as most of the parts are very small requires training and skill for its assembly.^[6,7] The matrix (female component of the attachment) would require a retentive sleeve on the inner surface of the casted housing to improve resilience and reduce frictional movements, also the sleeve might lose its retentiveness due to regular usage and wear for which it requires change periodically. The OT cap provides cushioning effect which acts as a shock absorber and also functions as stabilizing retentive connector.^[8]

The Rhein 83 OT cap system used in the case discussed is an extracoronal castable attachment positioned on the distal surface of the crowns as an extension allowing vertical space

for better aesthetics.^[9] The matrix part (male component) of the attachment is sphere shaped with a flat head and the matrix part (female component) is retentive nylon caps which are color coded based on the retentiveness was selected. A clear retentive cap was used for the patient that enabled standard retention.^[8,9]

4. Conclusion

Removable partial dentures can function at its best for partially edentulous Kennedy's class I and class II situations with help of extracoronal semiprecision attachments (Rhein 83 OT caps).^[10] With good clinical skills and judgement one can implement the use of attachments in daily clinical practice helps in improving retention, esthetics and function of the denture and also aids in patient satisfaction and comfort.^[11]

References

- [1] Mc Craken's Removable partial denture prosthodontics 12th edition. Pg 12.
- [2] Glossary of Prosthodontic Terms, Ninth edition, J Prosthetic Dent 2016; 117: 13-14.
- [3] H.W Preiskel, Precision Attachment in Prosthodontics, vol. 1-2, Quintessence Publishing, London, UK, 1995.
- [4] H.W Preiskel, Precision Attachments in Prosthodontics: Overdentures and Telescopic Prostheses, vol 2, Quintessence Publishing, Chicago I11, USA, 1985.
- [5] Gupta N, Bhasin A, Gupta P et al Combined Prosthesis with Extracoronal Castable Precision Attachments, Case Reports in Dentistry, Vol 2013, 1-4.
- [6] Bambara GE. Precision and Semi-precision attachments. In Freedman GA. Contemporary Esthetic Dentistry 1st ed. Elsevier, chapter 25 p 575.
- [7] Thapa D, Shrestha P, Removable Prosthesis with Extra coronal Attachment for the Management of Distal Extension Case: A Case Report; J. Nep Pro Soc, 2018, vol 1(2): 100-104.
- [8] Rhein 83 Catalog/Technical Manual for Dentists and Dental Technicians: Attachments and Pre-fabricated Castable Components, 12th ed, Pg: 14-15.
- [9] Prashad KD et al. A Simplified Approach to Semi Precision Attachment. NUJHS 2016, 6: 51-57.
- [10] Makkar S, Chhabra A, Khare A, Attachment retained Removable Partial denture: a case report, Int J Computing and Digital systems, 2011; Vol 2(2): 39-43.
- [11] D.R Burns, J E Ward, A review of attachments for removable partial denture design part 2. Treatment planning and attachment selection, Int J Prosthodon, vol 1990; 3(2), 169-174.



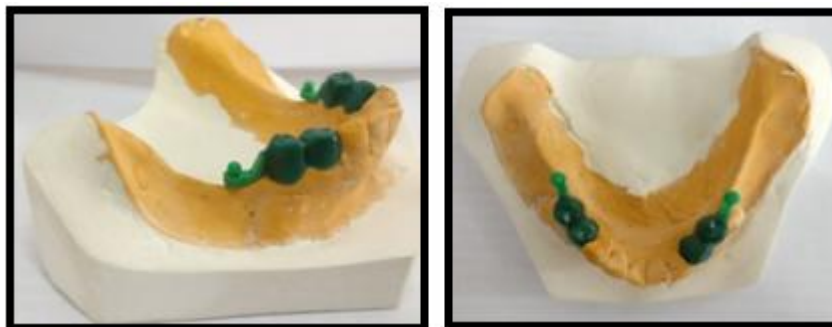
Pre-operative (intraoral view) (Fig 1)



Preoperative OPG (Fig 2)



Tooth preparation done in relation to 33, 34 and 44, 45 (Fig 3)





Wax pattern fabricated with extracoronal stud attachment attached using a dental surveyor. (Fig 4 and Fig 5)



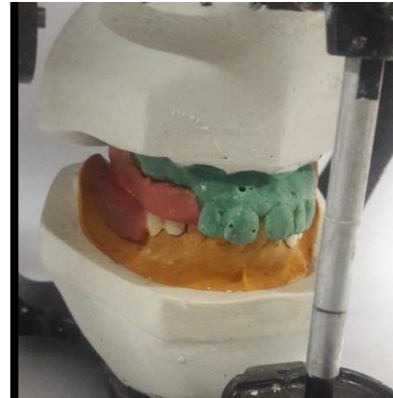
Metal try-in in relation to 33, 34 and 44, 45 with extra coronal attachments incorporated (primary component) (Fig 6)



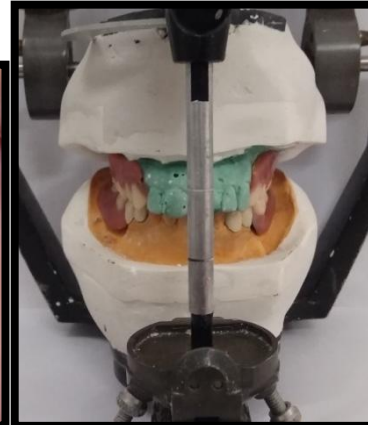
Wax pattern fabricated for the partial framework (secondary component) (Fig 7)



Metal try-in done for the partial framework (secondary component) (Fig 8)



Bite registration done (Fig 9)



Try-in with Acrylic Teeth (Fig 10)



Mandibular denture with pink retentive sleeve (Fig 11)



Maxillary Denture

Mandibular Denture

Denture insertion (Fig 12)