

Rehabilitation of a Maxillary Segmental Maxillectomy Defect Using a Cast Partial Denture with Dual Semi-Precision Attachments: A Clinical Case Report

¹Dr. Praveen, ²Dr. Sunitha Shammur, ³Dr. Dhanyakumar B.H, ⁴Dr. Nandeeshwar D B

¹PG Scholar, Dept. of Prosthodontics, Crown & Bridge, Bapuji Dental College and Hospital, Davangere, Karnataka, India

^{1,2}Professor, Dept. of Prosthodontics, Crown & Bridge, Bapuji Dental College and Hospital, Davangere, Karnataka, India

³Professor and HOD, Dept. of Prosthodontics, Crown & Bridge, Bapuji Dental College and Hospital, Davangere, Karnataka, India

Citation of this Article: Dr. Praveen, Dr. Sunitha Shammur, Dr. Dhanyakumar B.H, Dr. Nandeeshwar D B, "Rehabilitation of a Maxillary Segmental Maxillectomy Defect Using a Cast Partial Denture with Dual Semi-Precision Attachments: A Clinical Case Report" IJDCSR – January – 2026, Vol. – 8, Issue - 1, Page No. 01-09.

Copyright: © 2025, Dr. Praveen, et al. This is an open access journal and article distributed under the terms of the creative common attribution noncommercial License. This allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Corresponding Author: Dr. Praveen, PG Scholar, Dept. of Prosthodontics, Crown & Bridge, Bapuji Dental College and Hospital, Davangere, Karnataka, India

Type of Publication: A Case Report

Conflicts of Interest: Nil

ABSTRACT

Rehabilitation of partially edentulous patients with a severely compromised alveolar ridge remains a challenging task in prosthodontics. Precision and semi-precision attachments offer superior esthetics, enhanced retention, and improved distribution of functional forces compared to conventional clasp assemblies. This case report describes the prosthetic management of a patient with maxillary partial edentulism and post-traumatic alveolar ridge loss, rehabilitated with a maxillary cast partial denture (CPD) incorporating dual semi-precision attachments.

In this case, splinted porcelain-fused-to-metal (PFM) crowns were fabricated, with a Vertex attachment on 21, a Rhein 83 attachment on 24–25, and a circumferential clasp with mesio-distal rest on 18. The resulting prosthesis achieved excellent esthetics, function, and patient satisfaction.

KEYWORDS

Semi-precision attachment; cast partial denture; maxillary ridge defect; Vertex attachment; Rhein attachment; esthetic prosthodontics.

INTRODUCTION

Partial edentulism accompanied by alveolar ridge resorption, trauma, or loss of hard tissue presents significant esthetic and functional challenges. Conventional removable partial dentures (RPDs) often compromise esthetics due to visible clasps and may not achieve optimal retention in cases with deficient ridge support. In such situations, precision and semi-precision attachments are preferred, as they enhance retention, improve esthetics, and allow more favorable biomechanical force distribution [1–3].

Among the available systems, Vertex attachments and Rhein 83 attachments have proven highly effective due to their versatility and resilience [4]. The combination of multiple attachment systems in a single prosthesis termed dual attachment rehabilitation which offers a customized solution tailored to individual clinical needs.

This article presents the case of a patient with maxillary alveolar ridge loss managed with a cast partial denture (CPD) using dual semi-precision

attachments, demonstrating the clinical steps, prosthetic design, and outcome.

CASE REPORT

A 45-year-old male patient, Mr. Chandrappa, reported with a history of traumatic injury leading to partial tooth loss and ridge resorption in the maxillary arch. Clinical examination revealed the following status:

- Present teeth: 18, 21, 22, 23, 24, 25
- Missing teeth: 11, 12, 13, 14, 15, 16, 17
- Ridge status: First quadrant alveolar ridge absent with compressible soft tissue
- Remaining teeth: Healthy, but requiring full-coverage restoration for support and prosthesis anchorage.





TREATMENT PLAN

1. Fabrication of full-coverage porcelain-fused-to-metal (PFM) crowns for all abutments.
2. Splinting of anterior abutments (21–22–23) with incorporation of a Vertex semi-precision attachment on 21.
3. Splinting of premolars (24–25) with incorporation of a Rhein 83 attachment.
4. Placement of a metal crown on 18 with mesio-distal occlusal rests and a circumferential clasp for auxiliary retention.

5. Fabrication of a maxillary cast partial denture (CPD) engaging these attachments and rest seats.

CLINICAL PROCEDURE

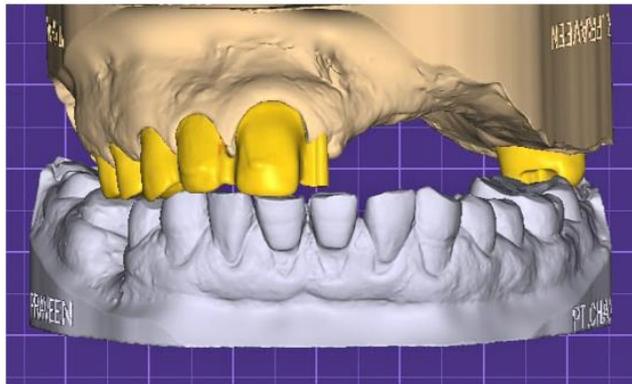
- Diagnostic impressions were made, and study models mounted on a semi-adjustable articulator. A diagnostic wax-up and survey were carried out to determine path of insertion and optimal attachment placement.

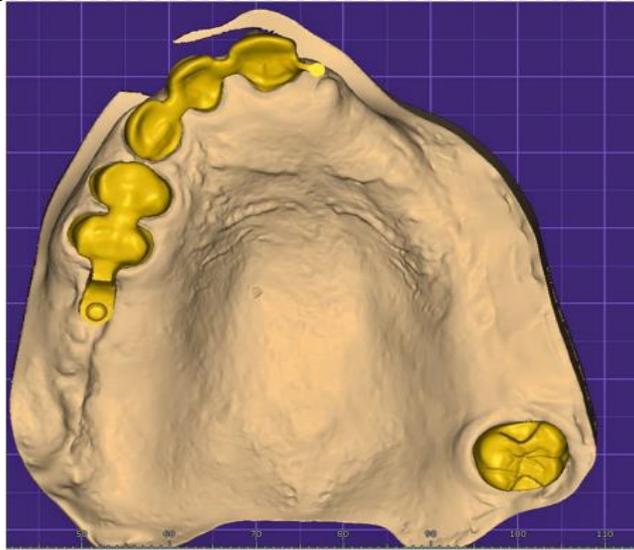


Tooth preparations were performed on 18, 21–23, and 24–25. Provisional restorations were placed.



- Final impressions were made with elastomeric impression material and cad cam design of crowns was done.

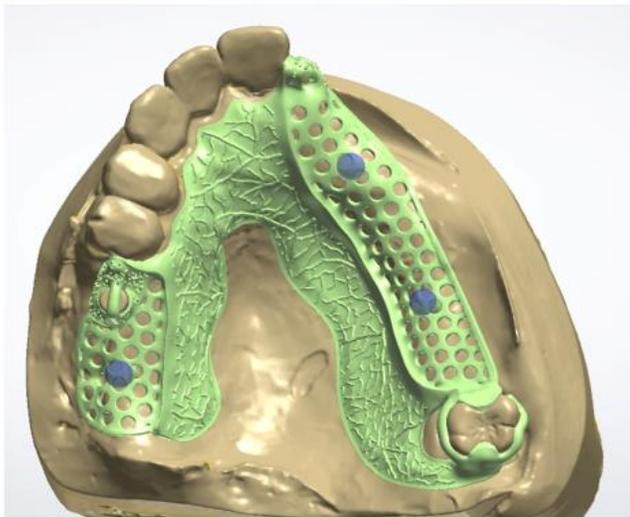




- Splinted PFM crowns with incorporated Vertex attachment (21) and Rhein 83 attachment (24–25) were fabricated.



A metal crown on 18 was fabricated with mesial and distal occlusal rests and a circumferential clasp arm.



- Framework try-in of the CPD was performed, ensuring passive fit.



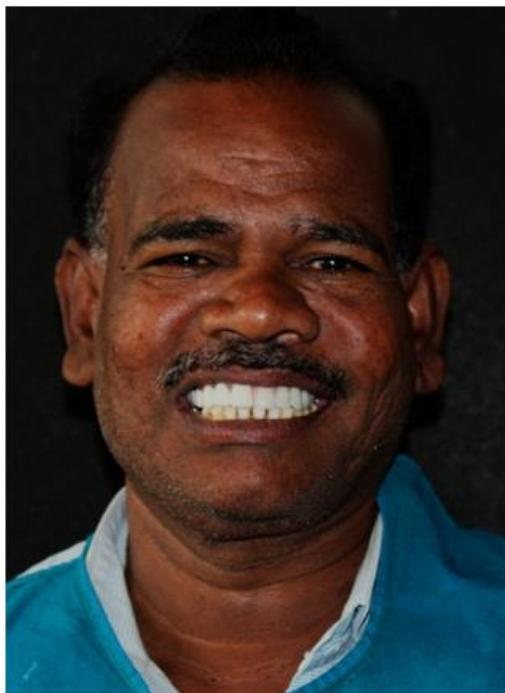
- Jaw relation was recorded, followed by wax try-in for esthetic and functional verification.



- Final prosthesis was processed in heat-cured acrylic resin with cobalt-chromium framework.



- Insertion was performed, followed by occlusal adjustments, clasp activation, and patient instructions.



Happy Patient

Outcome

The prosthesis exhibited excellent retention, stability, and esthetics without visible anterior clasps. The dual attachment system ensured even distribution of occlusal loads across abutments. Patient adaptation was favorable, and follow-up at 3 months demonstrated satisfactory function and maintenance of periodontal health.

DISCUSSION

The rehabilitation of maxillary partial edentulism complicated by ridge loss requires a prosthesis that restores esthetics, function, and psychological well-being. While conventional clasp-retained CPDs may compromise esthetics, semi-precision attachments provide a more harmonious solution [2,5,6].

In this case, Vertex attachment offered a rigid, esthetic solution in the anterior region, whereas the Rhein 83 attachment, with its resilient nylon housing, provided stress distribution in the premolar region. The combination, along with auxiliary support from a clasp on 18, achieved a balance between retention, stability, and esthetics.

Numerous studies have highlighted the advantages of semi-precision attachments:

- Increased retention and patient comfort compared to clasp-retained CPDs [2,7].
- Favorable esthetics, especially in anterior regions [3,8].
- Improved biomechanical load distribution reducing torque on abutments [4,9,10].

However, these types of prostheses require careful case selection, precise laboratory support, and patient compliance for hygiene and maintenance [11,12].

CONCLUSION

This case demonstrates successful rehabilitation of a maxillary partially edentulous patient with dual semi-precision attachments using a cast partial denture. The combined use of Vertex and Rhein attachments provided superior esthetics, retention, and function while addressing ridge deficiency. Such treatment modalities highlight the importance of individualized prosthetic planning in complex maxillary rehabilitations.

REFERENCES

1. Preiskel HW. Precision attachments in prosthodontics: Overdentures and telescopic prostheses. Chicago: Quintessence Publishing; 1985.
2. Burns DR, Ward JE. A review of attachments for removable partial denture design: Part 1. Classification and selection. *Int J Prosthodont.* 1990;3(1):98–102.
3. Mishra SK, Chowdhary R, Chrcanovic BR, Brånemark PI. Precision attachments in dentistry: A review. *J Int Oral Health.* 2013;5(6):132–136.
4. Chhabra A, Prakash H, Jain A. Semi-precision attachments in prosthodontics: A case report. *J Indian Prosthodont Soc.* 2003;3(1):27–29.
5. McCracken WL. McCracken's Removable Partial Prosthodontics. 13th ed. St. Louis: Elsevier; 2016.
6. Zitzmann NU, Marinello CP. Treatment outcomes of fixed or removable implant-supported prostheses in the edentulous maxilla. Part I: Patients' assessments. *J Prosthet Dent.* 2000;83(4):424–433.
7. Stewart KL, Rudd KD, Kuebker WA. Clinical removable partial prosthodontics. 2nd ed. St. Louis: Mosby; 1983.
8. Ettinger RL. The use of precision attachments in removable partial dentures. *Dent Clin North Am.* 1990;34(4):683–709.
9. Koller MM, Koller D. Attachments and their use in removable prosthodontics. *Aust Dent J.* 1989;34(5):413–418.
10. Nayar S, Bhuminathan S, Mahadevan R. Precision attachment prosthesis for partially edentulous patients: A case report. *J Indian Prosthodont Soc.* 2008;8(3):164–167.
11. Oswaldo Scopin de Andrade. Precision and semi-precision attachments: Indications and clinical considerations. *Rev Odontol Bras Central.* 2012;21(58):232–238.
12. Behr M, Zeman F, Bittinger A, et al. Survival of double crown-retained removable dental prostheses: A retrospective study. *Int J Prosthodont.* 2012;25(3):209–214.