

Rehabilitation of Mandibular Partial Edentulous Arch using Ceka Revax Semi-precision Attachment: A Case Report

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ABSTRACT

There are many prosthetic treatments modalities in rehabilitating partially edentulous condition. It is a technically difficult task for any prosthodontist to treat partially edentulous condition because retention and stability are the two main problems. Attachments are available with small interlocking devices which connects prosthesis and abutments which improves retention and stability and esthetics. Ceka attachment can be used to obtain retention and stability for the prosthesis. A 48-year-old-female patient reported to the Department of Prosthodontics, Crown and Bridge with chief complaint of missing teeth with respect to teeth number- 12,13,14, 22,25,26,35,36,37,45,46,47. This case describes rehabilitating maxillary missing teeth and posterior edentulous mandibular arch using semi precision attachment (Ceka Revax Extracoronar Green). Precision attachments have two metal components which form an articulate joint with first component or matrix or keyway which is attached to clinical contours of a cast restoration and the second component of patrix is attached to the removable partial denture. This case required multidisciplinary approach, technical skills and treatment offered showed excellent patient acceptance and also met aesthetic demands too.

Keywords: Extracoronar attachments, Keyway, Multidisciplinary approach, Removable partial denture

CASE REPORT

A 48-year-old-female patient reported with a chief complaint of missing teeth in relation to upper and lower arch. No relevant medical, surgical and personal history was given by the patient. On intraoral examination, it was noted that decay was present in 16, missing teeth were 12,13,14,22,25,26,35,36,37 and 45,46,47 [Kennedy's class I with mandibular arch], and restorations were done in 27,44 [Table/Fig-1]. Radiographically it was found that there was root canal treatment performed with respect to 11,15 due to periapical infection of teeth [Table/Fig-2]. After clinical and radiographic examination, multiple fixed partial denture with maxillary arch and extracoronar CEKA Revax precision attachment for mandibular bilateral distal extension was planned.



[Table/Fig-1]: Preoperative intraoral image.



[Table/Fig-2]: Preoperative orthopantomogram radiograph.

Diagnostic cast and face bow transfer were made and mounted to Hanau Wide-Vue articulator [Table/Fig-3-5]. Broderick's analysis was done to establish occlusal plane with mandibular arch [Table/Fig-6]. Wax mockup was done for maxillary and mandibular arch. Tooth preparation of abutment teeth 11,15 and 21,23,24,27 was performed to receive porcelain fused to metal fixed partial denture. The abutments prepared 11,15,21,23,24,27 were temporised after making definitive impression with addition silicon impression materials and master cast was made with die stone. After following all laboratory procedures, metal ceramic fixed partial crowns were fabricated for 11 to 15 of five unit and 21 to 23 of three unit and 24 to 27 of four unit. Bisque trial was done for the same. Finally all the porcelain fused to metal crowns were glazed and cemented to the maxillary teeth [Table/Fig-7]. Based on available interarch space, the attachment selected was CEKA Revax Extracoronar Green with one attachment and three different plastic profiles 30,45,60 with size M2 size RE01175 TI and M3 size OL 0275 TI [Table/Fig-8].

Crown preparations were done on 33,34 and 43,44. Master cast was obtained from putty and light body impression. Wax patterns of copings were made to which the plastic profiles of the CEKA attachments were attached [Table/Fig-9]. Laboratory procedures of investing and castings were followed. Bisque trial was done with CEKA attachments in patient's mouth and also evaluated for the fit [Table/Fig-10]. Fabricated metal ceramic crowns were provisionally cemented and pick-up impression was made using medium body impression material in custom tray. Cast partial denture frame work was fabricated from the obtained master cast. Wax frame work was done with liva wax, cured with UV light and then followed the casting procedure. The frame work of cast partial denture was tried in patient's mouth to verify the fit [Table/Fig-11]. Maxillomandibular relations were recorded with occlusal rim which was adapted on the framework. Try-in was done after the teeth arrangement. Acrylisation of cast partial denture was completed using heat cure acrylic resin [Table/Fig-12]. Using glass ionomer cement, the Porcelain Fused to Metal (PFM) crowns with attachment were cemented on 33,34 and 43,44. Cast partial denture was attached to these PFM crowns and occlusion was checked [Table/Fig-13,14]. Postoperative care and oral hygiene instructions were given to the patient. Follow-up was



[Table/Fig-3]: Diagnostic primary cast. **[Table/Fig-4]:** Face bow transfer. **[Table/Fig-5]:** Mounted to Hanau Wide-Vue articulator. (Images from left to right)



[Table/Fig-6]: Broderick's analysis was done to establish occlusal plane. **[Table/Fig-7]:** Fixed partial denture were glazed and cemented in the maxillary arch. **[Table/Fig-8]:** CEKA Revax Extracoronal Green with one attachment and 3 different plastic profiles (30,45, and 60) with size M2 size RE01175 TI and M3 size OL 0275 TI. (Images from left to right)



[Table/Fig-9]: Wax patterns of copings were made and the plastic profiles of the CEKA attachments were attached to the copings. **[Table/Fig-10]:** Ceramic layering was done and tried in patient's mouth. **[Table/Fig-11]:** Wax frame work was done with liva wax and cured with UV light and the frame work of cast partial denture was fabricated. (Images from left to right)



[Table/Fig-12]: The acrylization of cast partial denture using high strength heat cure acrylic resin. **[Table/Fig-13]:** Cast partial denture was attached with Porcelain fixed metal crowns and occlusion was verified. **[Table/Fig-14]:** Occlusal view of cast partial denture of mandibular arch. (Images from left to right)

done after 48 hours. Patient was recalled after six months for the check-up. Maintenance of oral hygiene, handling of the prosthesis and the final adjustments were easy as the cast partial denture was removable type.

DISCUSSION

Removable partial denture is a prosthesis that replaces few teeth and it can be removed and replaced from the mouth at patients will [1]. In 1951 by Karl Cluytens, a dental laboratory technician from Antwerp, Belgium developed the CEKA attachment to balance between cosmetic appeal and functional stability in partial dentures [2]. Precision attachment is highest form which provide better esthetic and function [3]. Few retrospective studies have shown long-term survival rate [2]. According to Arora et al., the CEKA attachment is a prefabricated, extracoronal, resilient attachment (non-rigid), which will help to distribute the destructive forces away from the abutments and soft tissues [4]. Decision must be made whether to use an intracoronal or extracoronal attachment, resilient or a non resilient type that can be used within the available space to gain retention, stability and strength for prosthesis [5].

Since, there was sufficient space available in the present case, extracoronal precision attachments were selected. Resilient

attachments allow free movements which will distribute the forces and support bone and tissue [6]. Criteria to choose different systems are based on the principle of force distribution which maintains the health of the remaining teeth and alveolar ridges. Each package of CEKA Revax Extracoronal Green contains one attachment and three different plastic profiles (30°, 45°, 60°) with available M2 size RE 0175 TI and M3 size OL 0275 TI which has exceptional feature with improved esthetics and less postoperative adjustments. It has got cup shape female part available in M2 size: RE 0100 TI, M3 size: OL 0200 TI made up of TITANAX alloy, which has to cement to CEKA site with CEKA bond. There is retention part available of M2 size: RE 0075, M3 size: 694 AKS which is made of TITANAX alloy which has to be fixed in acrylic denture base. Male spring pin 166 of available size M2: RE 0031 M3 size: 694 C which is made up of PALLAX alloy, bonded to retentive part with CEKA bond to prevent gradual unthreading. CEKA Revax Extracoronal Green attachment provides ease of utilisation and serviceability. There is laboratory kit available to fix all the male and female metal components. Construction of such attachment require skill and needs training. The [Table/Fig-15] shows advantages, disadvantages, uses and limitations of CEKA precision attachments. The parts of the attachment are usually exposed to wear and tear and needed to be replaced over time [7].

A good dual impression technique, broad coverage, stable denture base, splinting of abutments and proper selection of attachments is an essential factor for stress control on abutment teeth in distal extension cast partial denture [8]. Sabhlok A et al., explained about cuspids and bicuspid in both quadrants which will evenly distribute the forces and also increases retention and stability. Splinting of canine and 1st premolar in the present case was helpful in providing good support and stress control [9]. According to Feinberg E, attachments which are passive, dissipates lateral forces [10]. Gupta S et al., explained that attachment retained partial denture last longer, wear less, need less adjustments and are easier to clean [11]. In the present case, maintenance of oral hygiene, handling of the prosthesis and final adjustments were easy with CEKA type of cast partial denture. Finally, there is need of experience, technical skills and knowledge on principles for success of every precision attachment [12,13].

S. No.	Advantages	Disadvantages	Uses	Limitations
1	Resilient	Requires technical skills	In Kennedy's class I cases	Cannot be used in limited interarch space
2	Excellent retention and stability	Requires sufficient interarch space	In Kennedy's class II cases	Cannot be used on periodontal compromised abutments
3	Preserves the health of the remaining teeth and alveolar ridges	Expensive	In poorly resorbed alveolar ridge cases	Needs training
4	Improves esthetic	Post insertion follow-ups	-----	Time consuming
5	Improves masticatory efficiency	Requires extensive abutments tooth preparation	-----	-----

[Table/Fig-15]: Advantages, disadvantages, uses and limitations of CEKA.

CONCLUSION(S)

Partially edentulous patient often seek tooth replacement for comfort, esthetics and function. Dental practitioners often find

difficulty in achieving retention and stability in partial edentulous ridges. Proper treatment planning is must for the use of precision attachment systems. The role of splinting, occlusal analysis, removal partial denture design and correctable cast impression procedures are most important adjunct in the use of CEKA extracoronally retained removable partial denture. The economy, simplicity of care, and comfort in function make this type of prosthesis acceptable to patients. Ease of insertion and removal, abutment selection, periodic recall are very important factors for success of prosthesis. This case required multidisciplinary approach, technical skills and offered excellent patient acceptance and also met aesthetic demands too.

REFERENCES

- [1] The glossary of prosthodontic terms. *J Prosthet Dent.* 2005;94(1):10-92. Doi: 10.1016/j.prosdent.2005.03.013.
- [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] Schweikert EO. A prosthetic solution with cantilevered ceka-attachments. *Quintessence Int Dent Dig.* 1981;12(2):165-72.
- [4] Arora A, Upadhyaya V, Goyal I, Chowdry A. Attachments: Boon to preventive prosthodontics: Two case reports. *Journal of Dental Research and Review.* 2014;1(3):152.
- [5] Lorencki SF. Planning precision attachment restorations. *J Prosthet Dent.* 1969;21(5):506-08.
- [6] Weaver SM. Precision attachments and their advantages in respect to underlying tissues. *The Journal of the American Dental Association and The Dental Cosmos.* 1938;25(8):1250-59.
- [7] Makkar S, Chhabra A, Khare A. Attachment retained removable partial denture: A clinical report. *International Journal of Clinical Dental Science.* 2011;2(2):39-43.
- [8] Preiskel HW. Precision attachments in prosthodontics: Overdentures and telescopic prostheses. Quintessence Publishing Company; 1984.
- [9] Sabhlok A, Mantri SS, Nitin SK, Bhasin A. Over denture with ceka attachment: An alternative treatment modality to rehabilitate partially edentulous condition-A case report. *IP Annals of Prosthodontics and Restorative Dentistry.* 2020;4(1):19-22.
- [10] Feinberg E. Diagnosing and prescribing therapeutic attachment-retained partial dentures. *N Y State Dent J.* 1982;48(1):27-29.
- [11] Gupta S, Rani S, Sikri A, Kapoor A. Attachment retained cast partial denture: Conventional and contemporary treatment perspectives. *Int J Oral Care Res.* 2016;4(4):312-16.
- [12] Becerra G, MacEntee M. A classification of precision attachments. *J Prosthet Dent.* 1987;58(3):322-27.
- [13] Angadi PB, Aras M, Williams C, Nagaral S, Angadi P. Precision attachments: Applications and limitations. *J Evol Med Dent Sci.* 2012;1(6):1113-21.

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