

Usage of Ce-Ka Preci-Vertex Attachments in Dental Prosthetic Rehabilitaion with Complex Fixed-Removable Prosthetic Constructions

Katerina Stoimenovska Kirov^{1*}, prof. d-r Emilija Bajraktarova Valjakova²,
Budima Pejkovska Shahpaska³, Meri Lazarova

¹ Faculty of Medical Sciences, "Goce Delcev" University, Stip, N. Macedonia, dental prosthetic resident,

² University St. "Cyril and Methodius", Faculty of Dentistry, Skopje, N. Macedonia

³ PHI UDCC "St. Panteleimon" – Skopje, N. Macedonia, Faculty of Medical Sciences, Goce Delcev University, Stip, N. Macedonia

³ PHI UDCC "St. Panteleimon" – Skopje, N. Macedonia

Introduction: Although implant-supported restorations are increasingly utilized in contemporary dental practice, conventional clasp-retained removable partial dentures remain the most common treatment modality for partial edentulism, primarily due to economic limitations. Combined fixed-removable prosthetic constructions, including telescopic systems and precision attachment-retained dentures, represent a reliable functional and aesthetic alternative.

Aim: The aim of this paper is to present three clinical cases of prosthetic rehabilitation using a combined fixed-removable design with extracoronary sliding CEKA Preci-Vertex attachments.

Materials and Methods: Functional and aesthetic rehabilitation was performed in three patients indicated for complex prosthodontic treatment. In all cases, the mandibular arch was restored using a splinted metal-ceramic fixed dental bridge incorporating extracoronary CEKA Preci-Vertex attachments in combination with a removable skeletal partial denture. One patient additionally underwent full-mouth rehabilitation with fixed dental bridges in the maxillary arch. All patients presented partial edentulism, pronounced anterior tooth attrition, and compromised oral health. Functional impressions were obtained using a two-stage silicone technique, and maxillomandibular relationships were recorded with wax registration. Final restorations included fully veneered metal-ceramic crowns with incorporated precision attachments and corresponding removable dentures.

Results and Discussion: Pejkovska et al. emphasized the biomechanical advantages of precision attachments, demonstrating that extracoronary vertical attachments, such as the CEKA Preci-Vertex system, facilitate a more favorable vertical transmission of masticatory forces in accordance with fundamental physical principles enhancing prosthetic stability, which is consistent with the findings of the present cases.

Conclusion: Combined fixed-removable prosthetic constructions with precision attachments provide favorable functional and aesthetic outcomes, improved stability and rapid patient adaptation.

Keywords: complex fixed-removable dentures, CEKA Preci-Vertex attachments, precision attachments, partial edentulism.

Date of Submission: 26-08-2026

Date of Acceptance: 06-09-2026

I. INTRODUCTION

Although implants are gaining popularity in modern dental practice today, the most common solution for partial edentulism is still the classic removable partial dentures with clasps. One of the most common reasons is the economic situation of the patients. However, not always and not every patient has an indication for implant placement. A good alternative to implants and classic removable partial dentures are fixed-removable constructions, such as telescopic dentures and dentures with precise attachments or attachments. In these prosthetic constructions, the fixed fabrication, such as crowns or bridges, is connected to the removable partial denture. The techniques and materials used allow for very high precision, stability of the denture itself and thus good aesthetics without the use of standard wire clasps. ⁽¹⁾

A particularly big challenge is partial edentulism according to Kennedy Class I and II, sometimes combined with Kennedy IV where the restoration of the terminal saddle requires planning based on biomechanical principles. Therefore, the choice of the right retention element is of great importance. As a retention element, for combined dentures, attachments are most often used in our country. What type of attachment we will choose, individually depends on the clinical case itself and the location, function, retention, space, i.e. the size of the teeth and of course the cost. ⁽²⁾

According to the location itself, there are extracoronary and intracoronary attachments. CE-KA attachments can be used for retention and stabilization of dentures. In our case, CE-KA preci-vertex attachments were used. These are extracoronary sliding attachments, which consist of two parts: a matrix - placed in the denture and a patrix that is part of the retention tooth, i.e. the crown or bridge. ⁽³⁾

The aim of this paper is to present a clinical cases of rehabilitation with complex fixed-removable constuctions using extracoronary sliding CEKA Preci-Vertex attachments.

II. CASE STUDIES

The first patient that came to our office was a 62-year-old female patient who was treated for functional and aesthetic rehabilitation in the lower jaw. Clinical examination showed partial edentulism according to Kennedy Class I, with marked attrition of the anterior teeth and satisfactory oral hygiene. All remaining teeth (33–43) were prepared with a rounded chamfer. After preparation, a functional impression was taken with silicone masses (two-stage impression), and bite registration was performed with wax templates. The impressions were sent to a dental laboratory for further processing. In the laboratory, metal-ceramic crowns were fabricated in a block in the region from 33 to 43, with extracoronary sliding CEKA Preci-Vertex attachments installed. Then, a complex skeletal denture was fabricated to replace the lost teeth in the regions 34–37 and 44–47 (Figure 1a-f).



Figure 1a. Ortopantomography of the patients' jaws

Figure 1b. Intraoral view of the patient before treatment

Figure 1c. Intraoral view of the preparation of the frontal teeth

Figure 1d. The complete complex construction – intraoral view

Figure 1e. Extraoral view of the definitive fixed – removable construction

Figure 1f. Extraoral view of the attached complex fixed and removable construction

The second patient was a 67 year old patient with partial edentulism in the lower jaw and also a need for a complex treatment. He had lost his lower central incisors and teeth in the posterior region. The methods used were the same as for the previous patient. His remaining teeth were prepared with a round chamfer, and two stage impression was taken and send to the dental technician laboratory (Figure 2 a-d).



Figure 2a. Intraoral view of the patient at first visit at the office

Figure 2b. Intraoral view of the patients' prepared teeth

Figure 2c. Intraoral view of the patient with the definitive fixed-removable construction

Figure 2d. Intraoral lateral view of the patient in occlusion

Figure 2e. Lingual view of the complex construction with the attachment system CEKA Preci Line

Figure 2f. Occlusal view of the complex fixed-removable construction

The third patient in this study was a young woman aged 40 who had neglected herself to a degree that she needed a more radical solution, that is extraction of some teeth in both her jaws and a complex fixed – removable construction in the lower jaw and preparation of all her remaining teeth in the upper jaw. As it is now trend she insisted on choosing a lighter shade that complemented her youth and complexion (Figure 3 a-f).



Figure 3a. Orthopantomographic view of the patient

Figure 3b. Intraoral view of the patient at the first visit

Figure 3c. Intraoral view of the prepared teeth

Figure 3d. Intraoral view of the full mouth rehabilitation

Figure 3e. Extraoral view of the dental bridges in the upper jaw

Figure 3f. Extraoral view of the complex fixed-removable prosthetic constructions

The patients were followed for a period of three years for periodic oral hygienic preventive protocols during which the prosthetic rehabilitation was successfully achieved and there have been no alterations noticed regarding the complex fixed-removable prosthetic constructions.

III. DISCUSSION

According to Hwang et al. partial edentulism is a common clinical problem that can significantly affect the function, aesthetics and quality of life of patients. Although in recent decades implant therapy has been increasingly used as a method for the rehabilitation of patients with lost teeth, economic factors, systemic diseases and anatomical limitations often limit its application. In such cases, combined fixed-removable prosthetic constructions represent a safe and functional alternative. ⁽⁴⁾

Gumme et al. have concluded that combined dentures with precision attachments and telescopic crowns provide better retention, stability, and aesthetics compared to conventional removable partial dentures with different types of clasps. The absence of such visible clasps contributes to a better aesthetic result and greater patient satisfaction. Additionally, attachments allow for a better distribution of occlusal forces between the remaining teeth and the alveolar ridge, which contributes to better biomechanical stability of the prosthetic construction. ⁽⁵⁾

Extracoronary sliding attachments, such as the CEKA Preci-Vertex system, are widely used in modern prosthetics due to their high functionality and safety. These systems provide controlled retention, prosthesis stability and improved patient comfort during mastication and speech. According to Burns and Ward, the use of precision attachments in removable partial dentures significantly improves retention and functional stability of the dentures. ⁽⁶⁾

In patients with Kennedy Class I, Kenedy Class II and IV that have partial edentulism, as in the presented clinical cases, achieving adequate stability and retention of the removable dentures represents an important therapeutic challenge.

Dula et al. have stated that another successful solution is the usage of telescopic crowns. Combined fixed-removable dentures themselves contribute to greater stabilization, but also to an optimal distribution of masticatory forces. In this way, the load on the remaining front teeth is reduced and the long-term prognosis of the therapy is improved. ⁽⁷⁾

However, the application of such prosthetic constructions also requires great laboratory precision. So the application of telescopic crowns and dentures in our country is quite limited. Proper planning of the therapy, appropriate preparation of the supporting teeth and precise fabrication of the prosthetic construction are essential for the success of the treatment. In addition, over time, Angadi et al. conducted in their study that wear of the retention elements of the attachments may occur, which requires their periodic replacement and regular control examinations. ⁽⁸⁾

Furthermore, Pejkovska et al. highlighted the biomechanical advantages of precision attachments, emphasizing that, according to fundamental principles of physics, extracoronary vertical attachments—such as the CEKA Preci-Vertex system—facilitate a more favorable vertical transmission of masticatory forces. This vertical load direction contributes to improved stress distribution along the long axes of the abutment teeth and the supporting alveolar bone, thereby enhancing the overall biomechanical stability of the prosthetic construction, which is in correlation with this study.

In contrast, attachments with predominantly horizontal force vectors, such as Lecodent-type systems, have been associated with increased lateral stress components. Over time, these non-axial forces may predispose to a higher incidence of biological and mechanical complications, including abutment overload, attachment wear, and dentures instability. Clinical observations have suggested that such complications occur more frequently in patients rehabilitated with horizontal attachment systems, particularly in distal extension cases. With analysis of the vectors of the forces schematically shown as a comparative method by analyzing the Lecodent with the CEKA Preci-Line attachments it has been concluded that the CEKA Preci-Line attachments enable higher vertical transmission of chewing forces, since they are referred as vertical sliders. In Lecodent bars, there is a minimal tendency of anterior-posterior moves on the removable dentures, especially if distal teeth are missing because they are horizontal sliders. ⁽⁹⁾

Maintaining good oral hygiene is another important factor for the longevity of combined prosthetic constructions. Prasad et al. emphasize that patients should be informed in detail about the proper maintenance of the fixed and removable prosthetic constructions and regularly attend dental check-ups in order to prevent possible complications. ⁽¹⁰⁾

Within the limitations of this clinical presentation, it can be concluded that the combined fixed-removable prosthetic construction with extracoronary CEKA Preci-Vertex attachments represents a safe, functional and aesthetically acceptable solution for the rehabilitation of patients with different types of partial edentulism.

IV. CONCLUSION

Combined fixed-removable prosthetic constructions with attachments represent an effective therapeutic option for the rehabilitation of patients with partial edentulism, especially in cases where rehabilitation with implants is not indicated or is not acceptable to the patient. The usage of extracoronary sliding CEKA Preci-Vertex attachments allows for improved retention, stability and aesthetics of the prosthetic fabrication, as well as better distribution of the occlusal forces on the remaining teeth and the residual alveolar ridge.

In the presented clinical case, a successful functional and aesthetic rehabilitation was achieved in all three patients with partial edentulism in the lower jaw. Combined removable dentures offer optimal aesthetic and functional rehabilitation, but also greater stability for the remaining teeth, with fairly rapid adaptation in patients. Maintaining oral health can be somewhat challenging.

REFERENCES

- [1]. Al-Zord, N., & Al-Quraine, N. T. (2023). Telescopic Denture: A Treatment Option for Occlusal Rehabilitation in Partially Edentulous Patients. *Cureus*, 15(2), e35222
- [2]. Gupta, N., & Gupta, N. K. (2021). Precision attachment in Prosthodontics: A Review. *Journal of Advanced Medical and Dental Sciences Research*, 9(9), 115-120
- [3]. Al-Aali, K. A. (2020). Effects of New Modification in the Design of the Attachments Retaining Distal Extension Partial Denture on Stress Distribution Around the Abutments And Residual Ridges: An In Vitro Study. *International Journal of Dentistry*, 2020

- [4]. Hwang, D., & Wang, H. L. (2019). Are There Contraindications for Placing Dental Implants?. The Dental Clinics of North America, 63(3), 445–462
- [5]. Gumme, V. P., et al. (2025). Precision attachments in prosthodontics: classification, indications, and clinical considerations – A narrative review. IP Annals of Prosthodontics and Restorative Dentistry, 11(4), 284-290
- [6]. Burns DR, Ward JE. Review of attachments for removable partial denture design: 1. Classification and selection. Int J Prosthodont. 1990 Jan-Feb;3(1):98-102. PMID: 2196898
- [7]. Dula, L.J., Shala, K.S., Stubljär, D., Starc, A. and Kosumi, S. (2025), Comparison of Increase in Masticatory Efficiency Between Removable Partial Dentures Retained With Clasps and Retained With Attachments. Clinical and Experimental Dental Research, 11: e70130. <https://doi.org/10.1002/cre2.70130>
- [8]. B.Angadi P, Aras M, Williams C, Nagaral S. PRECISION ATTACHMENTS; APPLICATIONS AND LIMITATIONS. J Evol Med Dent Sci 2012;1:1118–26
- [9]. Pejkovska Shahpaska B, et al. Treatment possibilities for patients with partial edentulousness using fixed constructions with precision attachments and removable skeletal dentures. International Journal of Surgery and Medicine. 2021;7(3):25–28.
- [10]. Prasad K, Swaminathan AA, Prasad A. A simplified approach to semi-precision attachment. Journal of Health and Allied Sciences NU 2016;06:51–7.