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Case Report **Prosthodontics**

Step by Step to Succeed a Combined Prosthesis Restoring a Class I Kennedy Applegate Partial Edentulism

Ahlem Raddeoui[1], Sana Bekri[2*], Hajer Chtioui[3], Amel Labidi[2], Lamia Mansour[4]

[1]DDS, Dental Resident, Department of Removable Prosthodontics, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia
[2]Associate Professor, Department of Removable Prosthodontics, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia
[3]Assistant Professor, Department of Removable Prosthodontics, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia
[4]Professor, Department of Removable Prosthodontics, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

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***Corresponding author:** Sana Bekri
Associate Professor, Department of Removable Prosthodontics, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

Abstract

Satisfactory restoration in a patient with a partially edentulous situation can be challenging especially when bilateral posterior segment of teeth is missing. Combined prosthesis still have a good place as a treatment option for partially edentulous Kennedy's class I conditions especially when implants are contraindicated for one reason or another. With proper case selection and treatment plan, precision attachments system can be used to improve retention and esthetics. The purpose of this article was to describe a case of a patient with extended Kennedy's class I condition, which was prosthetically restored by a combined prosthesis using a extracoronal precision attachment.

Keywords: Combined prosthesis; extra coronal attachments, kennedy_Applegate class I, esthetics.

INTRODUCTION

Most traditional RPDs that are well fabricated are not used by the patient only because the individual does not prefer its appearance. The removal of a facial or labial direct retainer or clasp arm would be a critical factor in creating a cosmetic design [1, 2].

The combined prosthesis seems to be a good alternative, especially when implants are contraindicated for one reason or another. Association of attachments to connect a fixed partial denture and a removable partial denture becomes a significant alternative to the traditional clasp-retained removable partial denture [3, 4].

Combined prostheses with Attachment guarantees the patient with fairly long-term stability and more satisfaction than clasp-retained dentures, hence improves the quality of life of the patient.

Based on studies demonstrating attachment survival rates of 83.35% at 5 years, 67.3% at 15 years, and 50% at 20 years; this prosthetic solution seems attractive in certain clinical situations [5, 6].

This article illustrates a maxillary rehabilitation employing a combination of fixed partial denture and removable partial denture therapy, incorporating extracoronal semi-precision attachments. The aim of this work was to provide a didactic presentation, through a clinical case.

CLINICAL REPORT

A 55-year-old patient in good overall health consulted the removable partial denture department Faculty of Dentistry, University of Monastir (Monastir, Tunisia) following the loosening of an old maxillary bridge. The patient was cooperative and very concerned about her appearance.

In the initial clinical examination revealed the presence of extensive bilateral posterior terminal edentulism in the maxilla; with anterior embedded edentulism(fig1).

The edentulous ridge was well-formed and covered with firm, adherent fibrous mucosa, except at the site of the embedded edentulous space where the fibro mucosa was smooth and reddish, indicating pressure

from the fractured temporary bridge abutments. The palate was broad and moderately deep.

The residual teeth (11, 12, 13, 14, 25) were prepared and gingival inflammation around them. Tooth 13 was restored with an inlay-core.

The mandibular arch exhibited extensive bilateral posterior terminal edentulism. The remaining teeth (44, 43, 42, 41, 31, 32, 33, 34, and 35) showed no mobility or caries but presented with tartar deposits and generalized recession of 3 mm. A knife-edged was covered with thin and adherent mucosa.

Figure 1: Pretreatment frontal view

Radiographic examination showed horizontal bone loss extending to the middle third in the mandible and maxilla. occlusal vertical dimension (OVD) was maintained, and the occlusal plane needs to be restored (fig2).

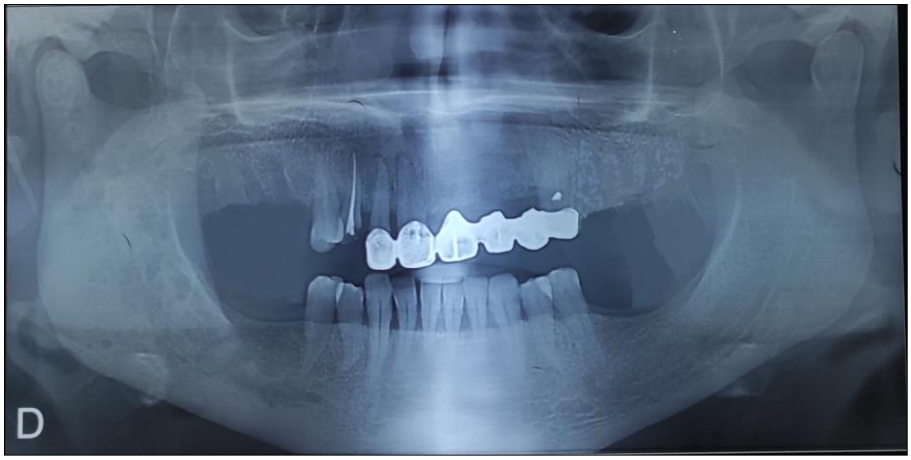

Figure 2: Panoramic radiograph of pretreatment condition

Given this situation, the treatment objectives are to:

- Restore aesthetics.
- Restore functional anterior guidance.
- Replace missing teeth with a removable partial denture with metal framework.

After discussion with the patient, implant-supported fixed prosthesis or implant-stabilized removable partial denture options were dismissed due to financial constraints. Therefore, the chosen therapeutic decision for the maxilla was a combined complex prosthesis: an association between tooth-supported FPD fixed partial denture and RPD removable partial denture with attachments as retention mean.

For the mandible, a resin removable partial denture was indicated due to the unfavrobale dento-parodontal condition.

The prosthetic steps began with the preparation of teeth 14, 13, 12, 11, and 24, followed by the fabrication of first-generation temporary fixed prostheses. The full-arch maxillary impression for the fixed prosthesis was taken using the wash technique with low and high viscosity silicones (fig 3). The occlusal registration was performed in the correct centric relation and vertical dimension of occlusion (fig 4).

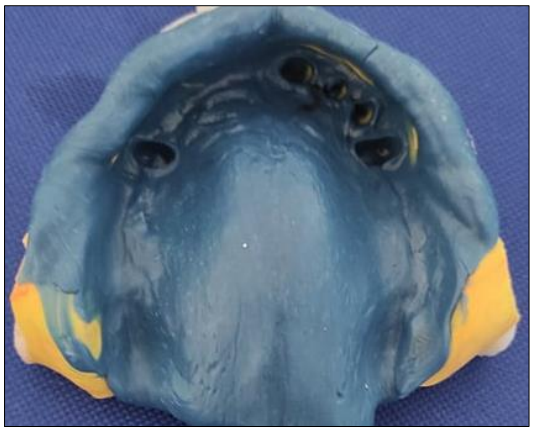

Figure 3: Global impression

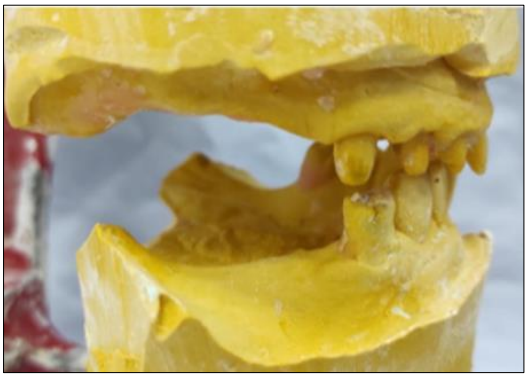

Figure 4: Occlusion recording

The milling and positioning of the male parts of the attachments were carried out on the wax model of the fixed prosthesis, following an axis perpendicular to the occlusal plane, using a dental surveyor (fig 5).

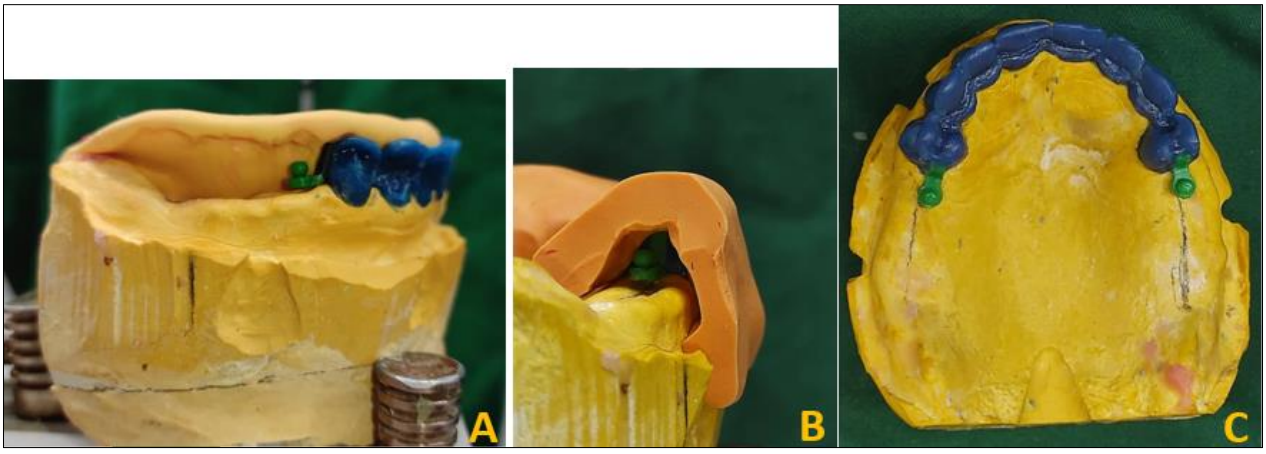

Figure 5: Three-dimensional positioning of the male part of the attachment using silicone keys

Once the fixed prostheses were fabricated, a try-in was performed. This try-in aimed to verify the adaptation, the occlusion, and to select the color of the cosmetic material for mounting the aesthetic veneers in the laboratory.

After mounting the ceramic aesthetic veneers, a second try-in of the bridge in the mouth and occlusal control was performed.

Anatomo-functional situational impressions for the construction of the framework were taken. For this purpose, the fixed prostheses were not cemented. A global anatomofunctional impression was taken in the mandible (fig 6).

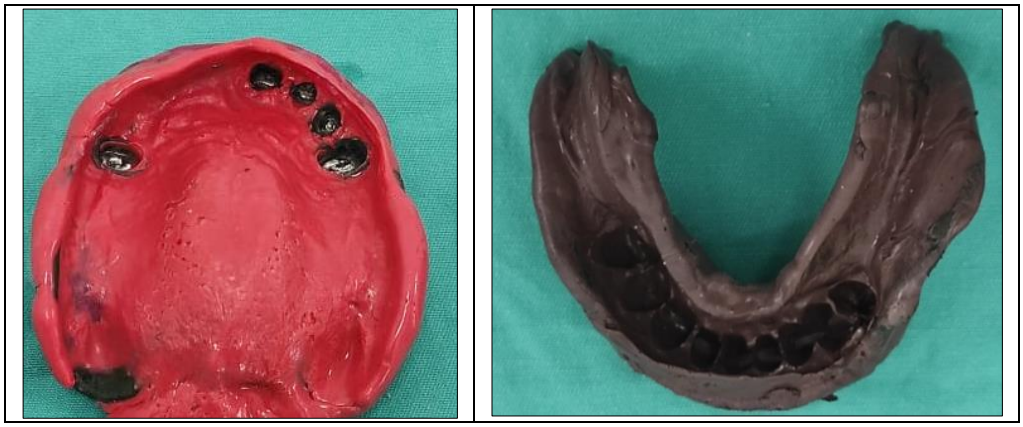

Figure 6: Maxillary and mandibular anatomofunctional impressions

The maxillary metal framework was fabricated framework on the cast derived from the anatomofunctional impressions following the guidelines provided by the practitioner (fig 7). The framework was tried in mouth (fig 8).

Figure 7: 7 A: Sculpting on wax of the framework; 7B: The well-fitting of the metal framework into the fixed prosthesis

Figure 8: Framework Try in mouth

Occlusal registration was done (fig 9), and the arrangement of the prosthetic teeth must adhere to functional mounting rules, ensuring harmonization of occlusal curves according to the chosen occluso-prosthetic scheme (fig 10).

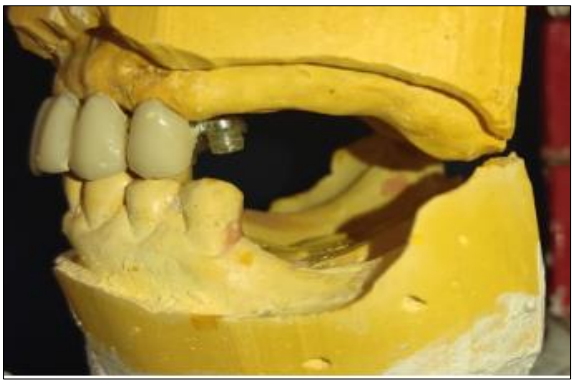

Figure 9: Occlusal registration for maxillary metallic RPD

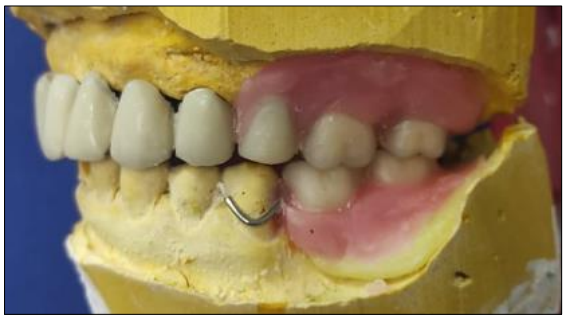

Figure 10: Prosthetic teeth mounting

Once the assembly of the prosthetic teeth is validated in the mouth, the laboratory technician proceeds to polymerize the resin.

On the insertion appointment, the fixed prostheses were cemented, and the female parts of the attachments were integrated into the intrados of the maxillary framework. The patient (fig 11) appreciated the aesthetic integration.

Figure 11: Maxillar and mandibular final rehabilitations

Periodic follow-up appointments are planned to check the integrity of the prosthetic restoration and to replace the female components of the attachments after wear, which clinically manifests as a loss of retention of the framework.

DISCUSSION

The distal extension RPD presents difficulties in design and performance of the prosthesis due to the difference in nature of the tissues supporting the prosthesis. Under function, the teeth are displaced by 0.2 mm into the periodontal ligament, whereas the mucosa overlying the residual alveolar bone may be displaced by as much as 1 mm [7]. As a result, there exists a significant difference in the support offered by the teeth and the residual ridge to the distal extension RPD. This difference in compressibility also results in rotation of the RPD around a horizontal axis extending between the distal rests of the terminal abutments [8]. Over a long-term, this may lead to accelerated bone loss of the edentulous ridge and loss of the terminal abutment teeth.

For these reasons, In the case of a combined prosthesis restoring this type of edentulism, the chosen attachment should be articulated to allow the saddle freedom of movement and prevent scoliodontic forces on the abutment teeth. The prosthesis design is based on the rigid-semi-rigid biomechanical concept [9-11].

Precision attachment refers to a connection involving two or more components. It entails mechanically joining one part to the implant, tooth root, or prosthesis, while the other part is attached to the prosthetic. These attachments allow for the combination of benefits from fixed teeth and removable dentures, presenting a versatile solution. Notably, in the early 20th century, Dr. Herman Chayes was the pioneer in describing the formation of attachments [12].

The use of attachments meets the aesthetic demand of the patient compared to visible clasps with their vestibular retentive arms.

From a functional standpoint, the retention provided by the attachments was superior to that of the clasps due to the association with milling. These devices will ensure the functions of support and stabilization and will enhance retention through frictional forces. The attachment, only ensures retention to prevent premature wear [13].

The thoughtful design of the prosthetic project, aiming to maximize the elements of support, stabilization, and direct and indirect retention, aims to control the destabilizing movements of the prosthesis to, thus becoming one of the keys to therapeutic success.

Removable dentures associated with attachments also exhibit some negative aspects such as: extensive dental crown preparation, financial burden, time-consuming and complex clinical and laboratory procedures. Other relevant aspects that must be pointed out are the integrity of the metal surfaces in contact with one another, in which longevity is related to their resistance to attrition wear, in addition to the difficulty in performing repairs.

Moreover, there are other possible disadvantages to consider, such as the abutment crown height of 4.0 to 6.0 mm required for a suitable retention and attachment functionality, need for root canal treatment in some teeth in an unfavorable position, and more invasive crown preparations for intracoronal attachments. In addition to taking the biomechanical aspects into consideration, periodic follow-up is essential to avoid damage to the support structures and guarantee adequate long-term function and esthetics [3].

CONCLUSION

Combined prostheses still have a good place as a treatment option for partially edentulous patients. The use of attachments provides a better esthetic appearance and improved retention and function than does a conventional clasp-retained RPD. This therapeutic approach requires knowledge and skills on the part of the dentist and the prosthetist as well as a rigorous prosthetic study.

Conflict of Interest: None

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