Rehabilitation with Fixed Prosthodontics Associated with Removable Partial Prosthesis: A 5-Year Follow-Up Clinical Evaluation

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Abstract

Dental implants are a common and successful option for the rehabilitation of edentulous areas. However, there are some limitations to their use. The present clinical report describes a 5-year follow-up of maxillary rehabilitation using an attachment-retained removable partial denture (RPD) associated with fixed partial denture (FPD) units as an alternative to orthodontic treatment associated with orthognathic surgery and dental implant placement. Rehabilitation with fixed prosthodontics associated with a removable partial prosthesis was proposed. For greater precision and stability, a gold attachment was prepared. The patient was very satisfied with the rehabilitation and has been clinically followed for 5 years. In cases where the use of dental implants and/or conventional FPDs is limited or not indicate the association between an FPD and an RPD by means of attachments remains an important alternative to conventional clasp-retained RPDs.

Keywords: *Dental prosthesis, fixed partial denture, malocclusions, removable partial denture*

Introduction

Rehabilitation with dental prostheses represents a significant portion of everyday clinical practice, although removable prosthodontics has been considered by many to represent a second-tier therapy.[1-3]

With the increased number of teeth requiring preservation due to the aging of the population, many types of edentulous spaces have been restored with dental implants.[4] However, medical contraindications, negative patient attitudes toward surgeries, and financial issues can limit the universal applicability of dental implants. When the use of dental implants and/or conventional fixed partial dentures (FPDs) is limited or not indicated, other clinical options are available. The association between an FPD and a removable partial denture (RPD) by means of attachments remains an important alternative to conventional clasp-retained RPDs.[5-7]

Case Report

Patient JBV, a 60–year-old man,was unsatisfied with his smile esthetic and masticatory function [Figure 1]. A radiographic examination revealed the presence of metallic cores in teeth 21, 11, 13, and 15 and satisfactory endodontic treatments. A periapical radiolucent area in tooth 11 related to a previous apicoectomy surgery was observed to remain under control [Figure 2]. Severe resorption of maxillary ridge height and an aerated left maxillary sinus was observed on computed tomography. Despite the history of periodontitis, which culminated in significant bone loss [Figure 2], the periodontal support was healthy, with the absence of periodontal pockets and bleeding on probing. During anamnesis, the patient reported no interest in having oral surgeries.

To elaborate on the treatment plan, irreversible hydrocolloid impressions (Jeltrate; Dentsply) were taken to obtain type IV stone diagnostic casts (Herostone; Coltene). The stone casts were transferred to a semi-adjustable articulator (A7 Plus; Bio-Art).

A provisional removable partial prosthesis was created using a thermopolymerized acrylic resin in the upper edentulous area to provide initial occlusal stability.

After intraoral physical examination, creation of the study models, and analyses

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of the complementary examinations, different treatment plans were proposed: (1) correction of malocclusion, diagnosed as Class III malocclusion, by means of orthodontic treatment associated with orthognathic surgery and prosthetic rehabilitation; (2) maxillary sinus surgery on the left side followed by implant installation and prosthetic rehabilitation; and (3) rehabilitation of the edentulous area with fixed prosthodontics associated with a removable partial prosthesis with attachments. After considering the cost-benefit analysis of each treatment option, the team and the patient decided on the third option.

Subsequently, the diagnostic wax models of all future crowns were prepared in stone casts [Figure 3] and *in situ*. Provisional crowns were made using the indirect technique with artificial teeth (Vivodent; Ivoclar Vivadent) and acrylic resin. Endodontic treatments and metallic cores of tooth 12 were created. The old metallic cores for teeth 21, 11, 13, and 15 were very bulky, and the remaining root dentin was very thin. Thus, it was decided to keep the cores in place.

The tooth preparation for the full veneers aimed to establish axial wall tapering. The provisional crowns were adapted, adjusted, and fixed with temporary cement (RelyX Temp NE; 3M-ESPE). In the following weeks, the esthetics and phonetics of the prosthodontics and the accommodation of the periodontal tissue parameters were evaluated.

Afterward, individual acrylic resin (Patter Resin LS; GC America) copings were obtained. A master impression of each tooth was taken using regular polyether material (Impregum; 3M-ESPE) to remove the acrylic copings and to further obtain individual casts in type IV stone (Herostone; Coltene). Subsequently, silicone impressions were also obtained with the individual copings in position (Empress XT; 3M-ESPE). Stone models were made and transferred to semi-adjustable articulators (A7 Plus; Bio-Art).

The crowns were waxed on working models, and attachments were milled on wax. These attachments were located in the palatal surface of the left central incisor and on the occlusal surfaces between the right premolars. Waxing reductions for the delineation of metallic copings and the separation of solder joints were performed [Figure 4]. The five solder joints were created individually with lasers. The copings and solder joints were cast in NiCr alloy (MeAlloy; Dentsply). In a subsequent session, a trial of the framework and recordings in acrylic resin was performed (Pattern Resin LS; GC America) [Figure 5]. Silicone impressions of the addition (Express XT; 3M-ESPE) were taken. The model was completed (Herostone; Coltene) and transferred to a semi-adjustable articulator (A7 Plus; Bio-Art). Feldspathic porcelain full veneers were fabricated using a conventional laboratory refractory technique. With the metalloceramic full veneers in position, functional and esthetic adjustments were carried out *in situ*.

Once adjusted, the crowns were sent to the laboratory to cast the metal framework of the RPD and its attachments. The attachments and RPD were waxed and cast at different times. RPD was cast in CoCr alloy, and the attachments were cast in gold alloy. Finally, the attachments were welded to the metal RPD framework. After polishing, the adaptation of the attachments to the crowns was verified *in situ*. Artificial teeth (Vivodent; Ivoclar Vivadent) were assembled

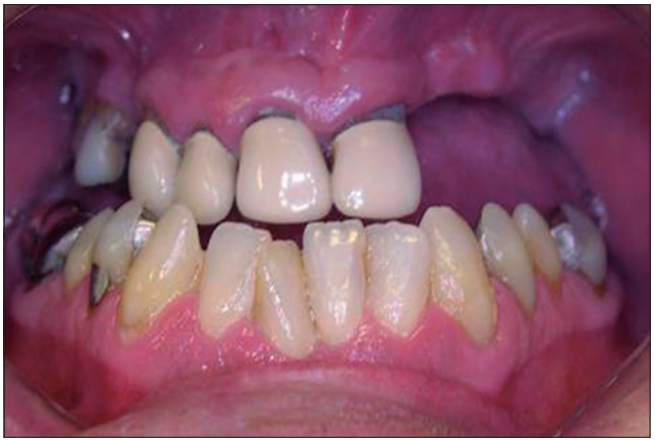

Figure 1: Initial situation of patient with unsatisfied esthetic and masticatory function

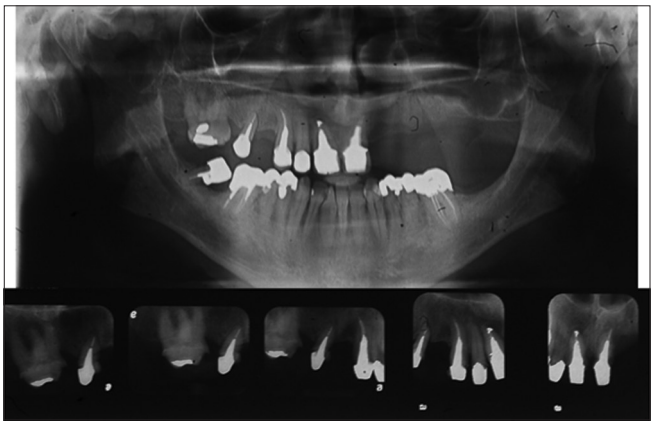

Figure 2: Digital panoramic radiography

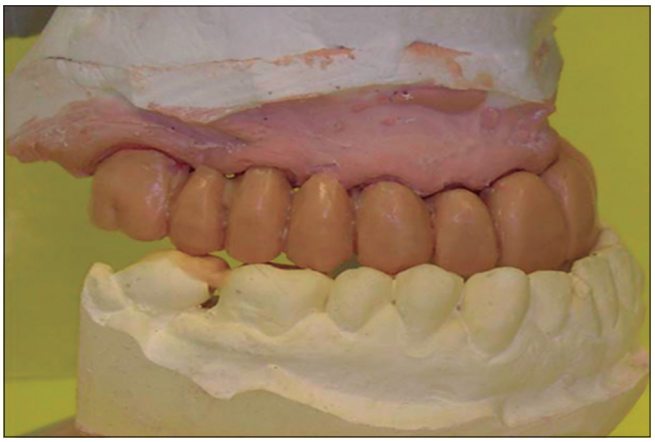

Figure 3: Articulator with the diagnostic wax models of all future crowns

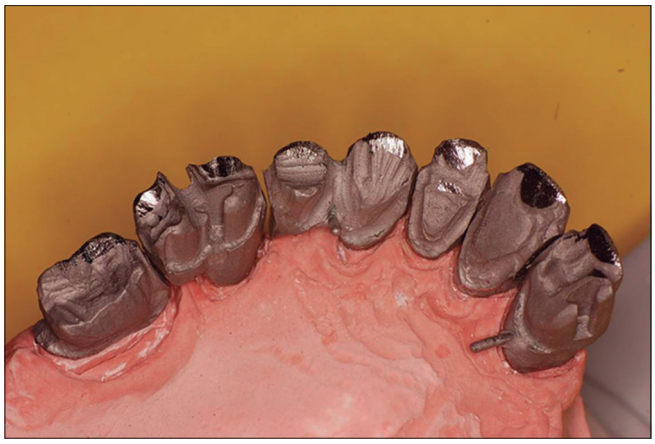

Figure 4: Metallic copings and solder joints

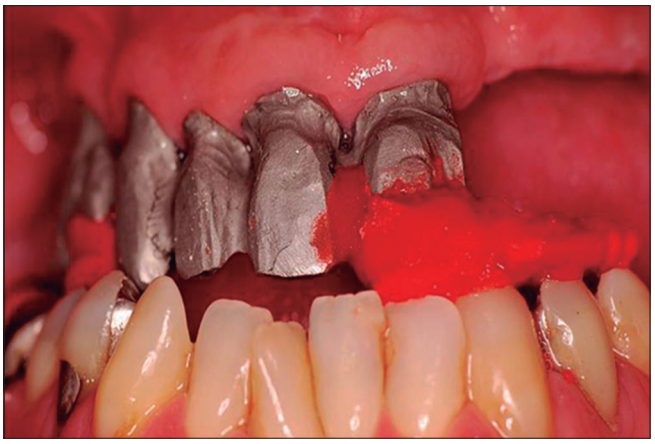

Figure 5: Trial of the framework and recordings in acrylic resin *in situ*

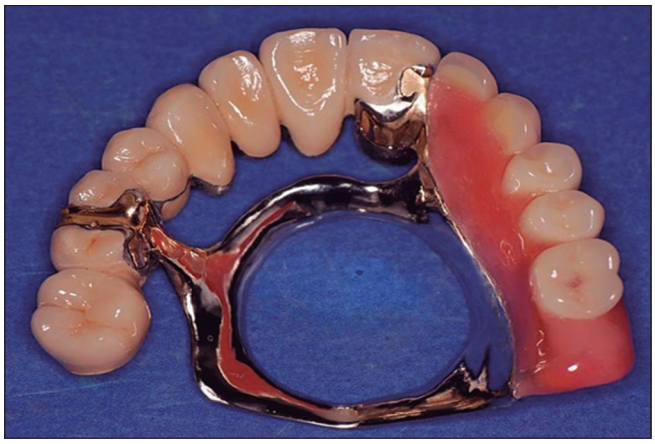

Figure 6: Prosthesis in acrylic resin thermopolymerized with all ceramic target teeth

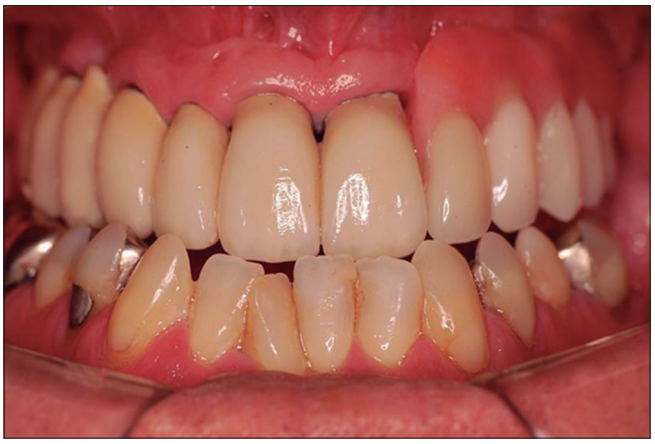

Figure 7: Final cementation of fixed partial denture and installation of attachment-retained removable partial denture

on the RPD framework, and the patient's occlusion was adjusted. Laboratory procedures were performed through the standard inclusion in wax to obtain gingival prosthesis in acrylic resin thermopolymerized color 2 (VIPI Cril Plus, VIPI) simultaneous with the application of ceramic glaze target teeth [Figure 6]. Finally, provisional cementation of the crowns was done with provisional cement, and RPD was installed. After 30 days, the final cementation was performed with zinc phosphate cement (Cement LS; Coltene) [Figure 7]. The patient returned for appointments every 6 months for 5 years. Veneers were intact without any chipping, discoloration, or other complications. The patient was highly satisfied [Figure 8].

Discussion

Different treatment options should be offered to patients after considering the individual patient's general health status, local risk factors, total treatment cost and time, and the status of the remaining teeth, as well as their periodontal support and bone health.[1,8]

In the reported case, the patient exhibited skeletal Class III deformities with loss of occlusal guidance.[9] In light of the clinical challenge, a combined orthodontic and orthognathic surgical procedure was indicated.[10] However, the patient was reluctant to undergo surgery. The decision to maintain the metal posts with the thin remaining root dentin was made because their removal would generate great tension and could increase the risk of root fracture.[11]

Moldovan *et al*., through a systematic review and meta-analysis of the survival rates of RPDs in the moderately reduced dentition, reported that RPDs, given suitable pretreatment and follow-up regimes, can provide satisfactory solutions.[12] The association between FPD and RPD using attachments, the option used in the reported case, represents an important alternative to a conventional clasp-retained RPD. Despite the desirable improvement in esthetic appearance and retention and the functional efficiency obtained with these systems, biomechanical factors must be considered to guide the therapeutic decision and treatment plan. The advantages of an attachment-retained RPD are the improvement in esthetics, as clasps are not used in the anterior region and biomechanics, given that less torque is applied to the abutment teeth in a cervical direction during functional movements.[6,13-15]

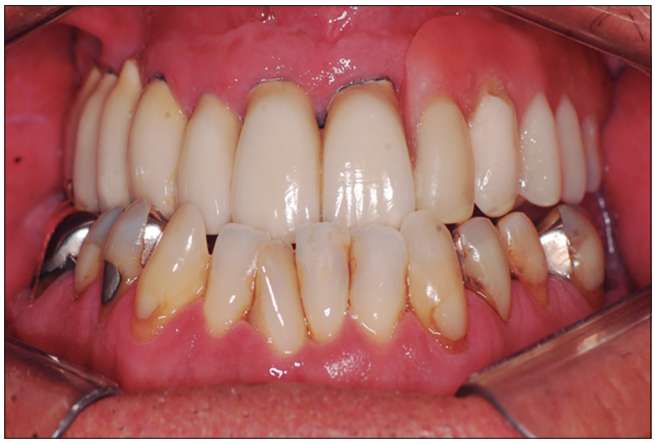

Figure 8: Attachment-retained removable partial denture associated with fixed partial denture after 5 years

Conclusions

The association between an FPD and RPD by means of attachments represents an important alternative to a conventional clasp-retained RPD in cases where the use of dental implants and/or conventional FPDs is limited or not indicated.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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