Removable Partial Denture in Combination with a Milled Fixed Partial Prosthesis as Interim Restorations in Long-Term Treatment

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Abstract

Interim restorations are frequently used in prosthodontic treatments. Many complex situations require the combination of fixed and removable partial prostheses. An appropriate interim restoration design that accurately implements the treatment plan is necessary to prepare the oral cavity for the prostheses, and to contribute to the preservation and health of remaining natural teeth, bone support, and gingival tissues. This report describes a modified technique for construction of interim restorations with a combination of fixed and removable partial prostheses. The technique consists of the construction of a milled fixed prosthesis and removable partial denture with metallic framework for use during extensive treatment, improving masticatory function and esthetics and preserving the periodontal health of supporting structures. This interim restoration can also serve as a template for the definitive restoration, allowing patient and dentist to evaluate appearance and function and helping to ensure the success of the definitive restoration.

Prosthodontic treatments with combinations of fixed and removable partial prostheses are extremely complex, due in large part to the time involved in periodontic and endodontic treatment and surgical procedures, in addition to construction of the prostheses. Interim restorations are frequently used in prosthodontic treatment. Many complex situations require fixed and removable prostheses in the same arch, significantly increasing chair time and the length of treatment. Consequently, interim restorations must be adequate for long-term use.[1,2] Such interim restorations require minimal repair and help avoid uncomfortable and lengthy procedures that could compromise the definitive rehabilitation.

This phase of treatment is very important because of its potential to reduce problems that may be encountered with the definitive prostheses.[3] The interim restoration should provide a template for the definitive restoration and should be constructed based on sound principles of phonetics, esthetics, and adequate occlusion.[4]

The conventional interim removable partial denture (RPD) is fabricated from acrylic resin, usually heat cured, as no occlusal rests are provided. As a result, the RPD is not maintained in its predetermined position, but instead settles into the tissues, creating a periodontal problem around the terminal abutment teeth. In addition, movement into the soft tissues may result in a nonharmonious occlusion.[5]

The preservation of periodontal health, esthetics, and masticatory efficiency during extensive treatment is extremely important for maintaining healthy denture-supporting structures. At the same time, evaluation of appearance and function by dentist and patient during this phase helps ensure the success of the definitive restoration.[6]

It is important to recognize when to provide an interim prosthesis and how to construct it to satisfy patient needs,[7] preserve the oral tissues, and improve oral function.[8] Some materials and techniques that have been described for use in long-term interim restorations include interim fixed partial prostheses reinforced with stainless steel wire,[9] heat-processed acrylic resin reinforced with a 16- or 18-gauge cast metal framework,[10] autopolymerized acrylic resin reinforced with stainless steel orthodontic bands,[11] and heat-processed acrylic resin with opaqued metal casting.[2]

This report describes a protocol for rehabilitation of the maxillary or mandibular arch with an interim acrylic resin-milled fixed prosthesis and RPD with metallic framework in the first phase of rehabilitation treatment. These prostheses are designed to avoid functional and/or biological alterations of involved structures.

Technique

1. Make a full-arch impression with irreversible hydrocolloid (Hydrogum, Zhermack, Rovigo, Italy). Record a facebow transfer and centric relation, obtaining the diagnostic casts to be mounted in a semiadjustable articulator.
2. Formulate an interdisciplinary treatment plan with the aid of clinical and radiographic examination and diagnostic casts.
3. On the diagnostic cast, cut the teeth scheduled for extraction, contour the cast in this area, and prepare the remaining teeth to serve as abutments.
4. Construct the interim fixed prosthesis with milled surfaces, using the dental surveyor to assist in determining the path of insertion for the RPD. This restoration should demonstrate a straight emergence profile with optimal termination.
5. After the construction of interim fixed restorations, cast the framework of the removable partial prosthesis using a base metal (Cr–Co) alloy (Fig 1).
6. Verify the adaptation of the metallic framework on the interim acrylic crowns (Fig 2A–C). The superstructure should maintain a relief space for the soft tissues in extraction areas and provide for future implant placement (Fig 2D).
7. Surgical procedures should be performed after prosthetic procedures to avoid contamination of the surgical site.
8. Seat the interim-milled-fixed restorations and removable partial prosthesis. Reline margins of interim-fixed restorations with autopolymerizing resin to readapt them to the preparations. Next, seat the fixed and removable restorations together to maintain the path of insertion and reduce torque on the terminal abutment.
9. Remove excess material before complete setting of the provisional material to prevent potential undercuts from locking the crown into place; allow curing, then refine margins and repolish restorations.
10. The denture base over the area of the extractions can be lined with a soft material such as Coe Soft (GC America Inc., Alsip, IL) to aid healing of the planned extractions.
11. Verify occlusal adjustment and marginal fit before cementation (Fig 3).
12. Cement the interim restoration with a temporary luting agent and fit it precisely together with the RPD to determine the accurate path of insertion (Fig 4A and B).

Discussion

Patients who submit to extensive rehabilitation treatment often present with inadequate prostheses, inaccurate tooth arrangement, dental extrusions, malpositioned teeth, or periodontal problems. The restorative dentist also confronts the emotional problems of patients who often present with complicating conditions as a consequence of having avoided the extensive time required for proper rehabilitation. Thus, it is extremely important to shorten the period of rehabilitation as much as possible and to provide the patient with esthetic, comfortable, and functional restorations that contribute to successful treatment.

The procedure described in this report can be performed during a single appointment, usually 3 to 4 hours, and allows the dentist to spend less time on dental preparations. The restorative dentist should remove old prostheses, prepare teeth, perform necessary extractions, and set the interim restorations. The interim restorations should reestablish the correct arch curvature and vertical dimension as well as provide a harmonious occlusal plane.

Endodontic, periodontal, and surgical treatments should be carried out in a subsequent treatment phase after the first visit procedures. Adequate periodontal treatment is essential to preservation of the gingival condition and accurate marginal fit of interim restorations. In cases involving implant treatment, the interim prosthesis with a metallic framework provides a relief space over soft tissues to prevent injuries to the implant placement area and loading on submerged implants or tissue grafts during the healing phase.

The advantage of such interim restorations is that they are stronger and more resistant than conventional interim restorations. Thus, less time is spent repairing interim prostheses as a result of fractures. Interim restorations also provide arch stabilization, preserve the path of insertion, maintain vertical dimension and denture-supporting structures, enhance the esthetic appearance and comfort of the patient, and may be used as a template for the definitive restorations.

One disadvantage of this procedure is that it can be more expensive and require a more experienced professional. Over the long term, however, the procedure is advantageous because fewer visits for repair are needed, and the interim restorations fracture less often. The clasps of the RPD may cause wear on the surface of an acrylic resin-fixed prosthesis, but this occurs rarely.

The procedure described is indicated for lengthy restorations, when the dental treatment involves complex and extensive procedures such as surgical, periodontal, or endodontic treatments and when fixed prostheses and removable partial prostheses are needed in the same arch. This protocol has been successfully used in the postgraduate prosthodontic clinic of the Araçatuba School of Dentistry at São Paulo State University for more than 8 years, reducing appointment times for rehabilitation, fulfilling patient expectations during the treatment, and improving the final result.

Summary

A modified technique for fabrication of interim restorations for long-term treatment in cases involving combined prostheses (fixed partial prosthesis with RPD) was described. This type of interim prosthesis allows maintenance of periodontal health, provides adequate and esthetic occlusal function for

Figure 1 Interim removable partial prosthesis in combination with milled fixed prosthesis. The arrows indicate the lingual rests.

Figure 3 Occlusal view of interim prostheses. Note the precise fit of the clasps and rests on the teeth.

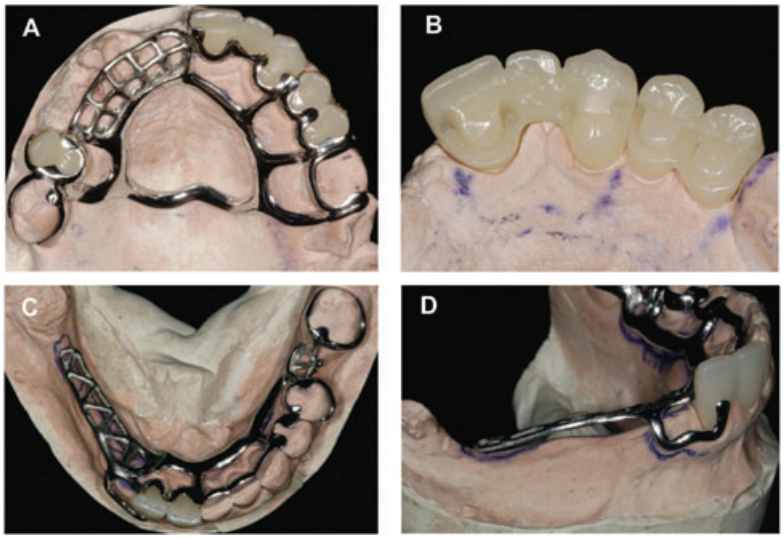

Figure 2 (A) Example of accurate adaptation of metallic framework (Cr–Co alloy) positioned on the milled fixed prosthesis. (B) Milled surfaces in the heat-polymerized acrylic resin interim restoration. (C) Note the adaptation of the metallic framework. (D) Framework with a relief space on the soft tissues in the case of future implant placement.

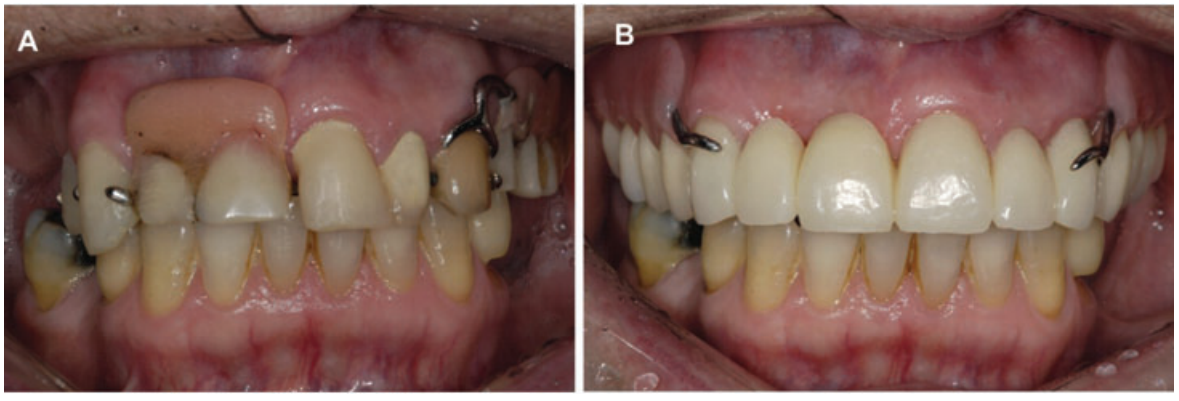

Figure 4 (A) Initial view of the case. (B) Frontal view of interim prosthesis placement.

extensive treatments, and can serve as a template for the definitive restoration. The milled surfaces of the fixed prosthesis permit a suitable path of insertion for the RPD of Cr–Co alloy, and avoid its seating on soft tissues. These interim restorations enhance esthetics and function for the patient.

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