

Long-Term Interim Fixed Prosthesis Reinforced with Metal Casting

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Received: August 26, 2017; **Published:** September 25, 2017

Abstract

Interim prosthesis is frequently used in prosthodontics treatments. Extensive prosthodontics treatment as an oral rehabilitation requires fabrication of long-term interim prosthesis. Acrylic resin used in interim restoration mainly fails due to fractures. During extended oral rehabilitation with fixed partial prosthesis, high strength interim prosthesis are often required to protect hard and soft tissues, avoid dental mobility and to give the clinician and patient a chance to evaluate appearance and functions before the placement of the definitive prosthesis. Due to the low durability of acrylic resin in long-term use, the use of reinforced materials such as metal castings or spot-welded stainless steel matrix bands, are indicated in cases of long-term treatment. This report describes an easy technique for fabricating a fixed interim prosthesis based on a diagnostic wax-up using acrylic resin and a cast metallic reinforcement.

Keywords: *Interim Prosthesis; Reinforced; Metal Casting*

Introduction

Extensive prosthodontics treatment often requires fabrication of long term provisional restorations. Fixed provisional prosthesis are indicated for partially edentulous patients undergoing implant therapy when teeth adjacent to the edentulous area are restored with full coverage crowns. In these cases provisional restorations aids in protection of dental pulp, periodontal tissues, prevent tooth movement, and allow proper mastication and esthetics. long-term use of interim prosthesis requires more durable materials [1]. Many materials have been used to reinforce interim prosthesis, and a number of authors have described methods of adding metal reinforcing structures to acrylic resin interim prosthesis [1-8], including castings, spot-welded stainless steel matrix bands, and precut stainless steel mesh. Carbon fibers [9] and wire have also been used to improve the strength of the restoration [10]. To achieve clinical success, the dentist should understand the importance of the interim prosthesis to the outcome of the definitive restoration. This paper describes a laboratory technique for fabricating a reinforced interim acrylic resin prosthesis with a cast metal framework.

Procedure and Technique

The technique is described in a patient requiring full mouth rehabilitation by replacement of all failed fixed prosthesis that restored all maxillary and mandibular teeth except mandibular anterior teeth, and which include "old long conventional fixed partial prosthesis" restoring the left mandibular area [third quadrant]. The cast metal framework was used because an Osseo integrated implants was planned to replace missing teeth in the mandibular left quadrant [first premolar, second premolar and first molar], that requiring long-term reliance on the interim prosthesis. The prosthesis was made according to the following steps):

1. A maxillary and mandibular impressions were made using irreversible hydrocolloid (Bosworth Super Gel, Regular set contents, USA. The impression was poured using type III dental stone (DURGUIX, Gesso PietraDuro, Protechno, (GIRONA) SPAIN) to make a diagnostic cast.

2. Centric relation, inter-occlusal records and face bow transfer were used to mount the diagnostic cast on semi adjustable articulator (Hanaw wide Vue). articulator programmed using the protrusive record and Hanaw equation.
3. Diagnostic wax-up was then carried out at the existing occlusal vertical dimension, (Figure 1). Diagnostic wax-up were used to fabricate provisional restoration using autopolymerized acrylic resin.



Figure 1: Diagnostic wax.

4. Old defective fixed restoration was removed and caries control was carried out for an abutment teeth. Mandibular impression was done using irreversible hydrocolloid impression material, then the provisional restoration was relined and placed on the prepared teeth.
5. The secondary impression poured with type IV dental stone in order to use the cast for the fabrication of delete it reinforced provisional restoration.
6. Separating media applied on the working area in the cast (Figure 2).

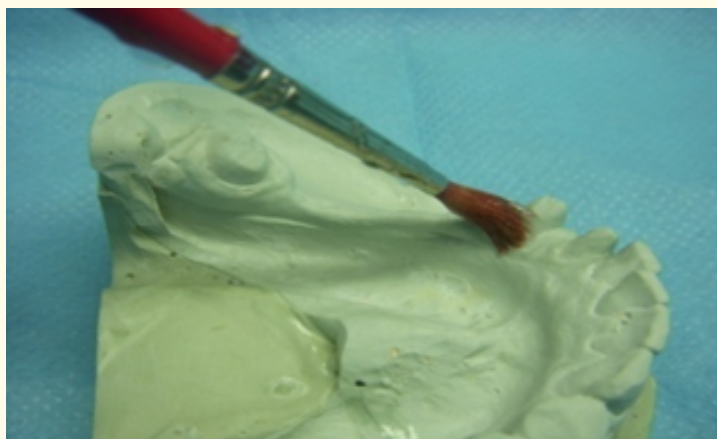


Figure 2: Separating media application.

7. The acrylic resin pattern (Duralay; Reliance Dental Mfg. Co., Worth, IL) for the metal framework was applied on the lingual surface of mandibular left abutments 2 mm coronal to the finish line and they were connected together using 10 gauge sprue wax (Figure 3).

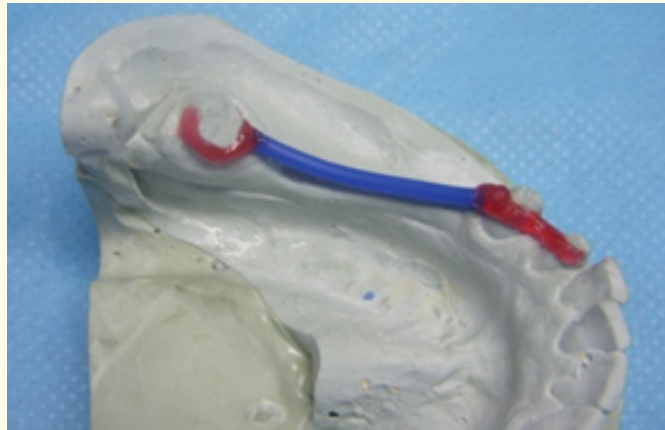


Figure 3: Wax pattern of a substructure.

8. Two matrices of the waxed teeth were made using the laboratory putty (sil-tech, Williams Ivoclar north America, Inc.; Amherst, n.y.), and the adjacent teeth were included to index the matrix. The first matrix was sectioned and used to evaluate space available for acrylic resin around the framework.
9. Space for acrylic resin around the waxed framework checked with the first matrix and adjusted. Framework was invested and casted using “Ni-Cr” base metal alloy (Wirron 99). Other alloys may be used if preferred. The sprues were then removed, and the casting was seated on the master cast, finished and polished (Figure 4 and 5).

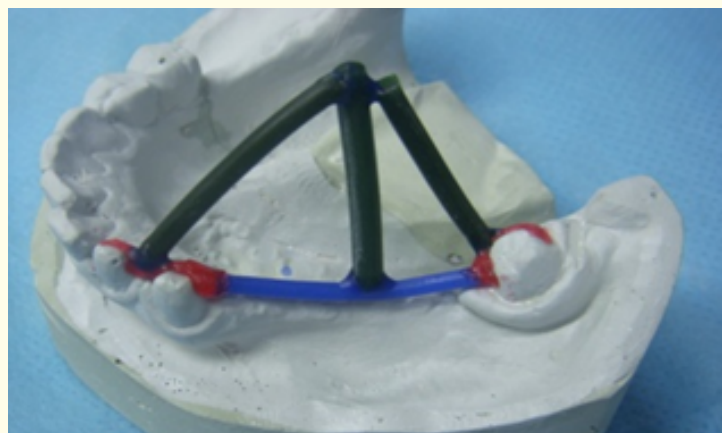


Figure 4: Wax pattern sprued.



Figure 5: Lingual view of the metal substructure adapted on the cast.

10. A Mix of autopolymerizing acrylic resin of the correct color selection were incrementally added to the second matrix. The matrix placed properly on the metal frame seated on the cast. (The poly methyl methacrylate temporary resin acrylic material used were BOSWORTH TRIM PLUS made by Skokie, IL, USA).
11. The matrix was secured in place on the cast with rubber bands and were placed in a pressure pot. Polymerize in water at 20°C and then vacuumed for 15 minutes (Figure 6).



Figure 6: Working cast in a pressure pot.

12. The polymerized provisional restoration were then removed from the master cast and necessary adjustments took place after that, “that will facilitate reseating it easily and precisely on the cast” (Figure 7).



Figure 7: Occlusal view of reinforced interim prosthesis after polishing.

13. The provisional restoration were then polished, tried in patient mouth and then cemented with a temporary luting agent (TempBond) (Figure 8).



Figure 8: Occlusal view of reinforced interim prosthesis in the patient mouth.

Discussion

This technique uses autopolymerized acrylic resin reinforced with a cast metal framework to prevent the multiple fractures and lack of retention that could occur if the occlusal load was born by the resin alone [8]. The reinforcement eliminates fractures and provides a significant improvement in rigidity and longevity of the interim prosthesis [11]. According to Binkley and Irvin, metal reinforced fixed interim prosthesis display advantages such as favorable periodontal contours, stable occlusion [12], more strength, greater esthetic satisfaction, less time spent repairing provisional restorations [2], and greater patient acceptance. Reduction of flexion in the restoration minimizes the progressive loss of cement and diminishes the chance of recurrent decay, reduces the amount of acrylic resin necessary for strength in the interproximal spaces, facilitates oral hygiene, provides occlusal stability and maintenance of vertical dimension [5]. The occlusion, tooth contours and pontic design developed in the interim prosthesis can be duplicated in the definitive restoration [7]. The choice of heat-processed acrylic resin could provide an interim prosthesis of greater strength and stability for longer periods than autopolymerized resin. The maintenance of long -term provisional treatment in association with procedures such as alveoloplasty, tissue augmentation, dental implant placement, endodontic therapy, and orthodontics is frequently useful [11]. one advantage is that the prosthesis is able to function from the presurgical through the surgical stages until the insertion of the definitive fixed and implant supported restoration.

Conclusions

In long-term treatments, the reinforcement of long-term interim prosthesis is indicated to maintain periodontal health, comfort, and function, and to avoid fractures during the rehabilitation period.

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Volume 14 Issue 5 September 2017

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