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Multiple Modification Technique in Fabricating Provisional Restoration of Fixed Partial Denture

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Abstract:

A properly fabricated provisional restoration is important in achieving a successful fixed partial denture treatment. Provisional restoration is an important part in fixed partial denture treatment in pertaining the marginal integrity, function, occlusion, and esthetics. There are varieties of techniques available to suit the individual needs of the clinician and of the clinical situation, from a single unit to a complete-arch provisional fixed prosthesis. A part from it few modifications have been described in the techniques to achieve a better provisional restoration.

Key words: Direct procedure, Fixed Partial Denture, Indirect procedure, Provisional restoration, Temporization

1. Introduction

Provisional restorations are important components in prosthodontic treatment. Though the word provisional conveys the notion that it is unimportant, the dentist must still maintain high clinical efficiency and treatment quality for the patient. Experience shows that time and effort invested in fulfilling the requisites of provisional restoration will result in patient satisfaction. Provisional restoration is defined as “A fixed or removable prosthesis designed to enhance esthetics, stabilization and/or function for a limited period of time, after which it is to be replaced by a definitive prosthesis. Often such prostheses are used to assist in the determination of the therapeutic effectiveness of a specific treatment plan or the form and function of the planned for definitive prosthesis” [1]. The interim restorations are essential for prosthodontic treatment after initial tooth preparation, an interim restoration must be provided until the definitive prosthesis is placed. The requirements of interim restoration are essentially the same as that of permanent restoration. The requirements of provisional restoration are biologic, mechanical and esthetic [2] [3].

1.1. Biologic Requirement

- Pulp protection
- Periodontal health
- Occlusal compatibility and tooth position
- Marginal integrity
- Prevent enamel fracture

1.2. Mechanical Requirement

- Function: Chewing
- Disadvantage: the strength of methyl methacrylate is one-twentieth that of metal ceramic alloy and during preparing fracture are more common
- Esthetics: Better appearance and harmonious with the other dental tissues

2. Conventional Techniques of Fabricating Provisional Restorations

2.1. Direct Procedure

Provisional restorations are fabricated directly on the patient's prepared teeth, the teeth and gingival tissue give the tissue surface form. However there is disadvantage in this technique as it can lead to tissue trauma from exothermic reaction of the polymerizing resin, chemical and bacterial insults due to inherent poorer marginal fit.

2.2. Indirect Procedure

An impression is made of the prepared teeth and ridge tissue and a cast is poured in quick-setting gypsum. The provisional restoration will be fabricated outside the mouth on the cast.

2.3. Indirect-Direct Procedure

In this technique the indirect components consists of custom made performed external surface foam similar to preformed polycarbonate crown. In most cases the practitioner uses a custom external surface foam with an under prepared diagnostic cast as tissue surface foam. The resulting mold forms a shell that is lined with additional resin after tooth preparation. This last step is the direct component of the procedure.

There is some failure in conventional techniques of fabricating provisional restorations. It extends chair side time. In some cases it may lead to gingival inflammation due to poor fabrication of the prosthesis hence some modification have been done in conventional techniques of fabricating provisional restorations. Some of these techniques are discussed in this article

3. Modification in the Techniques

Certain modifications in the conventional techniques of fabricating provisional restoration are done to increase the strength and esthetics. These modifications are discussed below:

- Modification in the direct technique
- Modification in the indirect direct technique
- Modification in the indirect technique
- Modification for reinforcement
- Modification for esthetics

3.1. Modification in the Direct Technique

3.1.1. Technique A [4]

It is a technique to make temporary restoration in occlusal harmony with silicone putty.

3.1.2. Procedure

- Silicone putty is manipulated and is positioned over the arch of the teeth to be prepared.
- Some time will be given to silicone putty to set later it will remove from the patient mouth and reduce the excess with a knife.
- It is relined with light body impression material.
- Tooth preparation is done.
- The composite auto polymerizing is placed in the silicone matrix.
- Now place this over the tooth prepared tooth and allow it to polymerize.
- As a precaution removes it before the final polymerization so that it will reduce the exothermic heat.
- Trimming and polishing will be done.

3.1.3. Technique B [5]

It is a direct technique for fabricating acrylic resin temporary crowns using omnivac.

3.1.4. Procedure

- Softened clear acetate sheet is placed over the diagnostic cast and placed in the vacuumator.
- Before removing the cast, the excess will be trimmed.
- Tooth preparation is done. 5.
- Place the acetate form over the prepared teeth to ensure sufficient tooth reduction.
- Tooth colored acrylic resin is mixed and placed in the acetate form.
- Petroleum jelly will be applied on prepared teeth to protect the soft tissue and pulp tissue from possible injury.
- Seat the acetate form with resin over the prepared tooth surface.
- After 2 minutes, dislodge the acetate from the prepared surface.
- Reseat and check then trim and level the margins.
- After checking the occlusion luting can be done.

3.1.5. Advantage

- Easy.
- Adequate tooth preparation is ensured as the acetate form act as matrix.

3.2. Modified Techniques for Indirect Direct Method

3.2.1. Technique A [6]

It is a technique for constructing a heat processed acrylic resin provisional restoration in the dental office.

3.2.2. Procedure

- A silicone mold is formed from the diagnostic wax up.
- Wax up is removed. The abutment teeth are under prepared in the cast.
- Biolon heat polymerizing acrylic resin is mixed and placed in the silicone mold over the under prepared in the cast.
- The assembly is placed in a pressure pot at 250°F at 3 psi for 3 minutes.
- The silicone mold is removed and provisional are obtained.
- Excess flash is removed.
- Reline with auto polymerizing resin over the tooth preparation. Thus the provisional are made to fit well.
- It will be polished and inserted.

3.2.3. Advantage

- No requirement for flasking
- Excellent fit and good looking

3.2.4. Disadvantage

- Lengthy procedure

3.3. Indirect Method

- Silicone mold is formed from the diagnostic wax up.
- Impression is made from the prepared area.
- A plaster cast in generated.
- Biolon is manipulated and placed in the silicon mold over the plaster cast.
- It is kept for curing in a pressure pot.

3.3.1. Advantage

- No need flasking
- No relining

3.4. Modification in the Indirect Techniques

3.4.1. Technique A [7]

It is a technique that utilizes vinyl polysiloxane die to create accurate indirect interim restorations

3.4.2. Procedure

- A half arch impression is recorded through a rigidly setting monophasic vinyl polysiloxane impression material then tooth preparation is done.
- Make a half arch irreversible hydrocolloid impression of the tooth preparation.
- Syringe rigid monophasic vinyl polysiloxane in to the irreversible hydrocolloid impression to generate a die.
- Fill the preliminary vinyl polysiloxane impression of the unprepared tooth with an acrylic resin.
- Press the polyvinyl siloxane die preparation in to the impression and fully seat the die.
- After curing of the acrylic resin, recover it, trim and polish the interim restoration.

3.4.3. Technique B [8]

It is a technique for provisional fabrication

- A cast was generated using irreversible hydrocolloid material. After diagnostic wax up, a thermoplastic template is made over it. The thermoplastic template was relined with polyvinyl siloxane on only over the areas to be restored for better detail production.
- After the tooth preparations, an irreversible hydrocolloid impression is made and it is poured with polyvinyl siloxane impression material.

- Fill the template with a mixture of desired shade of autopolymerizing resin and place it on the siloxane working cast.
- After removing and trimming the provisionals, reline it intraorally for good marginal adaptation.

3.4.4. Advantage

It produces restoration with definitive anatomy with minimal adjustments.

3.5. Modification for Reinforcement

3.5.1. Technique A [9]

It is a procedure for fabricating reinforced, heat processed, acrylic resin provisional restorations based on a diagnostic wax-up.

3.5.2. Procedure

- Construct a diagnostic wax up on a cast mounted with a semi adjustable articulator.
- Record a complete arch impression on the prepared teeth with reversible or irreversible hydrocolloid and produce a cast.
- Make two matrices with silicone putty from the diagnostic wax up cast.
- First matrix is used to evaluate the space available for acrylic resin around the frame work.
- In the second matrix make 2mm wide access holes using a round bur.
- Wax copings are done in the abutments and connect them with 10 gauge sprue wax.
- Casting is done and metal frame work is obtained.
- The metal frame work and the second matrix placed over the cast.
- The metal frame work is placed on the cast and wax up for provisional is done.
- Once curing is over, the whole assembly is retrieved.
- It is trimmed and polished and luting will be done.

3.5.3. Advantage

- Strong
- Good looking
- Periodontal compatible

3.6. Modification for Esthetic Enhancement

3.6.1. Colour

Custom color effects that simulate intrinsic and extrinsic stains, cracks, or hypocalcification of adjacent teeth may be added to provisional restoration with paint-on stain kits. These should be applied quickly, avoiding over manipulation, which causes streaking and surface roughness.

3.6.2. Technique A ^[10]

3.6.2.1. Procedure

- Provisional restoration are made and evaluated intraorally for its fit, marginal integrity and occlusion
- Palaseal (Heraeus Kulzer) is mixed with porcelain powder stain. This mixture is applied over restoration.
- It is photo polymerized

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3.6.2.2. Advantage

- Useful for teeth in esthetic zone
- Simple procedure

3.6.3. Translucency

The procedure requires two resins-one colored to match the body and one to match the enamel of the tooth. Some manufactures produce enamel of incisal shades that may be used without modification. When these are not available or when variation is needed, clear resin powder may be mixed with a smaller fraction of the “body” powder to produce the desired translucency.

3.6.4. Technique A

The enamel color resin is carefully bead-brushed onto the occlusal or incisal surface of the ESF and tapered to end at the middle or cervical third. The resin’s tendency to flow where it is not wanted can be controlled by orientation of the ESF with respect to gravity and by manipulation with the brush tip. When the desired distribution of enamel color resin is achieved, a disposable syringe is loaded with body color resin and ESF in immediately filled, avoiding disruption of the enamel color resin. The TSF is then positioned in the ESF, and normal procedures are followed. The result is a more natural – appearing provisional restoration with translucency in the incisal or occlusal portion that closely matches the existing dentition.

3.6.5. Technique B

In this procedure the enamel color resin is allowed to polymerize on the ESF without adding body color resin or the TSF. The rigid enamel veneer is removed from the ESF and trimmed to occupy only the space intended for enamel. Checking that the ESF and TSF can be mated without interference from the in-place veneer is important. With the veneer in place, monomer liquid is painted on it, and the body color resin is added. The TSF is then inserted, and standard procedures are followed for the remainder of the restoration. The timing for this procedure is less critical than for the first and may be better suited to practitioners with less experience.

3.6.5.1. Disadvantage

Sometimes there is an obvious demarcation between the enamel of the body resins.

3.6.6. Technique C

It is a procedure to incorporate a composite veneer in an acrylic resin provisional restoration.

3.6.6.1. Procedure

- A cast is generated with irreversible hydrocolloid impression material obtained from a diagnostic wax-up cast
- Using vacuumator adapt a clear plastic matrix on the generated cast
- Tooth preparation is done
- Place the microfilled composite inside the matrix on the facial surface
- Place this matrix over the teeth to verify complete seating and polymerize with light curing
- Apply rapid set acrylic resin in the matrix as thin mix and reseat the matrix over tooth preparation
- Contour, and refine the surface with carbide finishing bur.

4. Conclusion

Provisional restorations are a critical component of fixed prosthodontic treatment. They act as functional and esthetic try-in and serve as a blueprint for the design of the definitive prosthesis. So fabricating a proper provisional restoration with a modified technique is important factor achieving a better treatment results.

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