REVIEW ARTICLE

Provisional Restorations in Fixed Prosthodontics

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ABSTRACT

Provisional restorations in fixed prosthodontic rehabilitation are important treatment procedures, particularly if the restorations are expected to function for extended periods of time or when additional therapy is required before completion of the rehabilitation. They play a particular role in diagnostic procedures and continued evaluation of the treatment plan, as they should resemble the form and function of the definite rehabilitation that they precede. Therefore, interim treatment should satisfy the criteria of marginal adaptation, strength, and longevity. The purpose of this review is to discuss the various aspects associated with provisional restorations.

KEYWORDS: Acrylicresins, Provisional Restorations, Prosthodontics.

INTRODUCTION

According to the Glossary of Prosthodontic Terms, "provisional or interim prosthesis or restoration is a fixed or removable dental or maxillofacial 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 dental or maxillofacial prosthesis."[1] The importance of providing interim treatment with provisional restorations becomes critical in cases of full mouth reconstruction, in which multiple teeth are prepared. In these situations, provisional restorations will typically be used for relatively long periods of time (6–12 weeks) to monitor patient comfort and satisfaction and to allow for any necessary adjustments.[2] The interim treatment focuses on protecting pulpal and periodontal health, promoting guided tissue healing in order to achieve an acceptable emergence profile, evaluating hygiene procedures, preventing migration of the abutments, providing adequate occlusal scheme, and evaluating maxilla-mandibular relationships.[3] Provisional material selection should be based on how their mechanical, physical, and handling properties fulfill specific requirements for any clinical case. Other factors to be considered are biocompatibility and complications from intraoral use, such as chemical injury from the presence of monomer residue and thermal injury from an exothermic polymerization reaction. The most common materials used for custom interim-fixed restorations are several types of acrylic resins such as (1) polymethyl methacrylate (PMMA) resin, (2) polyethyl methacrylate (PEMA) resin, (3) polyvinyl methacrylate resin, (4) bis-acryl composite resin, and (5) visible light-cured urethane dimethacrylates.[4] Fabrication of provisional restorations is an important procedure in fixed prosthodontics. Provisional restorations must satisfy the requirements of pulpal protection, positional stability, occlusal function, ability to be cleansed,

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margin accuracy, wear resistance, strength, and esthetics. They serve the critical function of providing a template for the final restorations once they have been evaluated intraorally. A well-made provisional fixed partial denture should provide a preview of the future prosthesis and enhance the health of the abutments and periodontium. The theories and techniques of fabrication for numerous types of provisional restorations abound in the dental literature. Provisional restorations may be made directly on prepared teeth with the use of a matrix or indirectly by making an impression of the prepared teeth. A combination indirect-direct technique is also possible which has evolved as a sequential application of these that involves fabrication of a preformed shell that is relined intraorally.

COMPOSITES

Composite provisional materials encompass a fairly variable category by virtue of the fact that they are chemically comprised of a combination of 2 or more types of materials. Most of these materials use bis-acryl resin, a hydrophobic material that is similar to bis-GMA. Composites are available as auto-polymerized, dualpolymerized and visible light polymerized. Bis-acryl provisional materials are resin composites and represent an improvement over the acrylics because they shrink less, give off less heat during setting, excellent esthetics, minimal odour and can be polished at chair-side.[5]

PREFORMED CROWNS

Preformed provisional crowns or matrices usually consist of tooth-shaped shells of plastic, cellulose acetate or metal. They are commonly relined with acrylic resin to provide a more custom fit before cementation, but the plastic and metal crown shells can also be cemented directly onto prepared teeth. Polycarbonate resin is commonly used for preformed crowns. Polycarbonate resin is the commonly used for preformed crowns. These crowns combine microglass fibres with a polycarbonate plastic material.[5]

ACRYLICS

These materials have been used to fabricate provisional restorations since the 1930s and usually available as powder and liquid. They are the most commonly used materials today for both single-unit and multiple-unit restorations. Advantages of this material include low cost, good wear resistance, good esthetics, high polishability, good colour stability whereas it also has certain drawbacks like significant amount of heat given off by exothermic reaction, high degree of shrinkage (about 8%) objectionable odour, short working time, hard to repair and radiolucent.[5]

INDIRECT PROVISIONAL FIXED PARTIAL DENTURE

The technique involves fabrication of the interim restoration outside the mouth. Fabrication of provisional restorations using the indirect technique eliminates the problems associated with the direct technique and also has the advantage that it can be partially delegated to auxiliary personnel. Fisher *et al.* describes the use of an indirect technique for provisional fabrication that uses a fast-setting plaster.[6] The technique has several advantages over the direct procedures. There is no contact of free monomer with the prepared teeth or gingival which might cause tissue damage and an allergic reaction or sensitization. The technique avoids subjecting prepared tooth to the heat evolved from the polymerizing resin. When compared to direct technique, it has fewer demerits. Principal disadvantage of the technique includes increased chair side time and increased number of intermediate steps.[4]

INDIRECT-DIRECT PROVISIONAL FIXED PARTIAL DENTURE

The technique produces a custom made preformed external surface form of the restoration but the internal tissue surface form if formed by the underprepared diagnostic casts. This indirect-direct procedure has several advantages. With the combination indirect-direct technique, chair time can be reduced, since the provisional shell is fabricated before the patient's appointment. Enhanced control over restoration contours minimizes the time required for chair side

adjustments. The disadvantage of this procedure is the potential need of a laboratory phase before tooth preparation and the adjustments that are frequently needed to seat the shell completely on the prepared tooth.[4]

DIRECT PROVISIONAL FIXED PARTIAL DENTURE

In the direct technique, patient's prepared teeth and the gingival tissues directly provide the tissue surface form eliminating This is convenient when assistant training and the office laboratory facilities are inadequate for efficiently producing an indirect restoration. However the direct technique has significant disadvantages like potential tissue trauma from the polymerizing resin and inherently poorer marginal fit.[4]

MANAGEMENT OF PROVISIONAL RESTORATION SHORTCOMINGS

Fractures:Fracture of provisional restorations may occur upon removal from the mouth, during construction trimming, or function. This failure often occurs as a result of a crack propagating from a surface flaw, inadequate transverse strength, impact strength, or fatigue resistance. The best method to reduce the likelihood of fracture is to select the appropriate material based on its behavior in the oral environment when it will be subject to aging, fatigue, water sorption, and wear processes. Hence, it is important to know the flexural strength of various types of resins for provisional restorations, as most of them are brittle. Despite conflicting reports in the literature, it is generally accepted that PMMAs exhibit higher fracture toughness than bisphenol A glycidyl methacrylate (bis-GMA) resins.[3]

Non-integrity of the External Contour: Adding material to achieve the desired morphology and proper contacts with opposing or adjacent teeth is often necessary. The correct shaping of the external contours provides proximal and occlusal stability, and maintains tooth positions while the restorative plan is executed. The shape of an unfavorable residual ridge may be transformed by the gradual addition of material to create pressure, resulting in a more favorable tissue configuration (site conditioning).[3]

Marginal Inaccuracy: Provisional restorations should exhibit accurate marginal adaptation to the finish line of the prepared tooth in order to protect the pulp from thermal, bacterial, and chemical insults. Deficiencies can occur when auto-polymerizing acrylic resin is used, due to dimensional contraction because of the difference in density between the polymer and the monomer. In these instances, the resulting marginal gaps may be minimized by relining the restorations. The addition of provisional material allows closer adaptation to the finish line of the prepared teeth. Relining has been recommended at the time of fabrication in order to compensate for the polymerization shrinkage of the resin and to improve the initial retention.[3]

CONCLUSION

One of the most important aspects of dental profession is to provide a predictable outcome to any oral rehabilitation, and the use of the provisional restoration is a critical phase in the treatment. Direct techniques for the fabrication of provisional restorations have been limited to single crowns and up to 3- or 4-unit fixed partial dentures. For full mouth rehabilitation situations, indirect fabrication is considered to be the most suitable technique for the fabrication of provisional restorations. The use of practical methods and efficient techniques enhances the longevity of provisional restorations, maintains or restores the health and contour of the underlying and surrounding tissues, and ensures the patient's comfort and satisfaction. Precise knowledge of available materials and techniques enables the clinician to reline, modify, or repair these restorations through a simple and reliable process.

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