

# Awareness among dental students on different techniques available for temporization in fixed partial denture – A survey

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## ABSTRACT

**Background:** Fabrication of provisional restorations or temporization is an important procedure in fixed prosthodontics. Provisional restorations must satisfy the requirements of pulpal protection, positional stability, occlusal function, ability to be cleansed, margin accuracy, wear resistance, strength, and esthetics. Although any technique can be used to fabricate a provisional restoration, the choice of technique will be based on the ease, predictability, and availability of materials required to accomplish the required characteristics. This is possible only when an individual has adequate knowledge about the pros and cons of different techniques. **Aim:** The aim of the study was to assess the awareness among dental students on different techniques available for temporization in the fixed partial denture. **Materials and Methods:** The survey was conducted based on a questionnaire which was distributed to final-year dental students, interns, and postgraduate students of dental colleges in Chennai. The sample size was 100 students. The survey consisted of 10 questions. The questionnaire elicited awareness of different techniques employed in provisional restoration. The data were extracted and analyzed. **Results:** About 40% of the respondents answered that CAD CAM-processed temporary restoration has longer shelf life and were better, whereas 20% preferred conventional provisional restorations. **Conclusion:** The present study concluded that the students were moderately aware of the techniques used in the fabrication of temporary restorations. Further educational and awareness programs need to be undertaken to improve this status.

**KEY WORDS:** Esthetics, Fixed prostheses, Strength, Techniques, Temporization, Wear resistance

## INTRODUCTION

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, margin accuracy, wear resistance, strength, and esthetics. 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. Interim procedures also must be efficiently performed, because they are done while the patient is in the

operatory and during the same appointment that the teeth are prepared. Costly chairside time must not be wasted, but the dentist must produce an acceptable restoration. Failure to do so results in the eventual loss of more time than was initially thought saved. 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. As new materials are introduced and associated techniques are reported, and thus, there is even more variety. It is a helpful principle that all the procedures have in common the formation of a mold cavity into which a plastic material is poured or packed. Provisional restorations may be made directly on the 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

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possible which has evolved as a sequential application of these that involves fabrication of a preformed shell that is relined intraorally.

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.”<sup>[1]</sup> 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.<sup>[2]</sup> The interim treatment focuses on protecting pulpal and periodontal health and promoting maxilla-mandibular relationships.<sup>[3]</sup> 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) poly(methyl methacrylate) resin, (2) poly(ethyl methacrylate) resin, (3) polyvinyl methacrylate resin, (4) bis-acryl composite resin, and (5) visible dimethacrylates.<sup>[4]</sup> Light-cured fabrication guided tissue healing to achieve an acceptable emergence profile, evaluating hygiene procedures, preventing migration of the abutments, providing adequate occlusal scheme, and evaluating 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, 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 the 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. Composite provisional materials encompass a fairly variable category by virtue of the

fact that they are chemically comprised a combination of two or more types of materials. Most of these materials use bis-acryl resin, a hydrophobic material, that is, similar to bisphenol A-glycidyl methacrylate. Composites are available as autopolymerized, 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, and minimal odor; and can be polished at chairside. 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 the prepared teeth. Polycarbonate resin is commonly used for preformed crowns. Polycarbonate resin is the commonly used for preformed crowns. These crowns combine microglass fibers with a polycarbonate plastic material.<sup>[5]</sup>

These materials have been used to fabricate provisional restorations since the 1930s and are 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, and good color stability, whereas it also has certain drawbacks such as significant amount of heat given off by exothermic reaction, high degree of shrinkage (about 8%) objectionable odor, short working time, hard to repair, and radiolucent.<sup>[5]</sup>

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 and Shillingburg describes the use of an indirect technique for provisional fabrication that uses a fast-setting plaster.<sup>[6]</sup> 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.<sup>[7]</sup> When compared to the direct technique, it has fewer demerits. Principal disadvantage of the technique includes increased chairside time and increased number of intermediate steps. 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.<sup>[8]</sup> 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 chairside 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.<sup>[4]</sup> 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 such as potential tissue trauma from the polymerizing resin and inherently poorer marginal fit.<sup>[4]</sup>

## MATERIALS AND METHODS

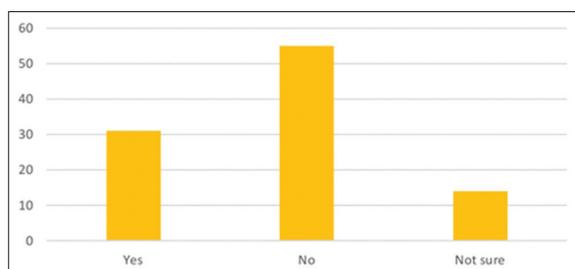
The survey was conducted based on a questionnaire which was distributed to final-year dental students, interns, and postgraduate students of dental colleges in Chennai. The sample size was 100 students. The survey consisted of 10 questions. The questionnaire elicited awareness of different techniques employed in provisional restoration. The data were extracted and analyzed.

## RESULTS

About 50% of the professionals answered that the temporary restoration was not required to be after fixed prosthesis preparation, whereas 30% were aware about the temporary restoration preceding fixed prosthesis preparation [Figure 1].

Only 20% of the professionals answered that temporization is to be proceeded including the root canal-treated abutment teeth and 60% of the professionals answered that temporization is not necessarily to be proceeded for the root canal-treated abutment teeth [Figure 2].

Almost 35% of the professionals have answered that they were sure that it leads to the failure of the temporary restoration and 40% of the professionals answered that the success of the fixed restoration is not interfered by the provisional restoration [Figure 3].



**Figure 1:** Requirement of temporary restoration after fixed prosthesis preparation

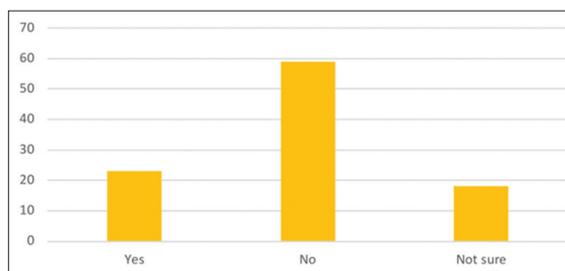
About 20% of the professionals answered that the teeth will not change its position even if temporization is not done, whereas 60% of the professionals answered that the teeth will change its position if temporization is not done [Figure 4].

About 40% of the people answered that methyl methacrylate is not directly used in the oral cavity, whereas 35% of the people answered that methyl methacrylate is directly used in the oral cavity [Figure 5].

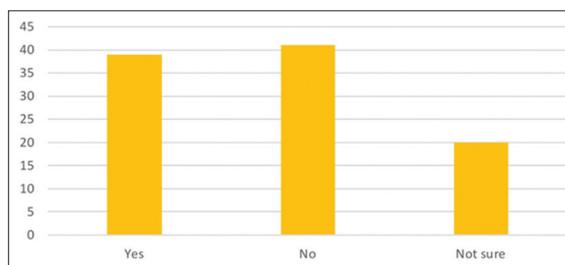
About 45% of the professionals answered that the bisacrylic composites can be directly used in the oral cavity, whereas 20% of the professionals answered that these types of composites are not used directly in the oral cavity [Figure 6].

About 50% of the professionals answered that the model preparation and wax-up in diagnostic cast is essential for the success of the fixed prosthesis, whereas 30% of the professionals answered that it is not necessary for model preparation and wax-up in diagnostic cast [Figure 7].

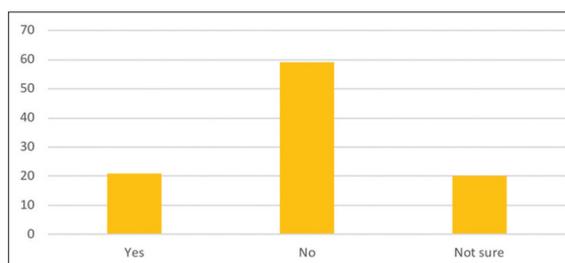
About 60% of the professionals answered that the putty consistency material is ideal for making impressions



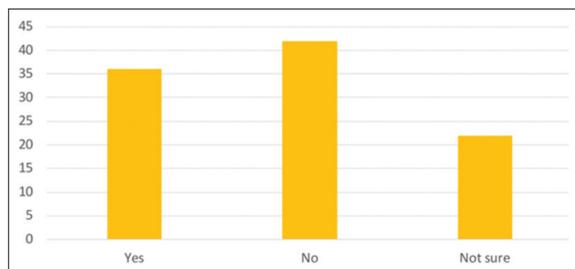
**Figure 2:** Requirement of temporary restoration in root canal treated teeth



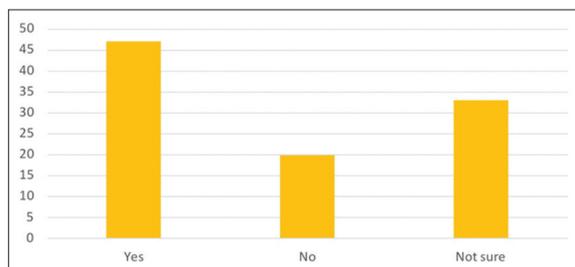
**Figure 3:** Success of the fixed restoration influenced by the provisional restoration



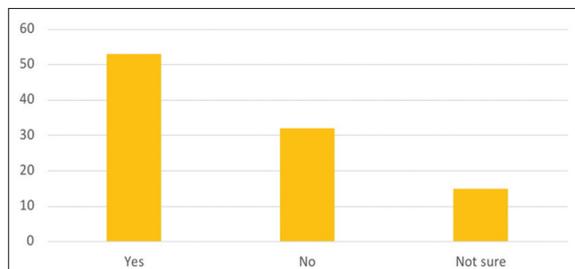
**Figure 4:** Change in position of teeth if temporization is not done



**Figure 5:** Use of methyl methacrylate directly in oral cavity



**Figure 6:** Use of bis acryl composites directly in oral cavity



**Figure 7:** Necessity for model preparation and wax-up in diagnostic cast

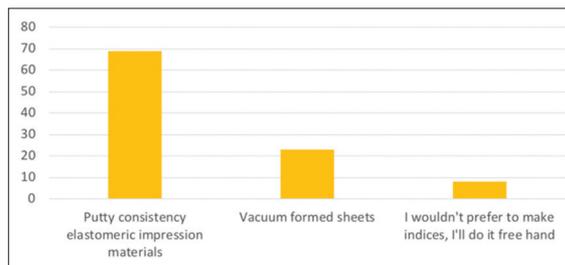
for the fabrication of a temporary fixed prosthesis, whereas 20% of the professionals answered that the vacuum-formed sheets are used in making impressions for temporary fixed prosthesis [Figure 8].

About 35% of the professionals answered that the final impressions taken before or after temporization do not alter in the prosthesis, whereas 25% of the professionals answered that temporization is altered based on the final impression [Figure 9].

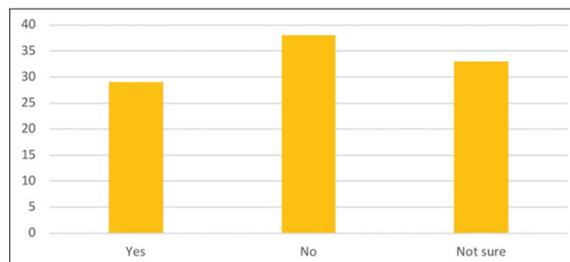
About 40% of the professionals answered that CAD CAM-processed temporary restoration has a longer shelf life, whereas 20% of the professionals answered that CAD CAM-associated temporary restoration shelf life does not last longer [Figure 10].

## DISCUSSION

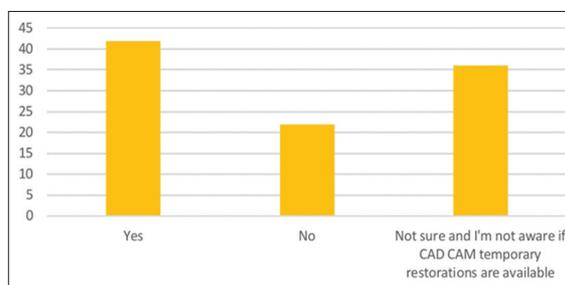
Various materials are available for the fabrication of provisional restoration, but till date, none have proven to be the most accurate and stable. Every material had its own merits and demerits that could be attributable to numerous factors. Any interim restoration should fulfill the biologic, mechanical,



**Figure 8:** Use of vacuum-formed sheets in making impressions for temporary fixed prosthesis diagnostic cast



**Figure 9:** Alteration of temporization is based on the final impression



**Figure 10:** Longevity of CAD CAM-associated temporary restoration

and esthetic requirements. Provisional restorations must not only provide an initial shade match but also maintain the esthetic appearance over a period of time. Alterations in color of these restorations compromise the acceptability. Color stability gains importance, particularly when the restorations involve esthetic zones, and must be worn for extended periods of time. Discoloration of provisional materials may lead to patient dissatisfaction and even additional expense for replacement. This is particularly problematic when provisional restorations are subjected to colorants during lengthy treatments. Hence, color stability along with mechanical properties is an important criterion in the selection of a provisional restorative material.

Koumjian *et al.* stated that methyl methacrylate resin was less color stable than bis-acryl composite (Protemp II) in an *in vivo* study, whereas study by Gupta and Gupta showed Revotek LC as the most color stable material. Staining of these provisional was attributed to the adsorption or absorption of colorants by resins. Factors such as surface roughness, wear resistance, and polishability also influenced the color stability

of these materials. Various methods of fabrication are also described, but none can be considered as a universally accepted standard technique. Indirect technique is generally preferred over the direct techniques as it overcomes the potential hazards caused to the tooth during fabrication by the direct technique, but routinely, situation dictates the material and the technique of fabrication. Provisionalization should also be considered during other treatment modalities such as various stages of implant-supported prosthesis which include provisionalization prior to implant loading (removable and tooth supported), provisionalization at the first/second stage surgery (implant retained – at first stage surgery – single tooth, implant retained – partially edentulous and dentulous), tooth retained – at or before the first stage surgery, implant retained – at the second stage surgery, transitional implant provisional restoration, cement, or screw retained provisional prosthesis. Provisional restorations also play a significant role in the sequelae of maxillofacial rehabilitation using interim obturators or feeding plates and interim dentures and also during transformation of an immediate denture to conventional denture prosthesis.

## 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. The students were moderately aware of the techniques

used in the fabrication of temporary restorations. Clinical techniques and indications are reasonably well characterized, but future research activities will need to focus on technological advancements to provide improved materials that demonstrate improved biocompatibility, physical properties, ease of use, and esthetically pleasing appearance to the patients.

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