



Provisional restorations: An overview of materials used

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Abstract

Provisional restorations are an important phase in the treatment procedure for fixed provisional restoration. Without a temporary the final treatment aspect cannot be judged as we can predict the design failures beforehand as the temporary restoration replicates the final restoration. A temporary also helps the patient as he does not need to compromise esthetically till he receives the final restoration. Here, various techniques and materials available for a fabricating a provisional restoration are explained.

Introduction

A provisional restoration plays an indispensable role in the success of the treatment. Meeting the functional and the esthetic demand is one of the most important aspects of making a provisional restoration, also the provisional material should be capable to meet this requirement. Some clinicians do not give adequate time and effort for constructing a temporary as they consider it merely a temporary and directly go for the cementation of the final prosthesis. This procedure will only lead to the a restoration that has not met the basic requirement of meeting the patients esthetic and functional demands According to Shillingburg,^[1] the restorations should:

1. Proffer pulp protection
2. To prevent supraeruption or tipping of the teeth
3. Serve proper occlusal function for the patient
4. Can be easily maintainable in a hygienic condition
5. The material should withstand occlusal forces and should be retentive
6. Be aesthetically pleasing and can be polished so as to prevent plaque accumulation
7. Margins should not intrude the gingival tissues and induce gingival pathosis.

Wassel has elaborated further functions of provisional restorations which helps in diagnosis like assessing phonetic problems and other practical uses such as to measure the amount of tooth reduction, to provide isolation and a temporary filling

in the form of a crown during endodontic treatment, to act as a mold for core construction.^[2]

A variety of provisional materials are available. Temporary restorations can be made intra orally termed as direct restoration, indirect restoration using the patients cast or can be direct – indirect. The duration between the tooth preparation of teeth and cementation of the final restoration can vary from a few days to several weeks or even several months for complex cases. Recently, temporary materials are also available which are prepared using computer-aided design and computer-aided manufacturing technology to meet the functional and esthetic properties but further research is required.

Materials

Materials available are comprised preformed and customizable under preformed it can be further divided into plastic and metal. For customizable temporaries materials are available which can be self, light, or heat polymerized. Metal alloys also fall in this category where cobalt chromium or nickel chromium are used for casting.

Pre-formed crowns

They are available both in plastic or metal alloys. The advantages of these crowns are that they are readily available, but the down side is that relining is required marginally and adjustments are

needed both occlusally and proximally. The plastic shells which are usually made of polycarbonate and acrylic are mainly used in the anterior region including the premolars and the metal shells are only indicated for the molars.

Materials that can be self or light cured are available and the temporaries can be made using both direct and indirect techniques the materials available are polymethyl methacrylate [PMMA] - e.g., vita acrylics, Temporary bridge resin (Figure 1) polyethyl methacrylate (PEMA) - e.g., snap, Bosworth trim II (Figure 2) bis-acryl composite - e.g., quicktemp protemp II (Figure 3), urethane dimethacrylate (UDMA) - e.g., povipont DC Unifast LC (Figure 4).

PMMA (Figure 1) is considerably strong, has a superior wear resistance, is easy to add to or repair, and has appreciable esthetics, which can be sustained over longer periods.^[3] However, it does have its downsides:

- i. It warps because of polymerization shrinkage



Figure 1: Self cure polymerized resin



Figure 2: Poly ethyl methacrylate

- ii. Heat production during polymerization due to the exothermic reaction which can damage pulp^[4]
- iii. The free monomer that is present may cause pulpal and gingival damage.

The porosity and free monomer that is usually found while making temporary restorations can be avoided using a hydroflask under pressure during polymerization.^[5] The adaptation of provisional restorations fabricated with the direct method is improved when a little amount of cold-cure acrylic resin is applied to the margins, whereas the bulk of relining material is at the doughy stage. This technique provides superior results and reduced chair time.^[6] The common complains after using this material as a temporary restoration is fracture, to overcome this problem research has proved that incorporating the following have found to increase the fracture resistance of the restoration such as metal strand, cast metal augmentation on the lingual side, and infusion with various types of fibers (glass, carbon, polyethylene, etc.). The occlusal middle third region of the pontic from mesial to the distal end of the connector is found out to be the site for the placement of the fiber for fortifying the PMMA interim restorative resin.^[7,8]

PEMA (Figure 2) is other material which is a suitable choice as a temporary restoration as it undergoes less polymerization shrinkage and gives out less heat during polymerization. However, this material has also its disadvantages or shortcomings when compared to other temporary materials when it comes to solderness, toughness, esthetics, and color stability.^[3,9] The color



Figure 3: Bis-acryl composite



Figure 4: Light cure resin

ranges are available for brands like Trim II while other brands have only light and dark shades.^[10]

Bis-acrylics (Figure 3) are dimethacrylate materials and can be categorized into two groups: UDMA and bisphenol A-glycidyl methacrylate.^[11] Bis-acrylics offers better marginal fit as it produces less heat and shows less polymerization shrinkage compare to other materials.^[11] The downsides of this material are they are brittle in thin sections, they stain easily and only few shades are available. Esthetically they are reasonable, an unpolymerized layer remains superficially which should be removed by alcohol and polishing this will reduce staining of the temporary. They are more color stable and have better flexural strength than PMMA materials and can be selected as a material of choice to make temporary restorations that require considerable time intra orally.^[12,13]

Visible light cured resins (Figure 4) are available based on UDMA, for example, provipoint D.C. These materials have good mechanical properties and good color stability. A variety of shades are available for this material making it esthetically appreciable also the marginal fit is good as there is less polymerization shrinkage. These materials are expensive and stains overtime but the operator has the advantage over control of the working time as it is light cured.^[14]

Conclusion

Making adequate provisional restorations requires significant time and effort. Provisional restorations should be delegated to qualified dental assistants to reduce the overhead cost of producing crowns and fixed prostheses. Bis-acryl resin is the most commonly used material for provisional restorations, but for restorations of three units or more, assistant-made PMMA shells lined intraorally with PEMA to provide more strength and color stability. In cases of full mouth rehabilitation cases and cases involving more than 5 unit bridges, the material of choice is heat polymerizing PMMA. In anterior region either autopolymerizing PMMA or Protemp II can be used. In certain surgical cases where an immediate provisional restoration is required Protemp-II is the material of choice.^[15]

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