Fabrication of a fixed provisional restoration utilizing a light-curing acrylic resin
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The properly fabricated provisional restoration must take into account the following interrelated factors: pulpal protection, periodontal health, occlusion, esthetics, and phonetics. The techniques advocated for construction of a provisional restoration include direct, indirect, and a combination of direct and indirect techniques. Two simple techniques that use light-curing acrylic resin for the fabrication of fixed provisional restorations are presented, and advantages and disadvantages of these techniques are discussed. (Quintessence Int 1992;23:415-419.)

Requirements for a satisfactory provisional restoration
The properly fabricated provisional restoration must take into account several interrelated factors. A provisional restoration must seal and insulate the prepared tooth surface from the oral environment to prevent sensitivity and further irritation to the pulp. The pulpal health of a tooth requiring a crown may be compromised prior to preparation, and additional pulpal trauma is inevitable during preparation. The possibility of irritation during fabrication of the provisional restoration must be considered. Chemical injury from the presence of monomer residue, thermal injury from an exothermic setting reaction, and mechanical injury caused by volume changes or pressure arising from polymerization shrinkage must be minimized.

The health of the surrounding periodontal tissue must be maintained by a restoration that has proper contour, adequate gingival adaptation, and optimal embrasure space. Slightly convex buccal and lingual contours and a flat emergence profile are a necessary prelude to gingival health. Overextension of the provisional restoration may lead to gingival recession. Inadequate extension will allow proliferation of gingival tissue resulting in overgrowth of tissue and tooth sensitivity. The proper shaping of proximal contours is necessary to maintain normal embrasure space. Impingement on the papilla reduces embrasure space, while too broad a space causes food impaction and blunting of the interdental papilla.
The provisional restoration must maintain the position of the prepared tooth in relation to the adjacent and opposing teeth. Inadequate mesial and distal contact points allow drifting and tilting of the prepared teeth. Food impaction also occurs, causing gingival problems. Improper occlusal contact allows supraeruption, resulting in time-consuming adjustment at the insertion appointment and poor occlusal form and function.

The provisional restoration should protect teeth weakened by crown preparation. Esthetic and phonetic guidelines for the definitive appliance are provided by the provisional appliance. The provisional restoration is modified until its appearance and shape are acceptable to both the dentist and patient. The time to satisfy the patient's esthetic demands are at this stage of treatment.

Phonetics is also established during this stage of treatment. The relationship of the teeth, tongue, and lips allow the creation of proper sounds. The correct length and lingual contours must be determined.

The diagnostic casts must be mounted on an articulator to establish occlusion. Waxups must demonstrate simultaneous contact of posterior teeth in centric occlusion, disocclusion of the posterior teeth in protrusive movement, and elimination of occlusal interference during working and nonworking excursions.

Displacement of the provisional restoration will cause irritation to the pulp and tooth movement. Displacement is prevented through proper tooth preparation and proper adaptation of the provisional restoration. Excessive space increases the load on a purposely weak cement.

The provisional restoration should be able to withstand repeated removal and placement and must be made of a material that the patient can clean easily. Splinting and stabilization of periodontally questionable teeth allows evaluation of these teeth during treatment.

**Phases of fabrication**

There are numerous techniques for fabrication of provisional restorations. However, the proper sequence must be followed:
1. Functional analysis
2. Diagnostic waxups on the study casts
3. Matrix fabrication
4. Tooth preparation and construction of the provisional restoration
5. Application of the restoration
6. Evaluation of treatment in the interim stage

**Fabrication of a fixed provisional restoration**

A variety of materials and procedures have been used in the fabrication of fixed provisional restorations. The techniques advocated for construction of a provisional restoration include direct, indirect, and a combination of direct and indirect. The materials used include poly(methylmethacrylate) resins, poly-R' methacrylate resins, epimine resins, hybrids (a combination of two or more materials), and microfilled resins.

Visible light-curing composite resins have been reported in the literature for use as provisional restorations. Several systems of light-curing composite resins have been developed for the dental laboratory. Recently a unique catalyst system, Unifast LC (GC International), has been introduced for poly(methyl methacrylate) resin. It is designed to autocure to a rubberlike stage, but achieve final set via visible curing light.

**Technique**

1. The powder-liquid paste is poured into an irreversible hydrocolloid impression in which an escape has been precut (Fig 1).
2. The impression is returned to its original position in the mouth and pressed in place (Fig 2).
3. The impression is held in the mouth for 2 minutes and removed when it reaches a rubberlike consistency (Fig 3).
4. A crown scissors or similar instrument is used to trim away excess material and undercuts. The material remains in a rubberlike state (Fig 4).
5. After shaping is completed, the provisional restoration is placed. While the teeth are occluded, the provisional restoration is light cured (Fig 5).
6. The provisional restoration is removed, and the unpolymerized areas are light cured.

Figure 6 shows the finished provisional restoration intraorally.

**Alternative technique**

1. The acrylic resin monomer is used to fully wet the area of teeth to be restored (Fig 7).
2. The DeVilbiss powder insufflator No. 119 (DeVilbiss Co) (Fig 8) is used to spray enough powder to absorb all the liquid (Fig 9).
3. The material is light cured (Fig 10).
4. The acrylic resin shell is removed from the irreversible hydrocolloid impression (Fig 11) and light cured again.
5. The excess is trimmed with a thin disk so that there
Fig 1. The liquid paste is poured into an irreversible hydrocolloid impression in which an escape route has been precut.

Fig 2. The impression is returned to its original position in the mouth and pressed into place.

Fig 3. The impression is held in the mouth for 2 minutes and then removed when it reaches a rubberlike consistency.

Fig 4. A crown scissors or similar instrument is used to trim away excess material and undercuts while the material is in a rubberlike state.

Fig 5. After shaping is completed, the provisional prosthesis is set in place. The provisional restoration is light cured while the teeth are occluded.

Fig 6. Intraoral view of the final provisional restoration.
Fig 7  The teeth to be restored are wet with acrylic resin monomer.

Fig 8  DeVilbiss Insufflator No. 119.

Fig 9  Enough DeVilbiss powder is sprayed to absorb all liquid.

Fig 10  The material is light cured.

Fig 11  The acrylic resin shell is removed from the irreversible hydrocolloid impression and light cured a second time.

Fig 12  The cervical areas are marked with a sharp pencil.
is no excess beyond cervical area. The prepared teeth are tried in to verify complete seating.
6. The shell is relined with methyl methacrylate or ethyl methacrylate. The patient is instructed to close into occlusion.
7. The cervical areas are marked with sharp pencil (Fig 12).
8. Tints and stain can be added internally before relining or on the surface afterward with a glaze (Fig 13).
9. The restoration is trimmed and polished.

Discussion

Two quick and easy techniques for fabrication of an acrylic resin provisional restoration have been presented. A major loss of time during fabrication of a provisional restoration is waiting for resins to polymerize from a putty or rubberlike stage to hardness. Unifast LC eliminates that waiting period.

Both techniques have several advantages:

1. They save clinical time because the final set is under operator control.
2. The unique formulation of the material requires mixing of powder and liquid in a normal manner, but keeps the resin in a rubberlike stage, allowing removal of resin from undercuts.
3. The resin adheres to previously polymerized acrylic resin.
4. The surface is smooth when polished—better than that of regular methyl methacrylate.
5. The color is stable.
6. The material is less brittle than is composite resin.
7. The resin can be light cured intraorally to splint provisional restorations together.

The techniques also have some disadvantages. The material currently has a limited number of tooth color shades. In addition, shrinkage is present during curing; however the effect of this shrinkage can be minimized by keeping the material on the object to be fitted. Curing longer will eliminate residual monomer.

References