Temporary restorations are used in dentistry either (1) for repair of a fractured or compromised restoration or tooth structure, or (2) as a substitute restoration while a permanent restoration is being fabricated in a dental laboratory.
INTRODUCTION
Definitions

Temporary = Provisional = Non-Permanent = 2-26 weeks

<table>
<thead>
<tr>
<th>Short-Term</th>
<th>Long-Term</th>
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<tbody>
<tr>
<td>TEMPORARY</td>
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0 10 20 30 40 50 weeks

EXAMPLES: Temporary crown fabrication procedures:

a. **DIRECT** -- intraoral fabrication (and intraoral/extraoral curing)

- 0s = mix and add to pre-impression; 45s = insert in mouth;
- 1m = initial set; 2m = remove; 6m = trim; 7m = contour and polish;
- 12m = cement in mouth.

b. **INDIRECT** -- extraoral or laboratory fabrication

In the case of being a substitute restoration, [CLICK] it is more appropriate to think in terms of a “temporary system” (i.e., restoration and cement). [CLICK] While the term “provisional” may be more technically correct, the term “temporary” is most commonly employed.

Temporary systems may only be needed for a short time such as 2-6 weeks [CLICK] (i.e., short-term temporary), or [CLICK] might be used for a much longer time such up to 26 weeks (i.e., long-term temporary). There are even more extraordinary circumstances where a temporary might have to serve for 1-2 years. This is much more typical in the armed services where soldiers are stationed overseas or away from dental care units for very long times. The origin of a famous temporary material called “IRM” (Intermediate Restorative Material) is that is was developed under a research contract for the US Armed Services during the 1950s as a temporary for soldiers who were deployed to Korea.

[CLICK] Temporary restorations can be constructed of a variety of materials, as will be seen shortly. They can be produced in vivo (i.e., direct temporaries) or ex vivo chair-side or in a dental laboratory (i.e., indirect temporaries). [CLICK] Direct temporaries only require about 12-15 minutes and this sequence is illustrated above.
The chairside procedure for an indirect temporary bridge, made from composite material, is illustrated above. A pre-impression is required before tooth preparation so that the anatomic contours of the original tissues can be captured. Material for the temporary restoration is dispensed and mixed. Then it is loaded into the pre-impression and inserted into the mouth over the prepared tooth surfaces. Then it is allowed to set and then is removed. The temporary bridge is trimmed to remove flash and excesses, and then light-cured to complete the set. Finally, it is carefully trimmed, polished, and then cemented in place.
There are several requirements for success of provisional restorations. Obviously, the longer the materials are in service, the more complicated it is to succeed at all of these.

These can be divided into (1) manipulation goals, (2) physiologic goals, and (3) materials performance goals, and (4) post-temporization goals, as listed above.

Manipulation concerns involve ease-of-use. There should be no problems arising manipulation. It is important for the reaction to occur efficiently with little exothermic heat. At the same time, the final surfaces should be completely reacted. Oxygen inhibition often leaves a sticky outside surface that must be wiped away before finishing and polishing.

Obviously it is important that the provisional crown be as functional as possible so that the patient feels comfortable.

The major materials performance expectations are that the restoration be esthetic, fracture resistant, and wear resistant. If the provisional cement is adequate then there will be good retention as well. Fracture resistance is related to strength and toughness. Wear resistance is related to filler level and extent of small filler loading.

Finally, the provisional materials (cement and restoration) should do nothing to interfere with the permanent restoration. It is possible that some of the provisional materials could contaminate the surfaces of the preparation and cause problems for permanent cementation.
Provisional restorations for crowns and bridges are much more demanding than for intra-coronal restorations. Extra-coronal restorations can employ preformed shell crowns of polycarbonate plastic or different metal alloys. They are adapted to the tooth structure by trimming the margins. Then, they are filled with provisional cements and placed over the preparations. Of course, they fit poorly at best and rely on the skill of the clinician to make them a proper geometry and size. Custom-fabricated provisional crowns are molded by filling the original impression and gently pressing it back over the preparation. Materials can be set in the mouth or out of the mouth. The latter is preferable because of the setting exotherm.

Current systems employ either (1) denture base monomer systems of MMA/PMMA (or similar monomers) or else they use (2) composite-like acrylic monomers which are highly filled. These are so called bis-arcryl or bis-methacryl monomers. These latter systems are very similar to Bis-GMA and can be self-cured, dual cured, or visible-light cured. These systems also are called resin provisionals but composite is the more correct term.

To lute or bond these to the tooth preparations, provisional cements are utilized. These cements do not need to have much retentive strength or adhesion, since they need to be removed later and be cleaned off the tooth structure. Often vaseline or petroleum jelly will be intentionally added to permanent cements to destroy any potential for adhesion.
A wide range of current provisional restorations are available on the current market. A sampling is shown above in the table. The most popular systems are Bis-Acryl or Bis-Methacryl (composite resin) [CLICK] ones shown at the bottom of the table. Many of these different competitor’s products are licensed from the dental company, DMG Ltd in Germany. They are actually the same formulation under different brand names.
Provisional or temporary cements are quite varied as well. Examples are shown above. Quite often a provisional composite is supplied with a provisional cement.
The information reported above has been provided by Dr. Ed Shellard of Kerr Corporation about the relative use of provisional materials.

In the top left-hand diagram, note that most provisional restorations are now made from self-curing composite.

The diagram at the bottom right-hand portion of the slide shows the market share for the most popular products. Kerr Temphase, Caulk Integrity, ESPE Protemp, and DMG/Zenith Luxatemp are popular self-cure composites and dominate the market with about an 80% share. Snap and Trim (total 10% share) are MMA/PMMA types that are not as strong, but work well, as long as the provisional restoration is neither very complex or large.
Provisional restorative materials are resistant to chemical degradation in the mouth (e.g., good chemical properties). They are thermal and electrical “insulators” (e.g., good physical properties). But, they do not have quite as good mechanical properties as commercial composites.

For the sake of comparison, the chart of compressive strengths demonstrates that MMA/PMMA materials are much weaker than Bis-Acryl/Bis-Methacryl composites. [CLICK] A similar trend is noted with flexural strengths as well.

[CLICK] In the table above are examples of just a few of the properties of two examples of provisional restoration materials (LEFT) [CLICK] compared to two examples of standard composite materials (RIGHT). Note that Luxatemp (provisional material) [CLICK] is not quite as strong as Prodigy composite.
Examples of 3 bis-acryl-based temporary materials are shown above. If you click on the individual samples, then you will be connected to the individual websites to look at more details of the materials.
Examples of 2 MMA/PMMA-based temporary materials are shown above from Bosworth. If you click on the individual samples, then you will be connected to the individual websites to look at more details of the materials.
Thank you.