Chairside acrylic temporary crowns

Chairside acrylic resin temporary crowns offer a practical, durable temporisation option for conservative preparations, and proficiency with this technique remains valuable for general dental practitioners.

Introduction

Temporary crowns serve several important functions. They protect the prepared tooth from bacterial and thermal insults, prevent sensitivity, maintain periodontal health, prevent unwanted tooth movement, and maintain masticatory function while the definitive crown is being fabricated.[1] Ensuring that a temporary crown is adequate in strength and fit is an essential part of treatment.

Chairside acrylic resin has long been used to fabricate temporary crowns and was, for many years, the standard material of choice in clinical practice (**Table 1**). However, with the introduction of bis-acryl composite systems such as Protemp (Solventum, USA) and Luxatemp (DMG, Germany), which offer convenience, easier handling, and auto-mix delivery, acrylic resin has fallen out of routine use. As undergraduate training has increasingly adopted bis-acryl as the primary material for temporisation, familiarity with acrylic resin techniques has diminished.

Bis-acryl materials are suitable for most crown preparations. However, the increasing adoption of minimally invasive dentistry has led to more conservative crown preparations, with restorations such as full gold and monolithic zirconia crowns requiring as little as 0.7–1.0mm of tooth reduction.[2,3] In these situations, acrylic resin may provide greater fracture resistance than bis-acryl materials.[4]

This article does not present new material or techniques; rather, it revisits a method that remains clinically relevant.

Clinical situations in which to consider a chairside acrylic temporary crown:

- conservative preparations for full gold or monolithic zirconia crowns;
- patients with parafunctional habits and increased occlusal loading;
- extended temporisation periods;
- cases with marked gingival inflammation or soft-tissue trauma, requiring optimal marginal adaptation of the temporary crown to promote gingival healing; and,
- temporary bridges where flexural loading may increase fracture risk at the connector.

Materials required for an acrylic temporary crown:

- polyvinyl siloxane (PVS) or putty impression material;
- sectional tray and adhesive;
- self-curing acrylic resin (powder and liquid);
- petroleum jelly;
- finishing and polishing instruments;
- shade guide;
- Dappen dish, mixing pad, spatula and microbrushes;
- temporary cement;
- articulating paper; and,
- floss.

Table 1: Examples of proprietary self-curing acrylic resin systems used for chairside fabrication of temporary crowns.

Brand name	Material type	Manufacturer	Country
DuraLay	Self-cure polymethyl methacrylate (PMMA) powder/liquid	Reliance Dental Mfg	USA
Snap	Self-cure ethyl methacrylate powder/liquid	Parkell	USA
TAB 2000™	Self-cure PMMA powder/liquid	Kerr	USA
Jet Set-4	Self-cure PMMA powder/liquid	Lang Dental Mfg	USA
Trim® Plus	Self-cure PMMA powder/liquid	Harry J Bosworth Company	USA
Unifast III	Self-cure PMMA powder/liquid	GC Corporation	Japan

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FIGURE 1: Material set-up for pre-preparation impression.

FIGURE 2: PVS impression of the tooth pre-op.

FIGURE 3: Occlusal view of tooth 26 after crown preparation.

FIGURE 4: Buccal view of tooth 26 after crown preparation.

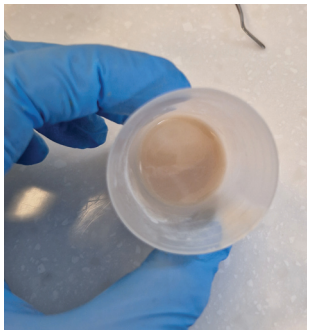

FIGURE 5: Homogenous mix of acrylic resin.

FIGURE 6: Checking the flow and consistency of the mix.

FIGURE 7: Acrylic temporary crown removed within the impression.

FIGURE 8: Acrylic crown removed from impression. Note the excess material and flash.

Chairside step-by-step technique

1. Pre-preparation (Figure 1)

- Apply tray adhesive to the impression tray. Take an impression of the tooth and the adjacent teeth using PVS or silicone putty material (**Figure 2**).
- Select a shade for the temporary crown.

2. Tooth preparation

- Carry out tooth preparation (**Figures 3** and **4**).
- Block out any significant undercuts in areas outside of the preparation margins and axial walls where the acrylic could lock during setting.
- Apply a thin layer of petroleum jelly on the prepared tooth and adjacent teeth.

3. Mix the acrylic resin

- Refer to the manufacturer's instructions.
- Dispense liquid into a Dappen dish. Add powder until the liquid is saturated.
- Mix with a spatula until a homogeneous mix is obtained (**Figure 5**).
- Allow the material to progress to the doughy stage, characterised by a dull appearance, a thick consistency, clinging to the spatula, and forming a slow-moving strand when lifted (**Figure 6**).

4. Load the impression and seat over the preparation

- Load the acrylic into the tooth space within the impression, ensuring complete crown form coverage without voids. Place a small amount on the back of your hand to monitor setting.
- Seat the loaded impression over the prepared tooth and maintain gentle pressure.
- Monitor the material until it reaches the rubbery phase: when it holds its shape and remains slightly resilient when pressed with a fingernail, like a firm rubber eraser, but is not fully set. Remove the impression carefully. The provisional crown should remain within the impression (**Figure 7**).
- Reseat the temporary crown within the impression back onto the tooth. Remove and reseat several times periodically as the material continues to set.

5. Polishing and adjustment

- Once fully set, carefully remove the temporary crown from the impression (**Figure 8**).
- Remove any excess material with acrylic-trimming burs or polishing discs (**Figure 9**).
- Seat the crown on the prepared tooth.
- Assess margins for gaps or overextension, and adjust or reline as required.
- Verify proximal contacts.
- Check occlusion in centric and excursive movements with articulating paper and adjust high spots as needed.
- Polish the temporary crown using discs, wheels, pumice slurry, or polishing paste.

6. Cementation

- Select suitable temporary cement.
- Clean and dry the crown's fitting surface and the prepared tooth.

FIGURE 9: Flash and excess material removed.

FIGURE 10: Buccal view of cemented acrylic temporary crown.

FIGURE 11: Palatal view of cemented acrylic temporary crown.

- Load cement and seat the crown on the tooth with firm pressure.
- Remove excess cement.
- Recheck occlusion and floss contacts.
- Make final adjustments as needed (**Figures 10** and **11**).

Additional notes

- Once the material reaches the rubbery stage, it should be periodically removed and reseated for two reasons:
  - to dissipate the exothermic heat of polymerisation and minimise the risk of pulpal irritation; and,
  - to prevent the acrylic from locking into undercuts, which can make crown removal difficult or impossible without destruction of the crown.
- The temperature of the environment matters: a warm room accelerates setting; a cooler environment increases working time.

Conclusion

Chairside acrylic temporary crowns may be a useful alternative for the temporisation of conservative crown preparations, including monolithic zirconia and full gold crowns. Although more sensitive to technique than bis-acryl provisionals, the method can be readily incorporated into routine general practice. As minimally invasive dentistry becomes more widely adopted, familiarity with acrylic resin remains a valuable clinical skill.

References

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