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SCIENTIFIC ARTICLE

Temporary Restorations: the Key to Success

Basil Mizrahi, BDS, MSc, Med

For Size Only

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Basil Mizrahi is a prosthodontist in private practice in London, England, and a Fellow of the American College of Prosthodontists. Besides being in private practice he is also a clinical lecturer at the UCL Eastman Dental Institute in London and runs hands-on courses in advanced aesthetic and restorative dentistry.

Mastering temporary restorations reduces stress, improves treatment results, and allows treatment of more complex cases. Good dentistry takes time, and temporary restorations are the key to allowing adequate time for individual procedures and overall treatment. Well-made temporaries will change "time" from being the eternal enemy of dentists into a useful ally.

AQ: 1

Temporary restorations are often relegated to the last few minutes of the appointment and end up playing no part in the final restoration. They act simply as a stopgap between the impression appointment and the fit appointment, and treatment is aimed at keeping the temporaries in place for as little time as possible. In an effort to ensure the temporaries are not in place for too long, patients with unsatisfactory temporaries pressurise the dentist to complete the treatment as soon as possible, and the dentist then in turn pressurises the dental technician to complete the final restorations as soon as possible (Figure 1 and Figure 2). This kind of approach only adds to the already stressful practice of dentistry.

Figure 1. Poorly made temporary crowns do not contribute information to the final crowns.

F1-2

Figure 2. Poorly made temporary crowns do not contribute information to the final crowns.

In complex cases the temporary restorations may need to remain in place over multiple appointments and undergo modification as treatment progresses (Figures 3-5). By the time the final impressions are made, the temporary restoration should provide invaluable information, such as incisal edge position and incisal guidance, for utilisation in the final restorations.[1]

F3-5

PROGRESSION OF TEMPORARIES

The initial shape of the temporaries can be improved on by chair-side refinement, but to do this the dentist must have a good knowledge and understanding of tooth structure. Modification may also be needed if adjunctive treatment is to be carried out, (eg, implant treatment or periodontal surgery). In complex cases chair-side modification may be inadequate, and it may be necessary to progress to a second set of temporaries made in the laboratory on a cast of the actual teeth preparations (Figure 6 and Figure 7).

F6-7

Figure 3. Original teeth.

Figure 6. Chair-side fabricated temporary.

Figure 8. Original teeth.

VISUALISATION BEFORE FINALISATION

In today's modern dentistry with the emphasis on cosmetic results, temporary restorations become even more important in helping to visualise the result before completion. Cosmetic appearances are subjective, and the patient's idea of a pleasing appearance may differ from that of the dentist. It is essential to make sure both dentist and patient have the same final outcome in mind before the final restorations are made.

What appears to be acceptable on a computer-generated photographic simulation or in a diagnostic wax-up may not appear as pleasing in the mouth. The temporary restorations are the only way to accurately assess the desired appearance of the final restorations. Only when both the dentist and the patient are satisfied with the aesthetic and functional aspects of the temporaries should the final restorations be made (Figures 8-12).

CASE STABILISATION AND SIMPLIFICATION

One of the biggest obstacles in treating more complex cases is the ability to keep control of the case as work is being carried out. Treatment can be simplified if it is broken down into smaller units. However, in more complex cases, it is often beneficial to complete all the final restorations simultaneously. The only way to allow for treatment of smaller units yet still be able to complete all the final restorations simultaneously at the end of treatment is to use temporary restorations.

Well-made temporaries also allow the final impression to be taken at a separate appointment from the preparation appointment. This allows time to carry out precision preparations and ensure good soft tissue health before making the final impression (Figure 13 and Figure 14). F8-12 F13 F14

Figure 4. Initial appearance of temporary crowns at time of placement.

Figure 5. Appearance of temporary crowns after undergoing chair-side modification over a period of time.

Figure 7. Laboratory fabricated temporary as next stage to Figure 6.

Figure 9. Wax up.

Figure 10. Matrix made from wax up, with temporary material.

Figure 11. Temporary veneers in place.

Figure 14. Tissue health 2 weeks after placement of temporary crown.

Materials

Generally two groups of temporary materials are available. The newer and more predominant systems are bis acryl–based and supplied in automix cartridges (Figure 15). The second group is the more traditional acrylic resin systems supplied as a separate powder and liquid (Figure 16).

F15

F16

Properties of bis acryl systems (automix cartridges) include the following:

- User friendly and foolproof for simple short-term cases
- Bonding of new material to old material is weak
- Have tacky surface layer which does not polish well and discolours over time
- Brittle and subject to breakage on removal
- Properties of acrylic resins (powder and liquid) include the following:
- Learning curve or technique sensitive
- More versatile mixing and application possibilities (eg, use of a paint brush to pick up small parts of powder and liquid or paint on a runny mix)
- Additions work well especially when polymerised under warm water in a pressure pot[2]

Figure 12. Final veneers.

Figure 15. Example of bis acryl temporary material.

Figure 13. Tissue inflammation around crown.

Figure 16. Example of acrylic resin temporary material.

- Polishes well and maintains glossy surface and colour over time[3]
- Less chance of breakage during removal because of lower modulus of elasticity (greater flexibility)
- Polymerisation shrinkage requires remargination or relining
- Exothermic reaction possible, use caution when working

In general, bis acryl systems are useful for simple cases, but when a temporary restoration is remaining in the mouth over an extended period of time and undergoing constant additions or modifications, acrylic resin is the material of choice. In edentulous spans of more than two teeth, it may be necessary to prepare a metal framework or use fibre reinforcement to increase fracture resistance.[4]

CEMENTATION AND RETENTION

The cements of choice over the years have been zinc oxide eugenol based, and these are probably still the most popular. One problem with these temporary cements is that eugenol reacts with resins and affects polymerisation.[5] This tends to soften the margins of the temporary and creates problems when making additions to marginal areas of preexisting temporaries. For optimal results the temporary material should be roughened before additions are performed. For the same reason, eugenol-containing cements should not be used on teeth that are going to have resin cements used on them. To avoid this problem, noneugenol temporary cements can be used, although they tend to be less retentive and have a shorter setting time. For nonretentive preparations (eg, tooth-coloured onlays), it may be necessary to use a permanent cement, such as polycarboxylate or zinc phosphate cement (Figures 17-19). When the temporary onlays are removed at a later stage, these ce-

F17-19

Figure 17. Nonretentive ceramic-only preparation.

ments tend to bond quite tenaciously to the tooth surface, needing to be removed with an ultrasonic scaler.

Figure 18. Acrylic resin temporary onlay.

Figure 19. Temporary only cemented in place with polycarboxylate cement.

Figure 20. Removable temporary veneers.

Retaining temporaries on veneer preparations is often seen as a problem. One solution proposed is to allow the temporary material to cure on the teeth, effectively shrink-locking them into place. The temporaries in effect can then only be removed by breaking them off at the time of cementation of the final veneers. This method has the disadvantage of not having any temporary luting cement in place which allows for micro leakage. A better option is to make the temporary veneers removable initially. Once they have been cemented in place, they can then be locked in place mechanically by beading acrylic resin into the embrasures from the lingual or palatal aspect (Figure 20 and Figure 21).

TRANSFER OF INFORMATION

Once time and effort have been spent on creating a functionally and aesthetically correct temporary restoration, the information needs to be transferred to the dental technician for use in the final restoration. One of the most important pieces of information that can be obtained from the temporary restoration is the incisal edge position. Incisal edge position depends on aesthetics, speech, and incisal guidance, all of which take time to assess and determine. As such, it is not possible to determine incisal edge position from static photographs or on a set of study models; it needs to be determined in the mouth, over a period of time, using temporary restorations. It is also essential to ensure stability of occlusion with the temporary restorations in place because this occlusal relationship will be copied into the final restoration.

To transfer this information an impression should be made of the temporaries in place. The dental technician must be able to cross-mount the cast of the temporaries with the cast of the preparations. This may require more than one jaw relationship record to be made.

Figure 21. Temporary veneers cemented into place and then mechanically locked into place on the palatal aspects.

TOOTH REDUCTION GUIDE

The temporary restoration should always be made before the final impression is made. By measuring the thickness of a correctly adjusted temporary, it is possible to verify that adequate tooth reduction has been performed. If necessary, the preparation can be modified before the final impression is made.

In more complex cases, once the desired functional and aesthetic shape of the temporaries have been approved, the final tooth reduction required can be determined from the outer surface of the temporaries (Figure 22 and Figure 23). In this regard, there is some benefit as to not finalising the tooth preparations until the

Figure 22. Thickness of temporary crown measured with thickness gauge to verify adequate tooth reduction.

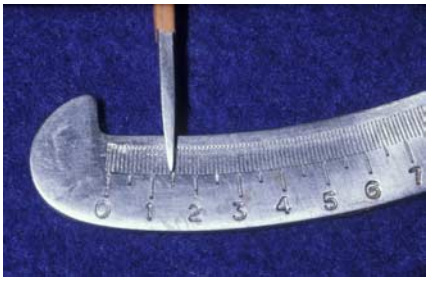

Figure 23. Thickness of temporary crown measured with thickness gauge to verify adequate tooth reduction.

outer shape of the temporary restorations are correct. In some cases less reduction of tooth surface than originally thought may be required.

CONCLUSION

To move forward in the treatment of patients, it is essential to master the skill of making good temporary restorations. High-quality final restorations will be preceded by high-quality temporary restorations. With good temporary restorations comes time and with time comes improved quality and enjoyment.

Acknowledgement

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