WARMED COMPOSITE RESTORATIONS

BETTER FOR THE PATIENT AND THE DENTIST

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A Publication by

AdDent INCORPORATED

Advancing Dental Excellence

AS A PROFESSION, we have a problem with the placement of composite restorations. Despite improvements in materials and techniques, the overall quality of the restorations has not improved as was expected (Figure 1)

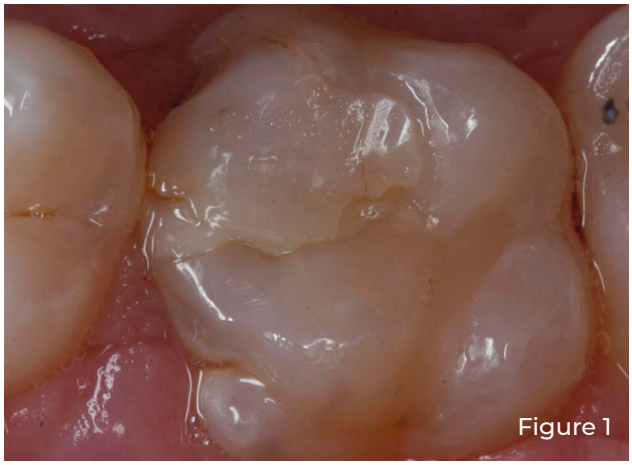


Figure 1

Some of this is related to the science of the physical and mechanical properties of the composite material itself. Some is related to the skill of the person performing the task, while still more is unfortunately controlled by economic pressures. In my practice I have attempted to simplify the process, expand its utility, while at the same time produce the best possible restoration. We can do better.

PROCESS CRITERIA

Placement of a satisfactory composite restoration involves several criteria, each coming with its own respective challenge to success. In no particular order they are:

1. **COMPLETE FILL.**
2. **PROPER INTERPROXIMAL CONTACT.**
3. **ADEQUATE CURING.**
4. **SATISFACTORY ACCOMPLISHMENT** of 1-3 regardless of patient driven restrictions, i.e. limited mouth opening, tooth position and location, specific dimensions of the interproximal areas, and the damage present to the tooth itself.

All of this while keeping an eye on the bottom line. My solution involves a combination of indirect and direct composite placement as the case study below will demonstrate. Interestingly, it has been introduced as biomimetic dentistry.

CASE STUDY

FIGURE 2 ILLUSTRATES a typical example. The restoration would involve the DOB surfaces of tooth #19. Insurance coverage for an onlay restoration was denied. Financial considerations of the patient limited the restorative choice to a direct composite. Figure 3 shows tooth #19 following the removal of the previous restoration. Note the wide intercuspal distance along with the wide interproximal space. Remember, the final restoration must satisfy all the criteria listed above in this challenging situation.


Figure 2


Figure 3

FIGURES 4-14 OUTLINE THE PROCESS. It begins with an occlusion check to identify centric stops along with any adjustments necessary to the opposing dentition. Doing this allows one to know areas of adjustment prior to restoration construction. Next isolate the dentin with a layer of bonded composite. Doing this soon after the preparation will improve dentin bond strength. Place your selected bonding agent according to the manufacturer's instructions. Warm composite is then placed into the cavity using the Compex HD composite dispenser from AdDent (Danbury, CT.). This device warms any composite compule to 155 degrees F. It is important to work quickly because the composite temperature will drop rapidly once it leaves the compule tip. Warm composite is ideal not only because of its obvious flow which facilitates a complete fill, but also because it requires less light energy for cure as compared to room temperature composite. It has become an integral, indispensable part of my armamentarium. As much as possible, complete the preparation so that the exposed surfaces are limited to enamel and composite. Next take a simple alginate impression of the area, Figure 5. Generate a flexible die by filling that impression with a medium viscosity fast set PVS impression material of any brand. Then add any fast set PVS bite material in order to create a solid base, Figure 6. The goal of this die is to aid in the creation of an outer shell of the final restoration (Figures 7-13). This shell will help to develop an ideal interproximal contact. In addition, it will be

CASE STUDY

possible to adjust the contour and contact to correct any deficiencies when the shell is placed in the tooth at try-in. The final restoration is completed by utilizing warm composite as the cement (Figure 14).


Figure 4

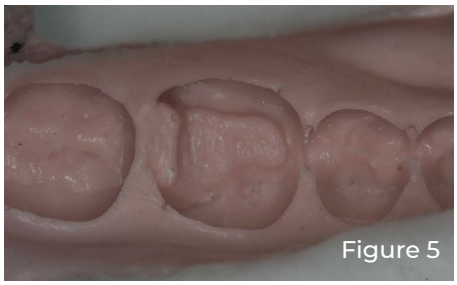


Figure 5

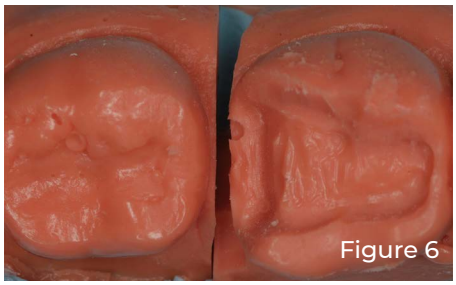


Figure 6

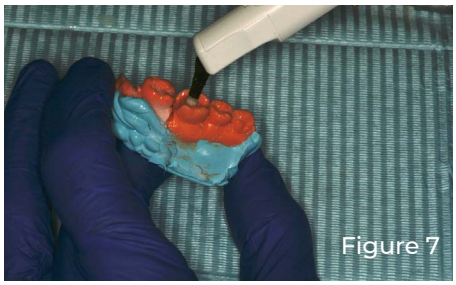


Figure 7

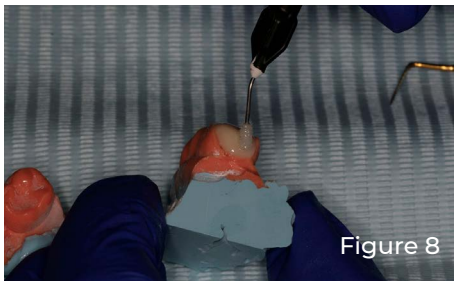


Figure 8

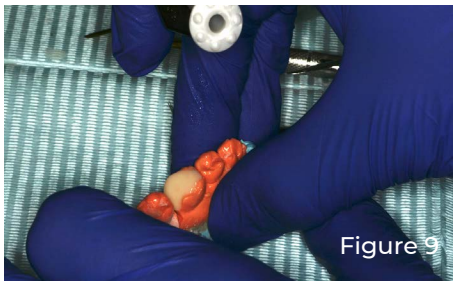


Figure 9


Figure 10


Figure 11

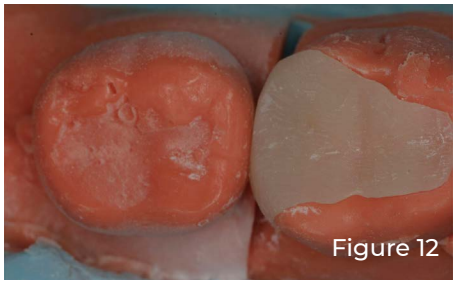


Figure 12


Figure 13

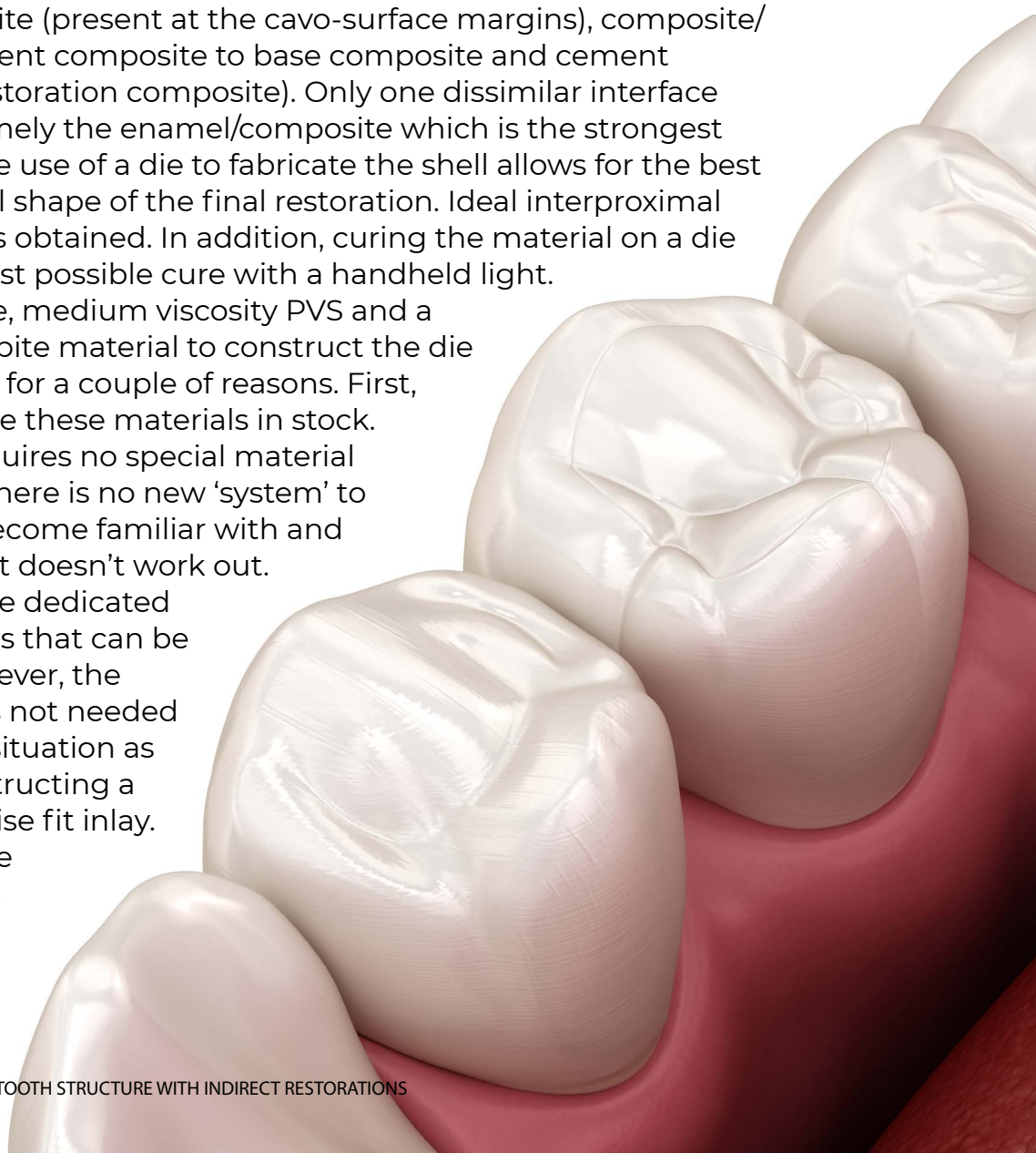

Figure 14

Figure 4. Tooth #19 followingplacement of a composite base. **Figure 5.** Alginate impression of #19 preparation. **Figure 6.** Working die for #19 restoration. Criteria for ordinary crown and bridge die not in play here as long as defects (ie bubbles) not severe. Die only used to create outer shell of restoration. **Figure 7.** Using the Compex HD warm composite dispenser (AdDent, Danbury, CT) to fill working die. Warm composite is ideal so as to limit pressure on the flexible die which ensures the die can maintain structural integrity throughout the procedure. **Figure 8.** Manipulating the uncured composite with wetting resin in order to facilitate creation of the ideal shape of the composite shell. **Figure 9.** Creation of the ideal interproximal contact by placing the two halves of die system together prior to cure. **Figure 10.** Fine tune of embrasure contours prior to cure. **Figure 11.** Material cure with handheld light. Removing shell from die following initial cure will ensure maximum possible cure with this device. **Figure 12.** Roughed out shell shape with round end tapered diamond bur **Figure 13.** Try in of completed composite shell. **Figure 14.** Completed restoration.

DISCUSSION

REGARDLESS OF THE RESTORATIVE MATERIAL USED, if the restoration is excessive in any of the three dimensions, the stresses of expansion and contraction from temperature variances within the oral cavity and the variable occlusal stresses over time can cause tooth fracture. In a bulk fill composite bonded situation, there are 2 dissimilar interfaces within the tooth restoration complex, namely the dentin-composite and the enamel-composite. The large bond strength differences of these interfaces coupled with the large mass of material can fracture the cusp. The solution is to have the fewest number of dissimilar interfaces possible. This is accomplished by constructing part of the restoration outside of the mouth on a die. Constructing the outer part of the overall restoration separate from the base composite and then combining them with warm composite produces the following interfaces within the tooth: enamel/composite (present at the cavo-surface margins), composite/composite (cement composite to base composite and cement composite to restoration composite). Only one dissimilar interface is produced, namely the enamel/composite which is the strongest one possible. The use of a die to fabricate the shell allows for the best possible external shape of the final restoration. Ideal interproximal contact is always obtained. In addition, curing the material on a die allows for the best possible cure with a handheld light.

Utilizing alginate, medium viscosity PVS and a heavy duty PVS bite material to construct the die is advantageous for a couple of reasons. First, most offices have these materials in stock. This method requires no special material or equipment. There is no new 'system' to purchase and become familiar with and be stuck with if it doesn't work out. Second, there are dedicated PVS die materials that can be purchased. However, the extra accuracy is not needed because in this situation as one is only constructing a 'shell' not a precise fit inlay. Warm composite makes up the fit difference.



CONCLUSIONS

MANY PRACTITIONERS continue to manipulate composite restorative as if it were amalgam. Unfortunately, there are several constraints that must be reconciled when utilizing composite as a restorative. The best solution appears to be a combination of indirect and direct placement. That combination will result in the best quality restoration possible in the least amount of time possible and satisfying all of the criteria above. As a final thought, the processes outlined here demonstrate the true value of biomimetic dentistry. It is not desirable to cut and remove tooth structure. Once cut, it's over. This sounds elementary, but it is easy to lose focus with this concept. In my opinion, it's not so much how long the restoration lasts but how stable the tooth itself remains. Removing a restoration periodically to reassess the tooth core, clean underneath and rebond may be a way of conserving the maximum amount of tooth structure. In fact, replacing a restoration every 10 years or so to insure a stable natural tooth base may just prevent future loss of the tooth itself or at least until new technologies eliminate the need for periodic replacements.

References:

Telich, M. The Indirect Resin Nano-Ceramic Restoration, *Dentistry Today* July/August 2021 Volume 40 #6. 114-117

Chairside Live, Glidewell Labs. Episode 34: Dr Gordon Christensen Part 2 https:/Youtube/eqb951b3okM