

The Solution for Multi-Surface Direct Restorations

The materials we use in dentistry have changed immensely over the past few decades, yet many of the techniques dentists are taught have remained the same. This leaves many of us using outdated methods and then becoming frustrated by our inability to consistently deliver results that serve our patients well. This is especially true for creating multi-surface direct restorations, which is one of the most common procedures clinicians perform, yet has the potential for many different shortcomings.

I have been placing bonded, tooth-colored direct restorations for the past 25 years. It has been my experience that it is possible to place these restorations predictably if we are taught the proper technique.

This three-part paper will present information and solutions that will help you avoid possible frustrations and turn them into celebrations.

Part I: Considerations of the Matrix System Used

Part II: Tips to Achieve Natural Contours and Tight Contacts

Part III: Advanced Techniques for Dealing with Real Clinical Situations

PART I: CONSIDERATIONS OF THE MATRIX SYSTEM USED THE EVOLUTION OF MATERIALS AND THE EVOLUTION OF THE CHALLENGES

I am in the middle of three generations of dentists who were taught how to place an amalgam restoration using a tofflemire matrix band (Figure 1) and a wood wedge. For amalgam restorations, this system worked great. We placed the metal band, cinched it around the tooth and then wedged the gingival floor closed with a soft, contoured wood wedge and burnished the band toward the contact. We then packed the amalgam into the preparation, deforming the band even further toward the adjacent tooth. After packing, we removed the band and wedge and then used an interproximal carver to remove the excess at the gingival floor of the preparation and shape the interproximal contour. Then we flossed the contact between the restoration and the adjacent tooth. We could do this because the amalgam was denser than composite and set slowly, so we could carve it. This is different when using composite.

The combination of a tofflemire matrix with amalgam as our filling material worked well. But dentistry evolved. When we moved from creating amalgam restorations to placing more esthetic bonded composite restorations, the tofflemire system began to present some challenges. Although it's what I was taught in dental school, I have rarely used a tofflemire matrix band in the past 20 years.

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Figure 1. The old, dependable tofflemire band.

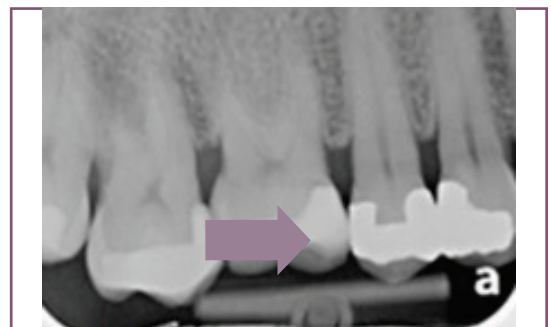


Figure 2. The use of the tofflemire matrix with amalgam served us well.

THE CHALLENGES WITH THE OLD SYSTEM

Today, we place composite restorations instead of using amalgam. The composite materials are not stiff and packable like amalgam, and they do not deform the band or push it toward the adjacent tooth. A composite restoration placed with a tofflemire band often lacks the proper anatomic contour interproximally (Figure 3) and has greater chance of an open interproximal contact.

Even in a case where the tofflemire band created an acceptable interproximal contact, the shape of the straight band positions the contact more occlusal than the location of the original anatomic contact. This means that even if there was a tight contact initially, the occlusally positioned interproximal contact may be eliminated after adjusting the occlusion, leaving an open contact once again (Figure 4).

In order to create successful composite restorations, we need a system that creates the correct contour, contact, and marginal ridge without excess material and with minimal adjustment. When a composite restoration has been created with a circumferential band, the excess composite at the margins is typically not removed until after curing. This means that if the band did not follow the tooth contours well, there is a great deal of excess composite material that has to be removed with a bur. Excess composite at the interproximal gingival margin is very difficult to remove. If it's present in great excess, it is often more expedient to remove the restorative material entirely and refill the preparation. All of these complications lead to a lot of frustration, and they are all too common. But we can now change that.



Figure 3. A metal matrix band moves the contact of the composite restoration occlusally.

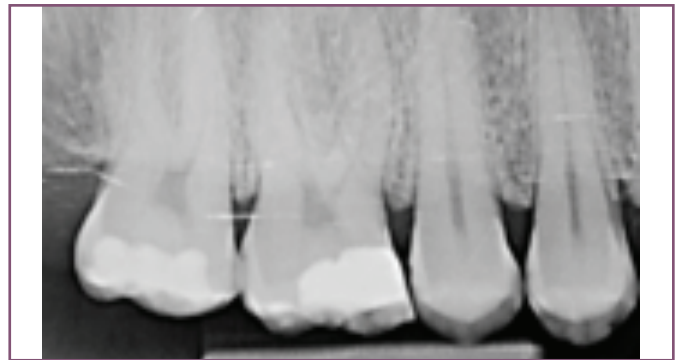


Figure 4. Composite restoration placed with a metal matrix band.

THE NEW SYSTEM

Enter a new innovation—sectional matrix systems, such as the Triodent® V3 system (Figure 5). The Triodent® V3 sectional matrix system™ utilizes metal matrix bands that create a tight, anatomically contoured interproximal contact and a nice marginal ridge. The system also has wedges that seal the gingival floor margin under the contact point, as well as rings that place tension to hold the metal matrix in place and slightly open the contact. This temporary opening of the contact compensates for the matrix thickness. The introduction of sectional matrix systems has opened up greater opportunities to easily produce high-quality restorations using the advanced materials available to us as dentists.



Figure 5. The Triodent V3 System

PART II: TIPS TO ACHIEVE NATURAL CONTOURS AND TIGHT CONTACTS

USING TRIODENT V3 SECTIONAL MATRIX SYSTEM

One key to creating a successful restoration with a sectional matrix system is to select the proper size of matrix band. In the V3 system, matrix bands come in 5 sizes. Figures 6a and 6b show that the matrix band has a nice contour, placing the interproximal contact right where it should be. They also show how the marginal ridge is contoured by the occlusal curve of the matrix.

Triodent V3 matrix bands have tabs that can be grabbed with the Triodent Pin-Tweezers to make placement and removal easier (Figures 7a and 7b). These tabs should be folded away from the preparation, allowing access and improved visualization. The wedge is placed to seal the matrix at the gingival floor margin and displace the gingiva (Figure 8). The wedges also are designed so the Triodent Pin-Tweezers can grip them for placement and removal. I like to place my finger on the matrix band so that it is not displaced occlusally while the wedge is placed. There are 3 sizes of wedges and it is important to use the largest one that is able to be placed interproximally. The wedges are designed to contour the matrix against the adjacent tooth on the buccal, lingual, and gingival margins and fit below the contact point (Figure 9).

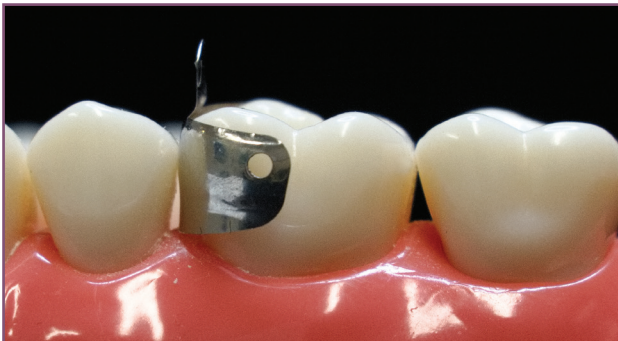


Figure 6a. Sectional matrix in place, showing nice contours.



Figure 6b. Sectional matrix in place, showing nice contours.



Figure 7a. Matrix being held with Triodent Pin-Tweezers for easy placement.

Figure 7b. Matrix being held with Triodent Pin-Tweezers for easy removal.

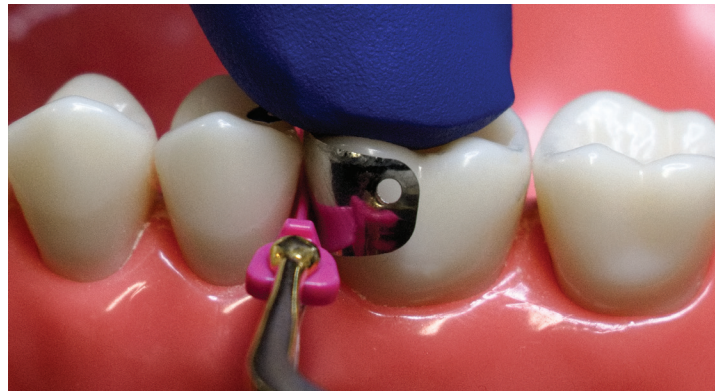


Figure 8. The wedge is placed while the matrix band is held down to prevent dislodgement.



Figure 9. Occlusal view (left) and side view of wedge, showing unique shape for proper contours.



Figure 10. Two sizes of V3 Rings: green for molars and yellow for bicuspsids.

After the matrix band and wedge are placed, we place the V3 Ring™, which secures all the parts into place. The ring also slightly displaces the teeth to temporarily open the contact ever so slightly to compensate for the thickness of the matrix, which is only 0.015” thick. There are two sizes: one for the larger posterior teeth and one for smaller teeth like bicuspids (Figure 10).



Figure 11. Inverted V-shaped tines allow the ring to be placed over the wedge.



Figure 12. The tines of the V3 Ring wrap into the interproximal contours and under the height of contour.

The inverted V-shaped tines allow the ring to fit over the wedge (Figure 11). The tines flare and widen to securely engage the anatomical undercuts of the tooth, while the inner walls of the tines form the matrix band to fit tightly against the axial-cavo margins of the tooth's preparation (Figure 12). There is also a subtle angulation of the rings, which allows the rings to be stacked (i.e., placed one over the other).

It is time to use a system designed for the esthetic bonded materials you are using. Ultradent's Triodent V3 system gives you a predictable way to establish the natural contours of the tooth using the V3 matrix, wedge, and ring (Figure 13). The Triodent V3 system shapes the restoration naturally so there is very little need for post-placement finishing. As you master the simple procedure, you will see that creating multi-surface direct restorations can be done very predictably and efficiently. Your patient will enjoy properly fitting restorations that should last a very long time.

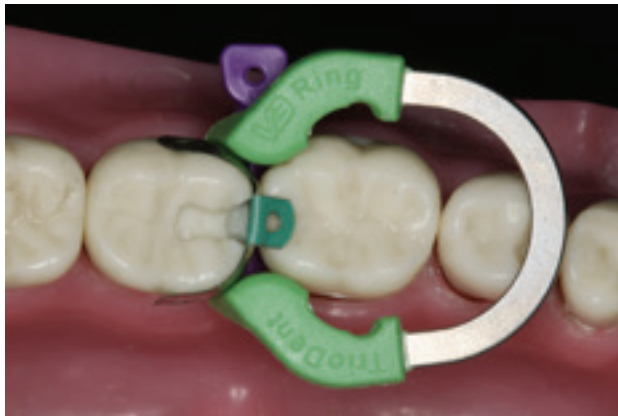


Figure 13. Preparation is ready to be filled.



Figure 14. Triodent's V3 matrix system.

PART III: SOLUTIONS TO SPECIAL SITUATIONS USING TRIODENT'S V3 SYSTEM

In Part I and Part II of this paper, we discussed the need for a better matrix system that is capable of creating naturally contoured multi-surface composite restorations, which are the most common composite restorations placed. Part I addressed the differing physical properties of amalgam and composite, which require different placement techniques. Part II discussed the use of the Triodent V3 sectional matrix system to create natural contours and tight contacts and to minimize post-op adjustments, saving the clinician significant time. Part II also addressed the proper placement of the matrix, wedge, and ring of the Triodent V3 matrix system. When this placement recommendation is followed, the clinician will be able to place the composite restorative material successfully in most cases. However, as with any system, there are clinical situations that are not ideal.

The Triodent V3 system is quick and easy to use for Class II restorations. However, special circumstances may arise, such as the following:

1. An MOD restoration is needed
2. Two interproximal surfaces between two teeth need restoration
3. There are multiple teeth in the same quadrant that require restoration
4. There is a wide interproximal box
5. There is a large interproximal gingival embrasure
6. There is a need to fit the V3 Ring around the rubber dam clamp
7. There are concerns about open contacts

Part III of this paper will address some of these challenging situations and provide recommendations so the clinician can still successfully place an esthetic, well-contoured restoration using the Triodent V3 matrix system.

THE MOD RESTORATION

When restoring a tooth with the mesial, distal, and distal surfaces affected, a clinician has two configurations they can use for the V3 Rings. The V3 Ring is designed with the tines angled from the circular body, allowing rings to be stacked one on the top of the other (Figures 15 and 16).



Figures 15 and 16. V3 Rings stacked one over the other.

The rings can also be placed in a position that resembles a butterfly, with one ring positioned distally that is placed on the distal surface and one ring positioned mesially that is placed on the mesial surface (Figures 17 and 18).



Figures 17 and 18. V3 Rings placed in a butterfly configuration.

TWO INTERPROXIMAL SURFACES BETWEEN TWO TEETH REQUIRE RESTORATION

When restoring two teeth with interproximal decay, one option is to prepare and restore each tooth one at a time. However, it is often more efficient to prepare both teeth and use the Trident V3 system to fill the restorations simultaneously. When a clinician is restoring back-to-back preparations, two matrices may be placed using one wedge and one ring (Figure 19). One matrix is positioned on the distal side of the DO preparation and one matrix is positioned on the mesial of the MO preparation. Caution must be used to be sure that the matrices are positioned to create the correct size and shape of the interproximal contact. The two matrices must be touching to ensure a good contact. The preparations can be filled one at a time, or both can be filled simultaneously. Once the fillings are placed and cured, the ring, wedge, and matrices may be removed. The gingival box must be checked to ensure there are no overhangs and that the contact is tight. The occlusion can then be adjusted and the restoration is polished.



Figure 19. Two matrices are placed with one wedge and one ring to secure them.

MULTIPLE TEETH IN THE SAME QUADRANT REQUIRE RESTORATION

When completing multiple restorations in one quadrant, we sometimes have to rely on stacking and butterflying the rings (Figures 20 and 21). There is typically enough space left to access the preparations between the rings.



Figures 20 and 21. Multiple rings are placed by being stacked and butterflyed.

A WIDE INTERPROXIMAL BOX

When the box of the preparation is overextended to the buccal and/or lingual surfaces of the tooth, placement of the ring often results in the matrix being crushed into the preparation (Figures 22 and 23). When preparing the tooth, try to keep some of the cervical area of the tooth so the tines have some tooth structure at the bottom of the box with which they can engage (Figure 24). Compare the buccal gingival margin placement in Figure 22 with the preparation in Figure 24, which has tooth structure with which the tines can engage.



Figure 22. Overextended preparation creates a challenging situation for tines to engage with the tooth.



Figure 23. View of the overextended lingual margin.

Another approach for restoring a tooth with an overextended box is as follows: 1) Complete your bonding protocol. 2) Place a little composite with just the wedge and matrix in place (Figure 25). 3) Fill the overextended portion of the preparation to get a lingual and/or buccal contour in the gingival portion of the preparation that is sufficient to retain the V3 Ring. 4) Cure the composite. 5) Place the V3 Ring. 6) Fill the tooth as previously described.



Figure 24. The mesial-buccal of the tooth was retained to help hold ring.



Figure 25. In this overextended preparation, the matrix is held in place with the fingers to better adapt the matrix while the first portion of composite is placed and cured. Then, the ring is placed.

LARGE INTERPROXIMAL GINGIVAL EMBRASURE

Facing a case with a large interproximal embrasure illustrates how well thought-out the Triodent V3 system is. The wedges are designed with a hollow underside. This allows the wedges to squeeze between the teeth and then expand outward again once placed. This hollow design also allows placement of multiple wedges from different directions to fill larger embrasure spaces (Figure 26 and 27).



Figure 26. One wedge is placed from the buccal and one from the lingual.



Figure 27. A ring is added.

FITTING THE V3 RING AROUND THE RUBBER DAM CLAMP

If a clinician has difficulty fitting the V3 Ring around the rubber dam clamp, there are three solutions I recommend.

First, try repositioning the clamp and the ring to fit in the mouth simultaneously. This might mean adjusting the ring's position mesially or distally as shown in Figures 29 and 30.

Another solution is using a clamp with smaller wings or no wings, if that is the problem. You can also modify the rubber dam clamp by removing some of the metal from the wings that are preventing the V3 Ring placement. It is important not to compromise the integrity of the clamp, as this might cause it to fracture in the patient's mouth.

Lastly, consider foregoing the rubber dam and use another system for isolation, such as the DryShield^{®1} or Isolite^{®2} systems, which retract the tongue and cheek while providing suction and a dry field. If there is any gingival bleeding or crevicular fluid weeping, use a laser to trough or use a hemostatic agent or retraction paste.



Figure 28. Teflon plumber's tape is plugged into embrasure space to create a tight contact.



Figure 29. Clamp and ring are distally positioned.

1. DryShield is a registered trademark of DryShield LLC. 2. Isolite is a registered trademark of Zyris, Inc.



Figure 30. Clamp is positioned mesially and clamp distally.

CONCERN ABOUT OPEN CONTACTS

The VALO® curing light has magnetic lens attachments available, including large and small ProxiCure Ball lenses. These lenses can be placed over the composite in the box of the preparation to push the matrix against the adjacent tooth contact. Then the composite can be cured with the VALO light to hold the contact (Figures 31 and 32). Usually this step is not necessary, but it is an option for clinicians who are concerned about their contacts.

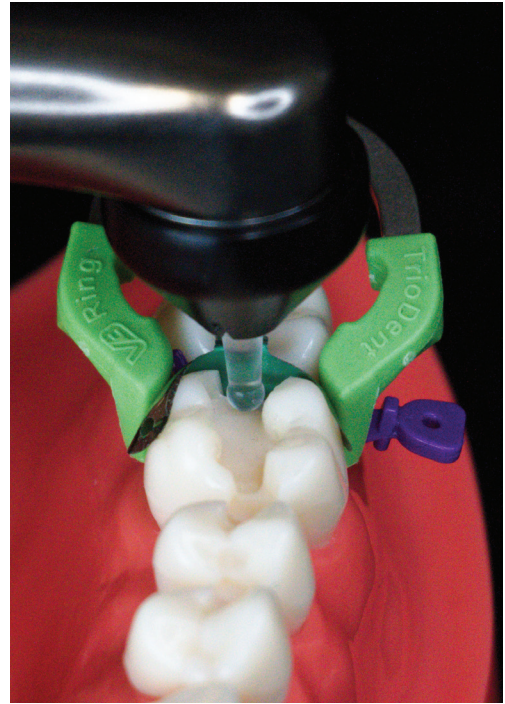


Figure 31. The ProxiCure Ball lens is used to push the matrix against the adjacent tooth contact.

We hope this discussion of sectional matrix systems has provided solutions that will help you place many well-contoured, well-fitting multi-surface composite restorations. ■

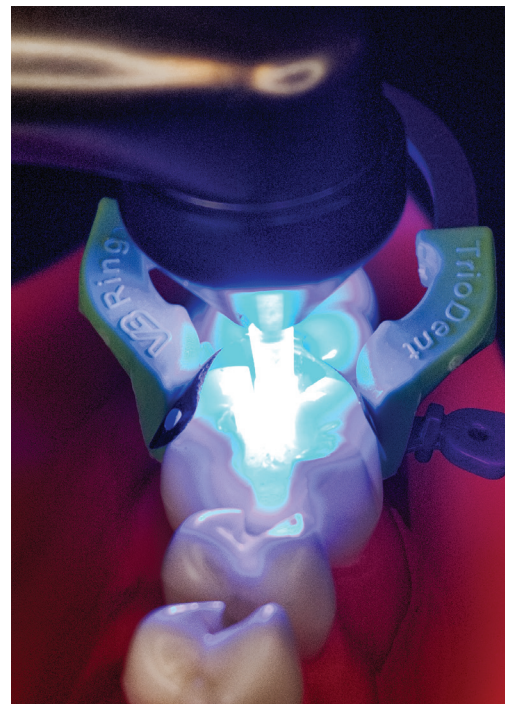


Figure 32. Composite is cured.



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– Dr. Miyasaki

