

The Pre-polymerized Ball Technique for obtaining posterior composite proximal contacts

by Drs. Van B. Haywood & Kevin Frazier

One of the biggest frustrations in restorative dentistry when placing posterior composite restorations is achieving an adequate proximal contact. The dentist can perform everything correctly from the anesthesia to the isolation to the preparation to the placement of the composite and light-curing, but if there is an open proximal contact, that's all the patient knows about, and it is what they remember about the dentist. It's imperative that the dentist have a system that will ensure an appropriate proximal contact to avoid interproximal food packing problems and the associated periodontal issues over time. Many techniques exist for achieving a solid interproximal contact with direct placement composite restorations.¹ The purpose of this article is to present a historical restorative strategy called the "pre-polymerized ball" technique, in conjunction with some of the newer segmental matrices and finishing techniques. There are different hand instruments and light-curing tips that have been used in the past to create a proximal contact, but each of those require having an instrument available for each patient and necessitate having the instrument fit the potentially different sizes of the proximal box. This article describes an older technique called the "pre-polymerized ball" technique, where the dentist creates the composite ball from the existing composite material at the size needed to ensure an adequate proximal contact and polymerizes it prior to insertion into the preparation.² With this technique the dentist can customize the ball size to fit the prepared proximal box.

The first decision is whether to use a segmental matrix band, which only covers one proximal surface, or whether a circumferential matrix band is needed. In either case if the matrix is not well-adapted and clearing contacting the adjacent tooth prior to placement of the restoration, then an adequate proximal will not be achieved. There are a variety of

segmental matrix bands on the market as well as circumferential pre-burnished bands which provide good contour when the space is available between the teeth for a pre-burnished band.³

This article demonstrates the use a segmental matrix band for a DO composite restoration on a mandibular molar. The first step is to achieve adequate isolation with a well-adapted rubber dam (Figure 1), followed by placing a tight wooden wedge in between the teeth before initiating the preparation ("pre-wedging"). This wedge will protect the gingiva and displace the rubber dam downward by depressing tissue, as well as begin moving the teeth apart much like an orthodontic separator. If the wedge gets in the way when preparing the gingival extension of the box, then it should be cut during the preparation as if it were tooth structure.

When the preparation is completed (Figure 2) with all caries is removed, then the tooth is prepared for bonding. Place the appropriate matrix to seal the margins and achieve proximal contact (Figure 3). Note that segmental matrix bands use a soft wedge for gingival marginal adaptation, not separation. The separation needed to account for the thickness of the band is provided by the ring. Inspect the matrix from the proximal and occlusal to ensure that it clearly contacts the tooth (Figure 4). If not, reposition the band and ring to achieve proximal contact. Now create two small composite balls that are slightly smaller in diameter than the axial depth of the proximal box. Do this by placing a small amount of unset composite material on the bracket table and roll it into a ball with a composite handling instrument or uncontaminated gloved hands. It is best to create two composite balls in case one is too big or is dropped while transporting from the bracket table to the tooth preparation. Completely light cure the two balls of composite material. Return to the preparation and complete the bonding steps (e.g. etch, prime, and bond) as appropriate



Fig 1



Fig 2



Fig 3



Fig 4

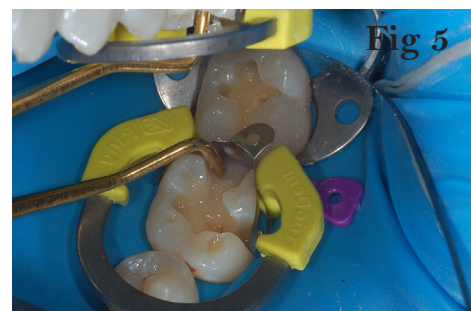


Fig 5



Fig 6

Figures, from top right:

Figure 1: Pre-operative teeth with ICDAS 3-4 caries isolated with a rubber dam.

Figure 2: Preparations completed (#31 O, #30 DOB)

Figure 3: Segmental matrix band and contouring wedge placed

Figure 4: Verifying the matrix band has good contact with adjacent tooth

Figure 5: First increment of composite material placed on gingival floor and light-cured

Figure 6: Second increment of composite material placed against matrix band leaving a small pocket, but not cured.



Fig 7



Fig 8



Fig 9



Fig 10



Fig 11

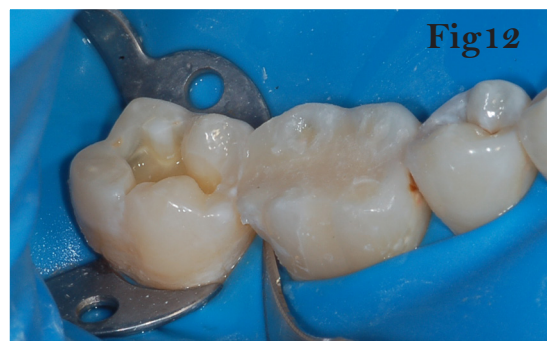


Fig12

Figure 7: Pre-polymerized ball of composite material placed into the pocket and unset material is adapted around it.

Figure 8: Parallel-sided instrument (e.g. a condenser) is used to press the ball through the composite material against the matrix band and held tightly during curing.

Figure 9: Remainder of preparation incrementally filled, with final layer burnished to form with a ball-shaped burnisher wetted with bonding agent before final curing.

Figure 10: Latch-type round bur used at slow speed to level marginal ridges and trim composite back to margins without damaging enamel.

Figure 11: #12-scalpel blade is "safe sided" using a metal-cutting bur to only leave the last 3-5 mm of blade for cutting on the inner curve.

Figure 12: #12-scalpel blade used to trim gingival margins and proximal margins.

for the system being used. Place a small amount of composite material in the depth of the box and pat the material along the gingival floor and into the proximal corners (Figure 5). Cure this first increment with the appropriate curing light positioned perpendicular to the floor of the box to obtain a full cure. The second increment of composite material is placed and patted up against the matrix band to form the contact, but not cured (Figure 6). Place the pre-polymerized ball of composite material that you have created into the unset composite material (Figure 7). Before placing the instrument on the composite, ensure that there are not any gaps between the set ball of composite and the unset composite in the box. Gently pack the unset composite around the ball. Using a parallel-sided condenser or plastic instrument, press the ball at a diagonal angle gingivally and toward the proximal contact with firm pressure and maintain it (Figure 8). The direction of this force vector will move the matrix band tightly against adjacent tooth and provide a broad, more gingival proximal contact. Continue holding the instrument-ball in place with firm pressure while the assistant light-cures the composite. Once this increment of composite is set, then continue to restore your restoration as normal. After the resin is filled to the surface of the

occlusal cavo-surface margins, burnish this final increment pre-curing to create initial occlusal anatomical (Figure 9) and to provide a good marginal adaptation. Perform the final light-curing step and then remove the matrix band.

One conservative strategy for the initial finishing of the occlusal margins of the composite restoration is to use the same latch-type round bur which was used for caries

removal (Figure 10). The latch-type bur used at slower speeds will not cut enamel readily but will cut composite easily. This slow-speed bur approach avoids the use of a high-speed handpiece and the resultant inadvertent loss of tooth structure while removing any marginal flash along the occlusal surface of the restoration. This technique can also be applied to removing excess cured sealant material while adjusting the occlusion without losing any enamel. With an electric handpiece which have increased torque, the speed should be under 5000 RPMs to avoid cutting the enamel.

One of the best instruments for removing any flash on the proximal and the gingival margin is a #12-scalpel blade. This curved blade has the cutting edge on the inside edge, while the outside has a smooth non-cutting edge. The scalpel blade is so sharp that you can carve cured composite much like amalgam. To use the blade, the cutting edge should be trimmed such that only the last 3 to 5 mm of the blade is used interproximally (Figure 11). A palm-thumb grasp provides excellent control. This approach can be used not only in the gingival and proximal embrasures (Figure 12), but also in the occlusal embrasure to provide the appropriate marginal ridge shape without damaging the tooth or opening the embrasure too large. When carving on an enamel, the blade feels like it is contacting glass, so it slides easily. When carving the composite, the blade bites or digs into the surface with resistance. Much like carving unset amalgam, only shave small amounts of composite material at a time. This technique allows smooth margins without opening the embrasure or damaging the enamel with a high-speed handpiece and bur. Now evaluate the clinical adequacy of the proximal contact, contours and margins (Figure 13).

Complete the finishing techniques to finalize the restoration, then remove the rubber dam and evaluate the occlusion (Figure 14). It is wise to assess the pre-operative occlusal contacts prior to the initiation of the restoration since some patients are unable to close back into maximum intercuspation after being open for a while.

If the patient feels like the restoration feels high to them, and it is obvious that they are not occluding on a surface that that was restored, it may be that there is residual bonding agent on the unprepared enamel. This is another situation where the latch type round bur in the slow speed can be used for adjusting those presumed high occlusal markings (Figure 15). Because the enamel will not be removed, then the occlusal contact will not be lost, but adjustment will remove the extra 25 microns



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of composite bonding agent that may be on the tooth (Figure 16) causing the restoration to feel high to the patient.

The use of a pre-polymerized ball technique with a segmental matrix to obtain a tight well-contoured proximal contact, the ball burnisher for composite marginal adaptation, the #12-scalpel blade for gingival and proximal excess, and the latch-type round bur for margination can result in an excellent outcome for a directly placed Class II composite restoration.

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Figure 13: Verifying that a tight proximal contact is obtained

Figure 14: Occlusion evaluated but patient reports that it feels "high"

Figure 15: Adjustment of occlusion with latch-type round bur removing bonding agent

Figure 16: Final restoration has appropriate occlusion and proximal contact.



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The dentist can
perform everything
correctly...but
if there is an
open proximal
contact, that's
all the patient
knows about, and
it is what they
remember about
the dentist.”

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