



OVERCOMING THE CLASS II CHALLENGE

Presenting clinical solutions to the common problems faced when placing Class II direct composites.

Direct composite restorations that involve posterior proximal surfaces are a common finding in many dental patients. Unlike dental amalgam, which can be a very forgiving material technically and can be condensed against a matrix band to create a proximal contact, proper placement of composite restorative materials presents a unique set of challenges for the operative dentist.

Although the adhesion process is well understood by most clinicians when it comes to isolation and execution, some steps in the placement process can cause difficulty, ultimately leading to a less-than-desirable end result. This article will discuss three specific areas: management of interproximal soft tissue; creating proximal contour and contacts; and finishing and polishing the restoration.

Management of interproximal gingival tissue

The proximal gingival margin presents the most common area for the adhesion process to fail. Compounding the problem is the inability to gain access to the area to affect a repair without removing the entire restoration. According to Dr. Ron Jackson, bonded restorations are unique because minor defects (decay or microleakage) at the marginal interface often can be renewed or repaired by removing the affected tooth structure and repairing the restoration using additional composite restorative material. Because of the bond of the restorative material to enamel and dentin, further recurrence of the defect usually is self-limiting. (*Note:* The same does not hold true for metallic restorations that are not bonded to tooth structure.)

Access is not possible, however, if the defective area is at the proximal gingival margin or line angle. Therefore, precise marginal adaptation of the direct composite restorative material and the seal of this



(1) This occlusal preoperative view of a maxillary molar with radiographic decay on the mesioproximal surface. (2) An occlusal view during cavity preparation. Note how the FenderWedge protects the adjacent proximal surface while the proximal box is refined with a 330 carbide bur. (3) Bleeding in the proximal area after the cavity preparation is completed. (4) Expasyl is applied into the proximal area, then tapped to place using a dry cotton pellet. (5) After rinsing away the majority of the Expasyl but leaving a small amount submarginal for additional hemorrhage control, the proximal tissue is deflected away and bleeding is absent, facilitating sectional matrix band placement.

margin without moisture or sulcular fluid contamination are of paramount importance. Nonetheless, the presence of blood can make it hard to use a matrix to seal the gingival margin, regardless of whether the blood is from gingival inflammation or is caused by subgingival decay.

Proximal contact and contour

Given the limitations of conventional matrix systems,

another challenge for the clinician always has been recreating contact to the adjacent tooth while simultaneously restoring proper interproximal anatomic form. The thickness of the matrix band and its ability to compress the periodontal ligaments of both the tooth being restored as well as the adjacent tooth can make restoring proximal tooth contact arduous, at best. Anatomically, the posterior proximal surface is convex occlusally and concave gingivally. The proxi-

mal contact is elliptical in the buccolin-
gual direction. It is located approximately
1 mm apical to the height of the marginal
ridge. As the tooth's surface progresses

gingivally from the contact point toward
the cemento-enamel junction, a concavity
exists that houses the interdental papilla.
Conventional matrix systems are made

of thin, flat metallic strips that are placed
circumferentially around the tooth to be
restored and are affixed with a retaining
device.

Although contact with the adjacent
tooth can be made using a circumferential
matrix band, it is practically impossible
to recreate the natural convex/concave
anatomy of the posterior proximal sur-
face because of these systems' inherent
limitations. Attempts to "shape" or "bur-
nish" a matrix band with elliptical instru-
mentation may help create non-anatomic
contact, but this only distorts or indents
the band and does not recreate complete
natural interproximal contours.

Without the support of tooth contour,
the interdental papilla may not completely
fill the gingival embrasure. This leads to

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(6) A sectional matrix band gripped
by Composit-Tight Matrix Forceps, an
instrument that enables precise place-
ment of sectional matrix bands without
deformation. **(7)** The WedgeWand during
clinical application with the wedge bent
at a 90° angle to the handle. **(8)** The Soft
Face 3D-Ring in place. Note the preci-
sion of the cavosurface and marginal
seal by the sectional matrix. **(9)** The
composite restoration is completed prior
to removal of the matrix band. Place-
ment of the matrix precisely reconstructs the
proximal tooth form.

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potential food traps and areas for excess plaque accumulation. In this case, placing direct Class II composite restorations can present even more of a challenge for the doctor because of resin materials' inability to be compressed against a matrix to the same degree as amalgam. This makes it difficult to create a proximal contact.

Finishing and polishing composite restorations

Direct composite material simply does not carve like amalgam. As a result, this means that most posterior composites are carved with a bur. This is not part of the restoration finishing and polishing. Remember, cuspal forms are convex; they cannot be carved with a convex rotary instrument *that imparts a concave surface to restorative material*. Composite should be incrementally placed and sculpted to proper occlusal form prior to light curing. This finishing and polishing process is to accomplish precise marginal adaptation and make minor occlusal adjustments. Rubber abrasives further refine the composite's surface, and the use of surface sealants can gain additional marginal seal beyond the limitations of instrumentation.

Case Report: Class II direct composite restoration

The patient shown in **Fig. 1** presents with radiographic decay on the mesial proximal surface of tooth No. 3. The operative area is isolated using an OptiDam (Kerr Hawe). Next, a Fender Wedge (Garrison Dental Solutions) is placed in the mesial proximal area prior to preparation with a 330 carbide bur. Because the decay is minimal, the operative plan is to keep the preparation very conservative. The Fender Wedge will protect the adjacent proximal surface from accidental excoriation by the bur while creating the proximal box of the cavity preparation. After the decay removal and the completion of the proximal and occlusal cavity form, the operative area is isolated with a rubber dam (**Fig. 2**).

Note that **Fig. 3** clearly shows the proximal gingival tissue was abraded during cavity preparation and there is evidence of hemorrhage. Nonetheless, it is not advisable to wash the hemorrhage away with water and then quickly apply the matrix band. Even if this proves successful, the likelihood of blood infiltrating into the preparation in the gingival area will make the etching and placement of the dentin bonding adhesive without contamination impossible. A far better method is to manage the proximal tissue hemorrhage quickly and completely by applying

Expasyl (Kerr Corp.) to the area, tapping it to place with a dry cotton pellet, and waiting 1 to 2 minutes (**Fig. 4**). Next, rinse away the Expasyl using an air-water mixture, but leave a little bit of the material

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on top of the tissue and below the gingival margin of the preparation (**Fig. 5**). The Expasyl will help deflect the tissue away from the preparation margin, control any

hemorrhaging, and facilitate placement of the proximal matrix, without risk of contaminating the operative field.

Class II preparations needing a matrix

band for restoration require rebuilding the marginal ridge, proximal contact, and often, a large portion of the interproximal surface. The goal of composite

placement is to limit the amount of rotary instrumentation needed for contouring and finishing, especially in the case of the interproximal surface. The constraints of clinical access to the proximal area make it extremely difficult to sculpt and correctly contour this surface of the restoration. Proper reconstitution of this surface is largely due to the shape of the matrix band and the accuracy of its placement. After removal of caries and old restorative material, assess the outline form of the cavity preparation. If any portion of the proximal contact remains, it does not necessarily need to be removed; conserve as much healthy, unaffected tooth structure as possible. If the matrix band cannot be easily positioned through the

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(10) The pointed Q-Finisher carbide finishing bur is used to make minor occlusal adjustments and refine the restorative margins. **(11)** The ultra fine pointed composite finishing bur is used to further refine and finish the restoration's adjusted areas. **(12)** A fine pointed diamond composite polisher smooths adjusted areas during polishing. **(13)** An occlusal view of the direct MO composite restoration after application of Seal-n-Shine sealant.

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remaining contact, use a Fine Diamond Strip (DS25F: Komet USA) to lighten the contact.

In this case, the Composi-Tight 3D

Matrix System (Garrison Dental Solutions) has been chosen to aid in the anatomic restoration of the mesial proximal tooth morphology of this maxillary first

molar. Select the appropriate matrix band that best corresponds anatomically to the tooth being restored as well as to the width and height of the proxi-

mal surface. When properly placed, the height of the sectional matrix should be no higher than the adjacent marginal ridge. Because of the concave anatomic shape, the proximal contact will be located approximately 1 mm apical to the height of the marginal ridge.

Composi-Tight Matrix Forceps (Garrison Dental Solutions) is used to place the selected sectional matrix band properly in the proximal area. The positive grip of this instrument allows for more precise placement than using cotton pliers, which could damage or crimp the matrix band. The sectional matrix band (Garrison Dental Solutions) is positioned and placed using the Composi-Tight Matrix Forceps to the mesial proximal area of

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**SOME STEPS
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tooth No. 14 (**Fig. 6**). The orientation of the band and the positive fit in the matrix holder makes precise placement possible, even in posterior areas that have tight access.

Next, the gingival portion of the band is stabilized and sealed against the cavosurface margin of the preparation using the appropriate size WedgeWand flexible wedge (Garrison Dental Solutions) (**Fig. 7**). The size of this wedge should be wide enough to hold the gingival portion of the matrix band sealed against the cavosurface of the preparation, while the opposite side of the wedge sits firmly against the adjacent tooth surface. To place the wedge, bend the Wedge Wand to a 90° angle where the wedge meets the handle. The flexible wedge now can conveniently be placed with pressure, without using cotton forceps. After the wedge is correctly positioned, a twist of the wand releases the wedge. Use the G-Ring forceps (Garrison Dental Solutions) to place the Soft Face 3D-Ring (Garrison Dental Solutions) into position. Place the feet of the Soft Face 3D-Ring on either side of the flexible wedge, then release the ring from the forceps. The force of the 3D-Ring causes the teeth to separate slightly due to periodontal ligament compression. The pads of the ring hug the proximal morphology of the buccal

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and lingual surfaces of the adjacent teeth, while simultaneously creating a remarkably precise adaptation of the sectional matrix to the tooth cavosurface margins (**Fig. 8**). The purpose of this proximal matrix is to eliminate the need for using rotary instruments to remove overhangs due to a poorly adapted matrix.

After the sectional matrix is properly wedged and the Soft Face 3D-Ring is in place, the restorative process can be started. A 15-second total-etch technique (10 seconds on enamel margins, 5 seconds on dentin surfaces) is performed using a 37% phosphoric etchant. The etchant then is rinsed off for at least 15 to 20 seconds

THIS SHOULD SERVE THE PATIENT FOR MANY YEARS TO COME

to ensure complete removal. The preparation then is then air-dried and remoistened using AcquaSeal G desensitizer (AcquaMed Technologies) to disinfect the cavity surface, create a moist surface for bonding, and begin the initial penetration of HEMA into the dentinal tubules. A fifth-generation bonding agent (OptiBond Solo Plus; Kerr Corp.) is placed on all cavity surfaces. The solvent is evaporated by spraying a gentle stream of air across the surface of the preparation. The adhesive then is light cured for 20 seconds. The first layer of composite is placed, using a flowable composite (Revolution Formula 2; Kerr Corp.) to a thickness of about 0.5 mm. The composite “flows” into all the irregular areas of the preparation and creates an oxygen-inhibited layer to bond subsequent layers of microhybrid material.

After light curing for 20 seconds, the next step is to layer in the microhybrid material. First, using a unidose delivery, the first increment of microhybrid composite (Premise; Kerr Corp.) is placed into the proximal box of the preparation. A smooth-ended condensing instrument is used to adapt the restorative material to the inside of the sectional matrix and preparation. This first increment should be no more than 2 mm thick. After light curing the first increment, the next increment should extend to the apical portion of the interproximal contact and extend across the pulpal floor. Facial and lingual

increments are placed and sculpted using a Goldstein Flexithin Mini 4 (Hu-Friedy Mfg. Co. Inc.). A #2 Keystone brush (Patterson Dental) is dipped in resin and used

to feather the material toward the margins, smoothing the composite surface.

Figure 9 shows the restoration after completion of the enamel layer and prior to

matrix band removal. The Composi-Tight Matrix Forceps is used to remove the sectional matrix after removal of the flexible wedge and the Soft Face 3D-Ring.

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Finishing and polishing

Finishing and polishing are accomplished using Q-Finisher Carbide Finishing Burs (Komet USA). Typically, 3 grits and cor-

respondingly, 3 different burs are used to finish composite materials. However, with the Q-Finisher system, the blue-yellow striped bur with its blade configura-

tion does the work of two burs with one. The cutting instrument's cross-cut design results in an exceptional surface quality on both composite and natural tooth. The

small, pointed Q-Finisher (H134Q-014) is used to make minor occlusal adjustments on the restorative surface as needed, and to smooth and refine the marginal areas of the restorative material where accessible (**Fig. 10**). The fine, white striped ultra fine finishing bur (H134UF-014) is used in the adjusted areas for precise fine finishing (**Fig. 11**).

Komet Diamond Composite polishing points (Green-Polishing and Gray-High Shine) then are used to polish and refine the restorative surface (**Fig. 12**). After polishing is complete, the final step is to place a surface sealant (Seal-n-Shine: Pulpdent Corp.) to seal and protect any microscopic imperfections at the restorative marginal interface that may remain as a result of any inability to access these areas on the micron level. Remember, an explorer can "feel" a 30-micron marginal gap at best; bacteria are 1 micron in diameter. The purpose of the sealant is to fill these smaller areas. **Figure 13** is an occlusal view of the completed Class II composite restoration.

Natural contour, predictable contact

The technique described helps control proximal tissue bleeding prior to matrix placement; uses a sectional matrix system and a nanofilled microhybrid composite to create an anatomically precise proximal surface; and employs a two-bur composite finishing system to finish, then polish with diamond composite abrasives. The procedure helps refine marginal integrity without destroying occlusal anatomic form. **for** The interproximal surface has been recreated with a natural anatomic contour and it has a predictable, elliptical contact with the adjacent tooth. With its proper occlusal and proximal form, this "invisible" direct composite restoration should serve the patient for many years to come. **DPR**

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