Class II challenge

Clinical solutions to common problems when placing Class II direct composites

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Direct composite restorations that involve posterior proximal surfaces are still 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. The adhesion process itself is well understood by most clinicians as far as isolation and execution, however, there are some steps in the placement process that cause difficulty and ultimately lead to a less than desirable end result.

In this article we will look at three specific areas: management of the soft tissue in the interproximal region; creation of proximal contour and contact; finishing and polishing of the restoration.

Management of the interproximal gingival tissue

The most common area for the adhesion process to fail is the proximal gingival margin. Compounding this problem is the inability to gain access to the area to effect a repair without removal of the entire restoration.

As stated by Dr. Ron Jackson, bonded restorations are unique in that minor defects (decay or microleakage) at the marginal interface can often be "rewound," or repaired by removal of the affected tooth structure and repaired with additional composite restorative material. Because of the bond of the restorative material to enamel and dentin, the recurrence is usually self-limiting. This is not true with metallic restorations that are not bonded to tooth structure. However, if the defective area is at the proximal gingival margin or line angle, access is not possible. Therefore, precise marginal adaptation of the direct composite restorative material and the seal of this margin in the absence of moisture or subgingival fluid contamination is of paramount importance.

However, whether due to the subgingival level of decay and/or gingival inflammation, it can be difficult to seal the gingival margin with a matrix in the presence of blood.

Proximal contact and contour

Another challenge for the dentist has always been to re-create contact to the adjacent tooth and, at the same time, restore proper interproximal anatomic form given the limitations of conventional matrix systems. The thickness of the matrix band and the ability to compress the periodontal ligaments of the tooth being restored and the one adjacent to it causes sometimes make the restoration of proximal tooth contact arduous at best.

Anatomically, the posterior proximal surface is convex occlusally and concave gingivally. The proximal contact is elliptical in the buccolingual direction and located approximately one millimeter apical to the height of the marginal ridge.

As the surface of the tooth progresses gingivally from the contact point toward the cemento-enamel junction, a concavity exists that houses the interproximal papilla.

Conventional matrix systems are made of thin, flat metallic strips that are placed circumferentially around the tooth to be restored and affixed with some sort of retaining device. While contact with the adjacent tooth can be made with a circumferential matrix band, it is practically impossible to re-create the natural convex/concave anatomy of the posterior proximal surface because of the inherent limitations of these systems.

Attempts to "shape" or "burnish" matrix bands with elliptical instrumentation may help create nonanatomic contact, but only "distorts" or "indent" the band and does not re-create complete natural interproximal contours.

Without the support of tooth contour, the interdental papilla may not completely fill the gingival embrasure, leading to potential food traps and areas for plaque accumulation. Direct Class II composite restorations can present even more of a challenge to place for the dentist because of the inability of resin materials to be compressed against a matrix to the same degree as amalgam, making it difficult to create a "proximal contact.

Finishing and polishing composite restorations

Direct composite material does not carve like amalgam, although many clinicians wish that it did! Unfortunately, this means that most posterior composites are carved with a bur.

This is not part of the finishing and polishing of the restoration. It must be remembered that cuspal forms are convex and cannot be carved with a convex rotary instrument that imparts a concave surface to the restorative material.

Composite should be incrementally placed and sculpted to proper occlusal form prior to light curing. The finishing and polishing process is done to accomplish precise marginal adaptation and make minor occlusal adjustments.

Rubber abrasives further refine the surface of the composite, and surface sealants are used to gain additional marginal seal beyond the limitations of our instrumentation.

Case report

The patient shown in Figure 1 presented with radiographic decay on the mesial proximal surface of tooth No. 5. The operative area is isolated using an OptiDam (Kerr Hawe). The decay is minimal, so the operative plan is to keep the preparation very conservative.

After removal of the decay and completion of the proximal and occlusal cavity form, the restorative area is isolated with a rubber dam in preparation for the restorative process. Figure 2 clearly shows that the proximal gingival tissue was abraded during cavity preparation and there is evidence of hemorrhage.

It is not advisable to try and "wash" the hemorrhage away with water and quickly apply the matrix band. Even if this is successful, it is
The Composi-Tight Matrix Forceps are used to place the selected sectional matrix band in the correct orientation in the proximal area of the tooth. The positive grip of this instrument will allow for more exact placement than a cotton plier, 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 tooth No. 14 (Fig. 5).

The orientation of the band and the positive fit make precise placement possible, even in posterior areas with 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 (Fig. 6)

The size of the WedgeWand® flexible 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, the Wedge Wand is bent to 90 degrees where the wedge meets the handle.

The flexible wedge can now be placed with pressure conveniently, without the use of cotton forceps, that often can be very clumsy. Once the wedge is in the correct orientation, a twist of the wand releases the wedge.

The G-Ring® forceps are then used to place the Soft Face™ 5D Ring into position. The feet of the Soft Face 5D Ring are placed on either side of the flexible wedge and the ring is released from the forceps.

The force of the 5D Ring causes a slight separation of the teeth due to periodontal ligament compression. The unique pads of the Soft Face 5D ring hug the proximal morphology of the buccal and lingual surfaces of the adjacent teeth, while at the same time creating an unbelievably precise adaptation of the sectional matrix to the tooth cavosurface margins (Fig. 7).

Once the sectional matrix is properly wedged and the Soft Face 5D Ring is in place, the restorative process can be started.
Remember, an explorer can “feel” a 30-micron marginal gap at best. Bacteria are 1 micron in diameter. The purpose of the Seal and Shine is to fill these areas. Figure 12 shows an occlusal view of the completed Class II composite restoration.

Conclusion
A technique has been described:
1) to control proximal tissue bleeding prior to matrix placement with Exa-syl (Kerr),
2) utilize a sectional matrix system (Composi-Tight 3-D, Wedge-Wand, Garrison Dental Solutions) and a nanofilled microhybrid composite (Premise, Kerr) to create an anatomically precise proximal surface, and
3) use the Q-Finisher, two-burr composite finishing system (Komet USA) to finish then polish with diamond composite abrasives (Komet USA), refining marginal integrity without destroying occlusal anatomical form. The interproximal surface has been re-created with natural anatomical contour and has a predictable, elliptical contact with the adjacent tooth.
With proper occlusal and proximal form, this “invisible” direct composite restoration will service the patient for many years to come.