

Diastema closure with freehand composite: Controlling emergence contour

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One of the most ideal uses of freehand composite restorations is for closing diastemas (Fig 1a). The ability to add material to teeth without any reduction of tooth structure is a significant advantage, especially for elective treatment. Handling composite freehand requires practice and may be considered a disadvantage to some, but with effective technique, an ideal result is possible (Fig 1b).

For complete success of any diastema closure, many criteria must be met, including: (1) increased emergence profile with natural contours at the gingiva-tooth interface; (2) a completely closed gingival embrasure (with no “black triangle”) must be achieved; and (3) the subgingival margin should be smooth so floss will not catch or shred.

Unlike traditional operative procedures, such as a Class II or Class III composite restoration, closing a diastema requires the emergence profile to be increased, sometimes significantly. The traditional technique of forming proximal surfaces with composite using a mylar strip and a wedge may achieve one or two of the aforementioned goals but never all three. This article will describe a technique the author has found to be predictable in achieving these three important criteria.

It is generally unnecessary to prepare the teeth with a bur when closing diastemas. Because the proximal surface rounds into the facial surface, a natural “bevel” exists for shade blending and retention on the facial and lingual sides. Also, there is no need for a prepared finish line with freehand composite restorations, as the composite margin can be thinned to “infinity.” This allows the proximal aspect, where the composite begins its new emergence profile, to be restored without tooth reduction. Avoiding the use of a bur at or below the gingiva helps prevent hemorrhage, which is an additional advantage.

The first step in closing diastemas is to pumice the teeth well and to place 000 retraction cord (Ultrapak Retraction Cord, Ultradent) along the side of the tooth to be widened. This cord is black, making it easier to identify the base of the sulcus and providing a reference or limit for the composite placement.

A mylar strip, about 1-inch long and cut lengthwise to about one-third its normal width, should then be placed in a particular fashion. The narrowed strip should be tested by fully seating it into the sulcus to ensure that it is just wide enough to extend out of the sulcus by approximately 1 mm. If it is still too wide, cut it as needed to create the proper width, as this plays an important role in the success of the technique.

If the gingival tissue is very rigid, it may be helpful to place a small cotton pellet between the tooth and the mylar strip, gently packed into the sulcus (Fig 2). After 5 to 10 minutes, the tissue will have a reduced capacity to relapse, so the space will remain open longer. This provides some additional working time for etching and composite placement. The narrow mylar strip is then set aside and a full-width mylar strip is used during etching to protect the adjacent tooth.

Next, the tooth surface is acid etched. Unprepped enamel should be etched for approximately 60 seconds. To prevent the gingiva from pushing the etching gel out of the sulcus a small instrument may be used to hold the mylar strip to keep the space open for the etching procedure (Fig 3).

After thoroughly rinsing the etching gel off the tooth surface, adhesive should be placed per the manufacturer’s recommendations. One word of caution if a self-etching primer is to be used: unprepped enamel is not reliably etched by most self-etching products. If using one of these products, etch the



Fig 1a Patient presented with diastemas and previous composite bonding on peg laterals.



Fig 1b Freehand composite bonding on six upper anterior teeth accomplished without reducing tooth structure.

unprepped enamel conventionally, and then apply the self-etching primer.

The narrowed mylar strip should now be replaced. Seat the cut strip fully with the machine-cut edge into the sulcus and the scissors-cut edge toward the incisal aspect. With the incisal edge of the mylar extending just beyond the tip of the papilla, the facial extension of the strip should angle apically as the seated edge of the mylar strip follows the slope of the sulcus base. The lingual portion of the mylar strip will angle slightly incisally. The adhesive should be applied and light-cured with an instrument holding the mylar strip (Fig 3).

Next, the operator's fingertip should firmly hold the lingual extension of the mylar strip against the lingual surface of the tooth. This stabilizes the strip and forms a barrier so the composite will not extrude onto the lingual aspect.

A long, narrow bladed instrument (ie, IPC-L titanium instrument, Cosmedent) is ideal for placing and sculpting the first increment of composite. This instrument should be clean and scratch-free to minimize the composite sticking to the instrument. The end of the blade should hold the mylar strip so that a receptacle area is opened to allow composite placement. This receptacle area is closed on four sides and open on two. The tooth surface creates one closed side and the mylar pushing against the gingiva forms the other. The apical side of the receptacle area is closed by the mylar contacting the tooth surface at the base of the sulcus (the cord should be visible



Fig 2 Mylar strip cut narrow with cotton pellet placed to initiate gingival remodeling process.

but outside of the space created by the mylar strip). The lingual side of the space is closed by the mylar wrapping around the lingual surface and held in place with a fingertip. This leaves the facial and incisal aspects open to place the first increment of material.

A very small amount, approximately 1 mm³, of composite should be placed into the receptacle area using the long, narrow bladed sculpting instrument (Fig 4). An ideal consistency for the composite is a material that has a very slow flow (ie, Renamel Universal microhybrid, Cosmedent). The viscosity of a flowable composite would be too hard to control; and the stiffness of many microhybrids would not maximize adaptation to the space with minimal handling. Once the increment is placed, condensing the material toward the apical and lingual borders of the space is done with light pressure to fill the lingual portion of the receptacle area.



Fig 3 Application of adhesive while using hand instrument against mylar strip to hold back tissue.



Fig 4 First increment of microhybrid to be placed in receptacle area created by narrow mylar strip held in place.



Fig 5 Immediately after first increment has been light-cured, ideal contour onto lingual surface and clearance for remaining facial layer are evident.

The amount of material used should fill the space to the tip of the papilla incisally and leave space for a facial layer of additional material (which may or may not be the same product). It is not recommended that the facial contour be developed at this point by pulling the mylar strip across the facial surface of the tooth. Trying to do this will distort the receptacle area's boundaries, especially at the base of the sulcus, and increase the chance of a rough margin.

Immediately prior to curing, a slight dragging of the mylar strip toward the lingual aspect will minimize the chance of any small

voids at the lingual margin. Using a fingertip to pull the strip about 1 mm is all that should be necessary to accomplish this. It is important not to allow the apical side of the strip to move incisally at all. Careful manipulation of the strip, practiced a few times, should make this small movement seem simple.

If the incisal extent of the composite (near the tip of the papilla) is not almost exactly in the middle of the diastema to be closed, use the tip of the sculpting instrument to guide the mylar strip to increase or decrease the contour as needed. While keeping a steady hold on the strip with a fingertip on the lingual side, and the instrument for the strip alignment, the dental assistant should light cure. The light tip should be held in such a way that the facial end of the mylar strip, which is extending out to the facial aspect, is not pushed in one direction or another.

After curing, the mylar strip can be released and the first increment checked. The lingual margin should be smooth, and there should be space on the facial for another increment (Fig 5). The mylar strip may then be removed and the remaining contours sculpted by free-hand, or a full-width mylar strip could also be placed again, if needed, for additional guidance of supragingival contours.

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