Deep Proximal Box GI/Compomer?

xcell  
Canada  
Posts: 599  
Reg.: 1/23/2002

Posted: 8/19/2003 4:05:32 AM  
Post 0 of 36

If you are stuck with a deep proximal box, how would you restore this? Would it be better to place GI in the box and then sandwich that with a regular composite on top? I know the limiting step is to make sure the box is well sealed, no leakage, etc., but what about the material?

karlleinfelder  
Chapel Hill, NC  
Posts: 233  
Reg.: 5/22/2002

Posted: 8/19/2003 5:47:07 AM  
Post 1 of 36

Xcell, that’s a question that has been asked for a long time. I believe the author for the solution comes from Dr. Qvist of Norway. Let me make a specific suggestion as it relates to your question. First of all, one is between a rock and a hard wall once the preparation goes below the dentinal-enamel junction. Not only is there an absence of enamel surface to which to bond, but the length of the proximal portion is extended beyond normal limits. In such a case the proximal aspect of the restoration tends to deflect further into the proximal region when subjected to strong occlusal stresses, particularly when located on the marginal ridge. (This potential can be attributed to the relatively low modulus of elasticity associated with composite resins.) All this tends to lead to a greater potential for leakage.

However, if one is committed to placing a posterior composite resin when the gingival floor is extended below the cervical margin, here is a good recommendation. First, acid etch and bond the surfaces of the entire preparation with a dentin bonding agent (Simplicity, iBond, Bond-It, etc). This process hybridizes the dentinal surfaces against microbial invasion into the dentinal tubules and prevents postoperative sensitivity. Next, place a two (2) mm layer (thickness) of a glass ionomer (Fugi II LC) on the gingival floor so that it is covered entirely. The glass ionomer exhibits a coefficient of thermal expansion (CTE) similar to dentin. And as a result, potential leakage is greatly minimized or eliminated. Secondly, the relatively high release of fluorides from the glass ionomer is effective in killing microorganisms that may be present in that location.

Next, you have the option of re-etching the GI surface. However, in the case of the photo-cured glass ionomers, it has been demonstrated that this step may not be necessary. At this point a flowable composite resin (Flow-It, Revolution, Tetric Flow, etc.) is placed over the entire surface of the preparation (depth about 1mm), care being taken to avoid contact with any of the enamel margins.

Posterior Class II composite resins are really pushed to their limits when used in conjunction with deeply extended gingival floors. Under such a condition, the glass ionomer effectively “raises the height of the gingival floor thereby reducing problems for the composite resin restoration.

marshall_white_dmd  
Newark, OH  
Posts: 5,695  
Reg.: 8/14/2000

Posted: 8/19/2003 1:56:47 PM  
Post 3 of 36

Dentin gingival margin seal: the Holy Grail of restorative dentistry. Only two ways really work, in my experience:

Bevel it, and bond first a thin layer of flowable composite then build up the box with composite without fast-curing with a PAC, etc. This method is more technically demanding of the operator, but I like it. Critics argue that the dentin bond degrades with time.

Leave a butt margin, and place a GI there against nude dentin first and right up to the matrix, then bond composite over it. Personally, I use Fuji IX. The RMGIs, and compomers, IMO, haven’t the ability to seal that pure GI has. This is pretty much idiot-proof. It effects a seal, and one that lasts in-vitro. Critics argue that the GIs are prone to wash-out (if not used exactly as directed...), and haven’t the compressive strength to stand up in function.

Continued on page 80
So Marshall, how about some technique tips. When I sandwich a Fuji IX layer for the bottom of the box, I don’t trust adaptation. It’s too sticky and too big an applicator tip to be sure...unlike flowable. Thus, I like to pack it and have been waiting for the IX to get some body and then condense it. At that point I let it set the rest of the way or hit it with light and continue with bonding and composite for the rest. Is this how you’re handling the material and technique?

I use Graeme’s Co-Cure Technique, Fuji IX is placed after using polyacrylic acid and rinsing, Fuji Bond, a RMGI is applied over the Fuji IX, unfilled bonding resin to enamel surfaces and flowable composite on top of the Fuji IX/Fuji Bond and cured for 10 seconds. This leaves a composite “skin” on top of the GI and now allows for incremental buildup of composite, or bulk placement with longitudinal sectioning of the composite to reduce C-Factor. Each component of the sandwich bonds to each other in the proper sequencing.

OK so from what I am getting...
1. etch polyacrylic acid
2. Fuji IX
3. RMGI flow (e.g.)
4. bonding agent
5. regular flow
6. composite...right?

Dentin at the bottom of a class II is no different than the dentin within the body of a class II. If you can isolate it properly, you can use resin. I would use an adhesive and then the first increment would be a compomer, and I like F2000 from 3M. This method saves you from having to utilize two different types of restorative media.

Correct me if I am wrong, but I was taught that the dentin in the base of the proximal box was less retentive due to the orientation of the dentinal tubules, since the tubules were effectively laying on their sides and not oriented with open orifices to get our bonding agents into effectively. Did I miss out on something ? The GI bases (Fuji IX) are supposed to chemically interact with the dentin as opposed to mechanical interfacing with resin “tags” in the tubules. This is the information disseminated during a recent lecture on microdentistry techniques.

Exactly, David. I do prefer the powder-liquid version, hand mixed and loaded into a Centrix needle tube & plug, but one must resist the temptation to futz with the ratios, so don’t. Some will argue with me on this point, but I do NOT think we should hybridize the dentin first with BA. This puts a layer of resin over the dentin and prevents the IX from bonding to the dentin, and the IX will not bond to that resin. One could use a compomer or RMGI over the resin-bonded dentin there, but I see no real advantage over flowable though I respect Karl’s point about similarity in properties of some RMGI’s to dentin.

I feel that if we are to take advantage of the GI’s, we should do so fully. This entails using them correctly, and not attempting to make RMGI’s or compomers do what they cannot, and...
what only true GI’s do: seal their interface with dentin. I choose to use Fuji IX. THAT material is exceptional among GI’s and these are the admonitions I’d make if one wants to truly seal a ging. margin with this particular GI:

1) Remove the smear layer with Fuji conditioner, or do a quick cleansing etch with phosphoric (<5 secs.), rinse and leave the dentin wet. Squirt in the Fuji IX.

2) Once it begins to set up, pack it firmly down using a packer/condenser with the largest width that will fit into the box without binding. Light-accelerate the set for 10-20 secs.

3) Apply Simplicity as directed, cure. Apply flowable, hybrid, etc., etc. to complete the filling.

Jermaine, the surface of set true GI can, in a sense, be etched...which is to say that acid will produce microscopic voids or lacunae that facilitate micromechanical retention similar to what happens with enamel when resin is applied to that surface.

FWIW, I would beg to differ with Sam’s sweeping statement that, “...If however your margin is on cementum, you will get less marginal leakage if you restore the deep area with glass ionomer.”

IMO it really is not that simple. Unfortunately, the scientific literature is equivocal on this subject, which is to say that both seem to work and both seem to leak, depending upon the study viewed. Also, we almost never bond to cementum: cementum absent perio attachment and once exposed to the oral cavity through recession lasts but a few weeks at most. We are bonding either to dentin or to enamel. Bonding to either with resin is touchier at the ging, margin, but suffice to say the enamel bond is more predictable and more long-lasting. (I do find it interesting that one would be comfortable bonding to dentin under a totally non-retentive Empress veneer, but they’d shrink from doing so in a box...food for thought).

If we are below the level of the former CEJ, and are dealing with a dentin ging margin, I think it’s fair to say that using a GI properly there is more idiot-proof and a bit less technique sensitive than bonding composite. The seal afforded by GIs, again properly used, is well established. The GI bond-strength to dentin is truly unknown as it cannot be tested. But thanks to researchers like Pashley, Tay, and Ngo, we do know that the GI seal there is both leak- and acid-resistant. And the compressive strength of Fuji IX surpasses other and earlier GIs, so is ideally suited for this application.

Over a year ago, I stated that I could see no reason for using a GI in a sandwich technique because it’s bond strength was low and it was prone to washout. I was wrong, and someone kindly encouraged me to do my homework. I have and am now more properly informed about the intricacies of these materials, which are making a certain resurgence. And that homework is the foundation for this post. GIs must be handled properly, and the surface should be free of smear; the bond is unknown, but the seal is well proven (done right...) If you want some abstracts, I got about 16 pages of them. This weekend past I had the pleasure of dining and talking with Dr. Hien Ngo, a New Zealand cardiologist, researcher and expert on GIs, and I learned a great deal then too. Such is the nature of the intellectual pursuit: confrontation of supposed fact, questioning its validity, and accepting it when persuasive argument with proof is rendered. And so I have.