

Bonding Materials:

Cements or bonding materials as we call them, need to be resin cements to best attach the metal to the enamel. Most are dual cure bis-GMA or urethane-based, glass-filled cements that have a chemical-cure plus light-cure component, otherwise known as a dual cure. Fourth generation Total-etch, three step systems are hands down the best bonding for fillings. Overlook the fluff and marketers and sales gimmicks, and you'll soon learn total-etch, three step is the dance we want to dance to. Total-etch starts with 35% phosphoric acid for 15 seconds or more on the tooth. It gives the highest bond strength in every major review! I've always stuck to total etch and I have NO sensitivity problems. I also must confess to dehydrating and drying the daylight out of every tooth I bond for any reason. You can't tell me it's a cause for sensitivity. It just isn't so! A frosty dry look is still the very best bonding enamel surface!!! For MB's we use Rely X ARC cement. The primer and bonding are separate or together in one bottle. It has a 0.1 to 0.2% expansion. Unicem has a 0.3 to 0.4% expansion. So expansion is NO BIG PROBLEM!! But using a light to help the curing IS VERY HELPFUL, VERY CRITICAL, VERY NECESSARY, VERY URGENT, VERY DOCUMENTED! The light cure gives color stability and wear resistance improvement. Higher power and longer curing time really helps! Comspan was our first bonding material, then Panavia and Enforce. Now RelyX ARC=Adhesive Resin Cement.



You must clean all temporary crown cement off before etching, clean it off real good. Avoid surface contamination with anything like blood or saliva or chemicals or debris. They say self-adhesive cements bond better to dentin than enamel. I'll wait to use those self-adhesives when I don't have any enamel left. Meanwhile, I'll stick to the resin cement, ARC! I don't use Panavia anymore due to problems it had in previous years. It may be okay now, just technique sensitive in timing of set and thickness.

It's a confusing, mixed up world – the world of cements and bonding. All cements are Acid-base mixes except resins. Let's call them conventional or contemporary. Conventional is ZnPO₄. Introduced in the 1800's and still now the standard for comparison for all cements and bonding. We all know it well and use it daily. Polycarboxylate and glass ionomer are it's kinfolk.

Conventional is therefore the old well known guys. Then came along the resins and resin-modified glass ionomers. These are the new Contemporary cements and bonding agents. Resins and modified resins are kinfolk. Back to ZnPO₄ – the pH is around 4 to start but gets better after 48 hours. So you can burn a pulp if you mix it carelessly. Compare the resins and you'll find they came out in 1952 when I was just a kid. Much improvement has happened and modifying them with glass-ionomer seems to be some advantage. Call them Compomers. Use Compomers for cementing crowns. I don't use Compomers for bonding for metal to enamel. I don't use them. I stick to the resins. Rely X ARC is my choice. Also, it's the best for implant components and crowns, getting the highest retentive strengths. So there you have it in a nutshell: Conventional versus Contemporary. No conventional use on Maryland Bridges. Only Contemporary Resins should be used. Just a parenthetical note here. I said I don't use Compomers (that one word replacement for resin-modified glass ionomer). Not for Maryland Bridges!!! However, I do use them for regular crown and bridge as an alternative to ZnOPO₄ cement. Gordon Christensen says most all of American dentists are switched from ZnOPO₄ to these resin-modified glass ionomer cements. Examples are 3M's RelyX Luting Cement (I use it more and more but still trust ZnOPO₄ for a standard). Another example is FujiCEM from GCAmerica. He says "these (Compomers) bond to tooth, expand and contract in a similar manner to tooth structure, release FL and recharge with fluoride, have adequate strength, are relatively insoluble, and seldom produce postoperative tooth sensitivity." So if you do a combination MB, use the ZnOPO₄ or Compomer for your standard crown cement. Mix separately at the same time and hold both in place very still as you remove excess and light cure the ARC margins. The metal must be a minimal thickness of 0.7 mm – 0.6mm to be rigid enough. Sandblasting the metal alone is a deadly sin. It must be acid-etched and treated right. Then your resin bond will hold it. And when needed, you can clean them up and rebond. You'll seldom ever find decay around a debonded Maryland Bridge. Nor do you find perio problems. It's a great service.

A brief monologue on pH of cements:

1. ZnPO₄ pH 4-5.4 at mix, 6.0-7.0 at 24hrs
2. Polycarboxylate pH 5.0-6.0 at mix, 6.0-7.0 at 24hrs
3. Glass Ionomers start at 2-3.5 and go to 4.5 in 6min.
4. Tempbond & all temporary cements pH at mix over 7 and stay over 7
5. RelyX Arc pH 3.5 at mix and settles from 4.5-6

SEATING BRIDGE INSTRUCTIONS:

- Check with celluloid strips your normal bite and lateral excursions without the bridge. Use articulating paper and know your occlusion before you start the case. Don't change occlusion, but rather enhance occlusion.
- Avoid moisture contamination/breath/finger oils.
- Try in with tooth totally dry – not etched – just pumice clean. Place cotton rolls and air dry entire area.
- Have patient occlude quickly and check bite on opposite side/ask patient if okay
 - Remove quickly. If moist, wash with hard water spray and air dry with air/water syringe. It's OK to re-etch with 35% Phosphoric Acid as a cleaner for the etched surfaces. DO NOT use Hydrofluoric Acid as it is no better cleaner and will hurt porcelain if contacted.

- Etch tooth with 35% phosphoric acid for 15 to 45 seconds.
- Wash with syringe water and dry with air syringe until frosted.
- Silane any porcelain in bonding area.
- Place liquid primer on etched tooth and thin with air spray (No pooling).

- Place two coats liquid bond on etched tooth, one coat on etched wing, and then thin with air spray.
- No pooling. Light cure tooth only, not wing.
- Keep tooth isolated with cotton rolls. Place bridge in hand.

- Assistant mix bonding material.
- Place bonding material onto etched portion of bridge. Cover well.
- Put Maryland bridge into prepared tooth areas.

- Assure seating then add firm pressure to achieve thin bond

layer

- Remove excess with Q tip or like item/perioprobe interproximally.
- Use the perio probe to add bonding to areas needing space closure or covering metal ie. on a margin.
- Assistant begin light cure of all areas of margins.
- Scaler clean up excess bonding.
- Check bite with articulation paper and celluloid strips.

Incidentally, I check bite with celluloid all around before try-in of the bridge and after seating. They should feel the same all around the mouth before and after. Adjust centric, lateral excursions, anterior rise, as necessary with slow or high speed, and then polish with standard kits.

