Does anybody know what causes the white line you sometimes get around the margins of posterior composites?

Failure to cure in increments can cause excessive shrinkage and a white line. Filled bonding agents such as OptiBond or PQ1 can cause the white line if not air thinned properly. Also, over finishing can heat the composite causing white line. If you are using any liners such as GC Liner or Vitrebond, be sure and keep it off of the margins.

Years ago in the days of “Adaptic” a dentist said the “white line” could be eliminated by using water when finishing. This was before the days of etching, primers and liners. Wow, did I really say that?

At a recent lecture, John Kanca recommended beveling the cavo-surface margins of your preps, incremental material application and shorter bursts of the curing light...with the emphasis on the bevel to prevent the white line from occurring. I forget the exact reason for the line but I seem to recall it was a polymerization shrinkage issue. If you’re reading this, John, please chime in...my memory is often suspect.

John Kanca defines a “white line” as an enamel fracture parallel to, but not including the bonding interface. Basically, he would argue that we are curing composite too fast, especially when replacing enamel since it’s modulus is much less than dentin. The spike in shrinkage stress fractures the enamel adjacent to the bonding interface. Furthermore, this problem is more likely to occur in fills with more walls. For example, it is much more likely to occur in a class I or class II than a WFT restoration.

Dr. Kanca recommends “pulse curing” with a halogen light without a turbo tip. Especially when replacing enamel with composite. Place the enamel replacement layer, cure for 4 seconds. Remove all matrices and start the finishing. About 3 minutes later, cure for another 4 seconds. Finish all shaping and polishing, then cure for 20 seconds to complete the cure.

When you cure for the initial 4 seconds, stresses build but the restoration is still able to flow slightly to relieve the stress and not break the enamel. Cure for another 4 seconds, stresses build then again flow occurs. By the time the final zap with the light is given, most of the shrinkage stress associated with composite curing is relieved. Therefore the enamel is not fractured which yields no white line.
On one more furthermore: Dr. Kanca argued in his presentation in Chicago that white lines are big-time clinically significant. He basically says that if we create white lines, we've decreased the quality of our restoration to that of an amalgam. Basically something shoved in a hole held in by mechanical means. Food for thought.

I'd avoid beveling the occlusal margin of a composite prep...it leaves a margin prone to gouging and chipping, that'd ultimately fail. I just pulse cure to minimize chance of white lines. Are you sure it was Kanca that said that Marty?

All margins should be beveled. I mean all. The adhesives need to really thin and pulse activation is best for the enamel layer. They will fail if the adhesive is thick. Bevels distribute stress. White lines are really bad.

Thanks, John. I suspect you have a preference for depth and/or angle of bevel to minimize the effects I mentioned above. For mine and the benefit of the others here, could you spell that out? I don't mean to avoid paying to see your lecture, but hey, your here! SO I'm askin' if you feel like answerin'...

I like BIG bevels, you cheapskate!

Big bevels? Do you mean big bevels in width or in depth? What is the angle of the bevel to the occlusal surface? What is the effect of wear and occlusal surfaces as the bevel thins out?

A buddy of mine just told me he dips all his finishing disks and points in adhesive and hasn't had a white line since. Is this hiding the enamel fracture or filling in the gap from the shrinking composite?

It sounds like that might temporarily hide the enamel fracture IMO.