“Just the facts, ma’am. Just the facts.” On the classic police drama *Dragnet* this was the way detective Sgt. Joe Friday admonished a witness who strayed into opinion, gossip or innuendo during his interrogation. Only from facts may he then obtain *evidence*, and from *evidence* he may deduce a conclusion.

Dentistry could benefit from such an approach. Many times we choose materials or perform procedures based in tradition, habit or the advice of a colleague. Since any dentist can consider the latest research done and render a judgment, we really should! Indeed standards are fairly uniform, and the majority of doctors can likely reach consensus on the *relative value* of a piece of scientific literature. For instance, despite any imperfections, a peer-reviewed scientific journal is first in virtually any hierarchy of sources. This new magazine feature will provide summaries and commentary on four published scientific articles. Please share your comments on Dentaltown.com: Dentaltown » Dentaltown Magazine this month » April 2006 » Practical Science.
Comparing posterior longevity of 4 types of cosmetic restorative materials –

Drs. Thordrup, Isidor and Horsted-Bindslev have spent 10 years tracking inlays made of two porcelains and two composites. One group of the ceramic inlays was made using a CEREC 2.0, and the other inlays were made using a conventional method and (non-pressable) ceramic. One group of resin inlays was made using a lab-processed material and one group using a so-called “direct” inlay technique. Direct inlays are made using direct composite materials placed in the preparation using a separating medium and light-activated. The inlay is then removed and finished extra-orally. Often it is heated to maximize polymeric conversion and finally bonded in the preparation like any cosmetic inlay.

Clinicians are generally confronted with a choice of materials for cosmetic restoration of posterior teeth. In an optimal treatment plan, we want to recommend use of the material(s) that delivers the best long-term outcome even if the material is more costly to the patient than another material: it’s worth paying more for something that does the job better. So dentists consider longevity/survival as one important factor (among several factors) that impacts the choice of what material and modality to recommend.

For the most part, survival is the property being examined in this study and the results are quite curious: regardless of the material used, at 10 years roughly 80% of the inlays had survived. This translates into a failure rate of about two percent per year and is consistent with other studies, notably several meta-analyses by Hickel & Manhart. This failure rate is also consistent with failure rates for directly placed composite restorations – a fact of sufficient gravity that the authors actually comment on this.

It is likely that dentists’ recommendations of material for posterior intra-coronal cosmetic restorations is best made with respect to what an informed patient desires regarding cost and/or other factors. All the materials examined in this study survived about as well as do directly placed composites. Stated another way, no material showed any advantage in terms of longevity.

Clinical implications: When considering ceramics or composites (either direct or indirect), the cosmetic material and modality used for posterior intra-coronal restorations makes little or no difference in longevity of that restoration. We should use other properties or factors in deciding what material to recommend in a given cosmetic scenario.


Looking at the effects of the way we air-blow adhesives; using those effects as an indicator of technique sensitivity

Many dentists consider user-friendliness an important factor in their choice of a dental adhesive. Also known as “technique sensitivity,” the user-friendliness of a product is difficult if not impossible to measure. One of the steps in the use of an adhesive; namely, air-blowing to evaporate solvent from an adhesive or its primer, may be one of the most technique sensitive steps in the sequence for placement of a bonding agent. How hard should the air blow? How close to the surface should the A/W syringe tip be? Perpendicular to the surface or at an angle? What angle?!

The authors chose to keep it simple and only used “how hard” they blew the air as their variable when air-blowing the self-etching bonding agents Clearfil SE Bond, G-Bond, and Adper Prompt-L-Pop, and an experimental bonding agent. They used the words “gentle” and “strong” to describe how hard the air was blown. (Or rather: they used the Italian words for gentle and strong… they are in Milan, Italy). Researchers concluded that the three known materials, Clearfil SE Bond, G-Bond, and Adper Prompt-L-Pop were not technique sensitive, because their data indicated bond strength of all three did not vary significantly when gentle or strong air-blowing was used. Bond strength (micro-tensile) of the experimental material did vary significantly when subjected to strong vs. gentle air-blowing.

Clinical implications: The switch to self-etch materials continues. Knowing the technique sensitivity of various materials may strongly impact our decision-making when choosing a self-etching bonding agent. These three self-etching bonding agents do not exhibit technique sensitivity based upon either strong or gently blown air during the air-blowing step of their application. Other variables and products should be examined.

“It is suggested that clinicians not rely ONLY upon user-friendliness in their choice of a self-etcher. Other properties that may be considered would include history, cost, bond-strength (shear or micro-tensile), the ability to bond to self-, dual-, and visible light-cured composites, the ability to etch prepared and unprepared enamel and dentin without a pre-etch step using phosphoric acid.

Bonding agents may be the best surface sealer to minimize leakage of cosmetic restorations

We’ve known about the advantages of sealing margins of composite restorations since it was demonstrated by Leinfelder et al in several papers in the early ’90s. Done with a so-called surface sealer after the restoration has been finished, sealing can diminish leakage and mitigate wear.

For this experiment, the authors incorporated a means to create a controlled gap at the margins of Class V experimental restorations in vitro, those margins completely in enamel. They then used an inert red dye to tint various materials used for surface sealing, all available commercially, and sealed the teeth. Following thermocycling, the teeth were soaked in a green dye to reveal any leakage at the sealed margins. Demineralization of the teeth renders them transparent and permits visualization of margins and the interfacial controlled gap. By looking for red at margins, the degree of penetration for the surface sealers could be examined microscopically to indicate their ability to enter (and presumably seal) the controlled gap at margins during sealing. The degree of leakage would be indicated by green.

None of the materials completely penetrated the controlled gap. All permitted leakage. But the sealing material that performed significantly better than the other commercially available sealers was dentin bonding agent. Nonetheless, even the gap sealed with a dentin bonding agent was not totally sealed. The researchers suggest that restorative procedures be performed throughout in such a way as to obtain ideal marginal sealing because the surface sealers are unreliable.

Clinical implications: While definitely useful, surface sealers should not be expected to totally seal margins when applied after finishing composite restorations. Dentin bonding agent appears to be the best material for surface sealing purposes. All means of maximizing the integrity of cavosurface margins should be incorporated into our regime for placing composites because we cannot reliably seal open margins following placement (at least not with any of the sealers used in this study). Some of those means might include the use of cavosurface bevels, pulse-delay light activation of visible light-cured materials, and scrupulous adherence to the manufacturer’s directions-for-use when applying bonding agents.

Some dental bleaching agents may roughen enamel and porcelain, but not composites

Most patients find the prospect of a whiter smile to be quite appealing, even something worth paying for. We have been providing doctor supervised tooth lightening to our patients for many years now, with bleaching agents in varying concentrations, flavors and ingredients. Carbamide peroxide is far and away the most common active ingredient in these products. One common concern is whether or not bleaching could cause any problems to the dentition and/or to existing restorations.

This study looked at the effect of 10% and 35% carbamide peroxide upon enamel, ceramic, a microfill composite and a microhybrid when applied in a regimen that mimicked fairly typical application times and frequencies. The 10% was applied for three hours a day, the 35% applied for a half hour once a week, distilled water was control for all groups. This course ran for three weeks, and surface roughness was measured and used as an indicator of a material’s effect upon that surface.

The data indicated that the porcelain, microhybrid and the enamel specimens all had a significant increase in surface roughness when subjected to the 35% carbamide peroxide regimen. The microfill remained unchanged after three weeks. Only porcelain showed a significant increase in surface roughness after being subjected to the regimen for 10% carbamide peroxide. There is other work that appears to contradict these results, and still more science that seems in agreement with the data, so an accurate and succinct statement about the effects of these peroxides upon teeth and dental work is difficult if not impossible.

Clinical implications: Whitening of the teeth remains in high demand. Carbamide peroxide is the material most used to bleach teeth, and is likely here to stay. Information on the side-effects of these materials varies widely, and differences between similar studies may be due to variables that cannot be standardized or controlled such as inactive proprietary ingredients in studied products such as flavorings, buffers, and desensitizing agents. One common theme is that for the studies that do reveal some adverse effect upon teeth or other materials, higher concentrations of the carbamide peroxide are most associated with observed changes in substrates.