

The gold standard

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_We've all heard the term "gold standard" applied to many items in our everyday lives as well as those used in our practices. For the sake of discussion, we'll define "gold standard" as the product in a specific category that reaches the highest level of achievement sought after by all competitors. But is this nebulous concept static or dynamic? In my view, it has to be dynamic in our fast-changing world. Here are some gold standards in general dentistry and my view on whether they need to be updated.

_Cast gold restorations

It seems appropriate to start here when discussing gold standards. According to several widely quoted surveys¹, dentists would prefer to have their own teeth restored with gold, even as they recommend tooth-colored alternatives for their patients. Although this may have been true in the past and still may be applicable to the "senior" members of our profession, I doubt it applies any longer to most mainstream practitioners.

Traditionalists also will argue that no matter how well-made a ceramic restoration is, it will never match the amazing longevity of gold, which will not cause accelerated wear to the teeth against which it occludes. But with the advancement of ceramic technology, specifically in relation to zirconia-supported crowns and bridges, excellent-fitting and durable restorations are no longer the exception. Nevertheless, if a patient desires the ultimate in strength and

esthetics are not an issue, then cast gold is still the standard.

_Bonding agents

With self-etch products being introduced on almost a weekly basis, you would think that the gold standard had shifted away from total-etch. But even the owner of one of the most prolific manufacturers of both types of adhesives was quoted recently as stating that he still considers "fourth generation, total-etch adhesives" as the pinnacle.² In addition, the only bonding agent to receive a five-star rating (the highest possible rating based on clinical and laboratory testing) in the 2009 Annual Edition of REALITY happens to be a fourth generation, total-etch product. Furthermore, the bonding agent that created the so-called seventh generation (that is, an all-in-one self-etch material) has recently undergone brand extension with the introduction of a total-etch sibling.

Even though there are several very good self-etch adhesives, I believe that the gold standard still belongs to total-etch. This is due to the virtually universal application of total-etch products, including their utility on unprepared enamel. Granted, you need to be somewhat more conscientious when applying total-etch adhesives than you would be with self-etch adhesives, to prevent postoperative sensitivity. Rinsing off the etchant is an extra step and an unpleasant one at that, especially when you are not using a rubber dam. In addition, self-etch adhesives usually are more than adequate for certain restorations, such as full crowns. Having said that, if you could have only one bonding agent in your office, it should still be a total-etch version.

_Curing lights

Halogen lights were first introduced approximately 30 years ago and ruled the roost for most of this time despite the brief and rather tepid challenges of argon lasers and plasma arcs. During this time, these lights have reliably cured all photo-activated materials with reasonable efficiency and economy, due to the wide bandwidth of halogen bulbs. However, light-emitting diode (LED) units have stolen the thunder of halogen lights, due to their relatively small size, mostly cordless design, and more efficient energy management.

The problem, of course, is that most LEDs still won't cure some materials that utilize photoinitiators, which are activated at wavelengths lower than the usual coverage of LEDs. Therefore, even with the market domination of LEDs, the halogen light remains the gold standard. This is evidenced by the fact that a halogen light remains REALITY's highest-rated curing light.

Radiography

The digital revolution has definitely changed radiography, leaving film in its wake. Digital radiographic images can be organized, stored, and recalled electronically for instant retrieval and presentation with special software. This software allows for a wide array of patient-pleasing devices (such as zoom, image reversal, image coloration, annotations, and so forth), which also are very valuable when sending pre-determinations. This software also provides dentists with the capability to e-mail images to colleagues or insurance companies.

Patients also respond very favorably to digital images, because the image is much larger on the computer screen and they can see what you are talking about more clearly when you point to a shadowy area of a radiograph. Viewing an image on a computer monitor is also much more comfortable for patients, since they are more used to viewing images this way than viewing a film-based image on a viewbox, with its glare and unfamiliar feel. Options such as coloration, image enhancement, and image reversal allow for better contrast and improved views of carious lesions, open margins, bone loss, and furcations.

While some clinicians still believe that film-based radiography is more diagnostic, this is one category where the gold standard has surely shifted to digital.

Cements

Materials designed for luting restorations have undergone such significant changes over the years that designating any gold standard would be difficult, if not impossible, in part because no single type of cement can be used across the board. Therefore, to establish any sanity in this area, you have to identify a type of restoration and then establish a gold standard for it.

For example, cements for metal-based crowns and bridges have morphed from zinc phosphate to zinc polycarboxylate to glass ionomer to resin ionomer to resin. There are several permutations in the resin category alone, ranging from the early self-cured materials paired with self-etching primers to the current crop of dual-cured, self-adhesive

versions. While most of the recent buzz in the market has surrounded the self-adhesive resin products, resin ionomer still has to be the gold standard in this arena; two such products achieved a rating of five stars in REALITY. On the other hand, no self-adhesive resin cements even came close to this lofty status.

To lute metal-free restorations, the choices are even more convoluted and beyond the scope of this column. Suffice it to say that you need to identify your needs carefully and match them to a specific type of cement.

Gold standard status remains a useful parameter to judge new entries in specific product categories. However, with the rapidly changing marketplace, the gold standards of yesterday may not be applicable today or tomorrow.

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