

Why Gold Castings Are Excellent Restorations

We, in dentistry, still have choices to make. Probably, at no time has the profession been offered so many choices in patient treatment, especially as it relates to restorative dentistry.

“Esthetic dentistry” has become a major focus in recent years, and it is difficult to know if this interest is generated by patients or by the dentist. In any case, the quality of esthetic treatment is a major consideration in restorative treatment today. Hopefully, white is not the only consideration. Until recently, gold was considered to be the esthetic restorative for posterior teeth, as it does not discolor the teeth and the color gold was considered less objectionable than other materials. As we have become more aware of esthetics in dentistry, we also have developed new techniques, even with gold, which do not destroy the beauty of a smile. For example, with the conception of the invisible onlay, no longer does the buccal cusp of a maxillary premolar need to be “shoed” with a mm or more gold. There is renewed emphasis on intracoronal gold restorations, which can be placed by showing no metal or, in some cases, very little metal, by the proper design of cavity preparations. We also show proper consideration of a badly destroyed tooth by placing tooth-colored crowns, rather than display so much metal. As new materials and concepts evolve, dentists have learned to perform very esthetic dentistry by using gold as a restorative.

As mentioned, I would hope that other considerations, such as longevity of the restoration, would be considered, along with proper contour, proper contacts and maintenance of the occlusion. No material satisfies these requirements as well as gold. Of all the attributes gold has to offer, the most valued is the longevity of gold restorations.¹ We would never tell a patient when we seat an inlay or onlay, that we think it will probably last for the patient’s lifetime. However, I have seen countless patients whose teeth were restored with gold 40 or 50 years ago, many without further treatment than the original restorations.

When my oldest daughter was born, I took the occasion to restore my wife’s teeth with gold, which had amalgam on all posterior surfaces. (She was in the no-

fluoride generation.) Every tooth, except for a lower second molar that fractured a cusp, has remained as restored as it was originally done 60 years ago. Not a single tooth is submarginal, leaking in contour or has open margins or lacking proper contacts.

It is this type of experience that has caused me to list the following reasons to support the use of gold castings.

DISADVANTAGES

1. Gold is Not Tooth-colored

The gold inlay or onlay is obviously not tooth-colored. However, the filling is usually not objectionable, because it is in the posterior part of the mouth, where it is not normally visible. It would seldom, if ever, be recommended for anterior teeth. The teeth should be prepared in such a manner that the patient would not display gold as they speak or smile.

2. Gold Restorations are More Expensive Than Some Other Types of Fillings

Gold casting is more expensive than amalgam or composite restorations. It requires two appointments: one to prepare the cavity and a second to deliver. In addition, there is the expense of the laboratory fabrication between preparation and delivery. The dentist must design a cavity preparation with no undercuts, allowing the casting to withdraw from the cavity, while fulfilling all the other requirements of a good preparation. There are many different preparation designs, depending on the extent and position of the lesion on the tooth. Some things have made the process easier over the years, including significant improvements in impression materials, which enable extremely accurate reproduction of the preparation for the laboratory. The actual gold casting, which is an alloy that gives the most advantageous properties to the metal, is fabricated in the dental laboratory, providing the control necessary to obtain a very accurate fit. The cost of the gold itself is a minor expense and, although more effort and time are necessary, the cost, when compared to the longevity of the restoration, suggests that it is not really more expensive for the patient in the long run.

3. Gold Castings Require Considerable Care, Skill and Technique From the Operator

As with any dental procedure, the dentist must be trained to accomplish successful gold restorations. Knowledge and understanding are required, so that the final restoration is accurate and fulfills all the requirements of providing long-term function and service. It is a fairly demanding procedure for the dentist and is definitely not for someone who is not willing to make the necessary effort.

ADVANTAGES

1. Gold Castings Will Not Break or Fracture

The gold casting will never break or fracture when properly prepared. Silver amalgam, due to its brittle nature, has a greater tendency to fail under load. This is not to infer that dental amalgam is not a “permanent” filling, but points out a greater propensity for fracture in the mouth. Fracture does not seem to be a significant problem with resin composites.

2. Gold Will Not Exhibit Marginal Wear of the Material Itself

The gold casting maintains marginal integrity even after many years of function. The composite filling, though tooth-colored, gradually erodes away, which may leave the enamel margins unsupported and prone to chipping and wear.

3. Gold Has a Coefficient of Expansion Similar to Tooth Structure

The favorable coefficient of expansion of the gold alloy, as compared to that of the tooth, is important. The tooth and restorative material shrink when exposed to cold and expand with exposure to heat. Since the temperature in the mouth varies from cold ice cream to hot coffee, it is important that the filling material expands and contracts to a similar extent as the tooth structure.

4. Gold Supports and Protects the Enamel Margins of the Tooth

The gold casting can be placed so accurately in the tooth that the enamel at the margin of the cavity is supported, so that, as the patient functions, the enamel is protected from breakage. It is as if the gold braces the enamel rods to prevent them from breaking down.

5. Gold Can Provide Precise, Stable Anatomical Form

Returning a tooth to its normal, healthy form is elementary for any restoration. This produces a restoration that allows proper function with opposing teeth and allows food to pass over the dentition in a normal chewing and grinding motion. The gold casting is made in the laboratory from an accurate replica of the preparation and adjacent and opposing teeth. Since it is fab-

ricated outside the mouth in a far more open environment, it is possible to create a final restoration that is as close as possible to ideal.

6. Gold Restorations Can Be Finished to a Very Smooth Surface

There are obviously advantages to having a highly polished restoration. It is much easier to accomplish this in the laboratory, where we have much better access and visibility and are not dealing with oral tissues and fluids. The polish surface is less likely to accumulate plaque and presents a more pleasing feel to the tongue.

7. Gold Does Not Flow or Change Shape

While it is true that gold is not likely to flow or change shape in the mouth, the improvements in high copper amalgams tend to make it less of a comparative factor than it was 30 years ago.

8. Gold Does Not Absorb Oral Fluids

Saliva and other oral fluids will not penetrate the surface of a gold casting. On the other hand, resin composites are penetrated by oral fluids and occasionally absorb enough so that there is a putrid smell when they are removed.

9. Gold Does Not Oxidize in the Mouth

Gold fillings are of such a noble metal that they do not oxidize or corrode as can amalgam fillings over time. Resin composites also discolor over time, although they would still be considered more esthetic for anterior restorations.

10. Gold Does Not Produce Discoloration of the Tooth

Gold castings do not produce discoloration of the tooth, which may occur from ion penetration with silver amalgams. Occasionally, if the tooth is very thin, the gold may reflect through the enamel, but it does not usually create any esthetic liability.

11. Gold Allows for Easier Formation of Proximal Contacts

Since the anatomy of the tooth is carved as a wax pattern in the dental laboratory, it is relatively easy to simulate the broad contact area of a natural tooth. It is also simpler to produce a well-rounded marginal ridge that produces the appropriate occlusal spillways for food movement during mastication.

12. Gold Is Esthetic

Before tooth-colored materials were available, gold was often placed for esthetic reasons, particularly because it does not discolor a tooth and has a “clean” look. Today, dentists are careful to display as little gold as possible by creating a cavity preparation that does not extend out to visible areas of the tooth.

13. Gold Castings Can Be Cemented Successfully Without Adhesive Bonding

It is the opinion of some that time-tested zinc phosphate cement is still the luting agent of choice for the cementation of castings, although glass ionomer cements are also used extensively. Since retention and marginal seal are primarily obtained by minimally tapered preparations, well-fitting castings, luting agents of minimal film thickness and precise finishing, the use of adhesive bonding is really unnecessary.

14. Cast Gold Restorations Allow Good Tissue Health

A gold restoration is biotolerated extremely well by the gingiva and supporting tissues. These restorations can have imperceptible margins, with no discrepancies to harbor plaque; gold is non-reactive and does not usually contribute to allergic responses; and the smooth surface that is obtainable does not act as a primary irritant nor does it produce gingival inflammation. In addition, many patients report increased comfort and note how the smooth tooth/restoration margins are not detectable.

15. Gold Restorations Do Not Abrade the Opposing Dentition

The gold casting does not wear or abrade teeth in the opposing arch when the patient masticates or grinds his or her teeth, as porcelain is likely to do over a period of time. Composites can also produce wear, as filler particles are liberated and contribute to three-body abrasion.

16. There Is No Mercury in Gold Casting Alloys

Many studies have attested to the fact that mercury, as used in amalgam fillings, is not a health hazard for patients. However, for those individuals who still have concerns with mercury, gold is an obvious choice.

17. Wear of the Gold Restoration Is Similar to Normal Wear of Tooth Structure

The gold alloy used in inlays, onlays and crowns is of a hardness that is compatible with tooth structure. It is soft enough that it will wear slightly over time as natural teeth wear, so, the result is similar to natural equilibration over a period of time. As the teeth "flatten" with age, so does the gold.

18. Gold Does Not Liberate Toxins

There have been studies that indicate a release of toxins from resin restorations of an estrogenic nature. This has been essentially discounted as a health hazard but, like mercury, gold may be the material of choice for concerned patients.

19. The Physical Properties of Gold Support Long-term Occlusal Function with Minimal Thickness

The bonded composite changes dimensionally on both polymerization and thermal cycling, often producing micro-fractures in tooth structure. Amalgam apparently can produce some fracturing under the restoration. Both types of fracture can produce sensitivity to both thermal insult and pressure. This is not a factor with gold fillings. Because of its physical properties, including high tensile strength, gold can be placed in very thin layers, providing cuspal protection with minimal removal of tooth structure.

20. Gold Restorations Have Excellent Longevity

Gold castings are usually relatively permanent. We often see gold restorations that have been in service for 40 or 50 years. The permanence of gold fillings is the most obvious reason for their use. If there were a "lifetime" restoration, gold casting would be it.

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¹Masters of Esthetic Dentistry
Retrospective Clinical Evaluation of 1,314 Cast Gold Restorations
in Service from 1 to 51 years
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