



A Comparison of Dental Filling Materials

Cavities can occur at any age for a variety of reasons. Discovering decay as soon as possible, removing it, and filling the space with an appropriate material to protect your tooth from further damage is extremely important for the long-term health of your mouth and your body. Allowing a cavity to get bigger only leads to larger and more expensive health problems. Tooth decay is essentially a bacterial infection that eats away at your tooth. If you let the infection go on long enough, eventually the tooth will abscess and you may lose it altogether. In very extreme cases, the infection from an abscessed tooth can actually move from the mouth into other parts of the body and create an extremely serious systemic infection that may require hospitalization to get under control.

The good news is that all this can be prevented with a healthy diet, adequate home care, and regular dental care. In fact, very small pre-cavities can actually remineralize on their own with the proper changes in diet and mouth pH, and deep grooves in the biting surfaces of the teeth can often be protected from potentially larger fillings later on through the placement of preventive resins. But if you already have a cavity that needs a filling, the biggest choice you have to face is what to fill it with.

Dental fillings don't have to be made exclusively from silver amalgam anymore. In fact there are several types of materials that are equally as strong and durable as amalgam, without many of the potential drawbacks that a silver amalgam filling can present. Certainly, if the choice is no filling or a silver amalgam filling, then the silver filling may be better than none at all. But when you have a choice, it is important to understand all your options. Let's review the pros and cons of the most common dental filling materials available in the United States today.



Amalgam (Silver Fillings)

Amalgam fillings are still the most commonly placed type of filling in the United States today, although that statistic is slowly changing. Amalgam fillings are often referred to as “silver” fillings, mostly due to the color they present in the mouth. But amalgam fillings are actually comprised of a mixture of mercury, silver, tin and copper. Much has been discussed in the media, medical community, and online about the safety of the mercury content in amalgam fillings, and certainly there are legitimate reasons to avoid them – especially if you already know you have metal sensitivities or mercury poisoning. But the mercury content is not the only reason that a silver filling may not be the best long-term choice for your filling.

Our teeth and our fillings all respond to the constantly changing temperature within our mouths. When we eat hot or cold foods, the exposed teeth and filling materials expand or contract in reaction to the change in temperature. While there is no material that can exactly match the expansion and contraction rate of tooth enamel in relation to temperature, silver amalgam is perhaps the most at odds with the surrounding tooth structure during these times. The longer the silver filling is in place, the competing expansion and contraction rates can set up tiny fractures in the healthy enamel surrounding the amalgam filling. Leaking, further decay, and breakage can all result over a period of years. Certainly, any filling of any material weakens the original structure of the tooth overall, but an amalgam filling is more likely to set up these types of temperature-related fractures in a shorter period of time.

In our opinion, there are far better mercury-free filling materials available that are safer, more stable, and better for the long-term health of your tooth and body. Dr. Rich herself has not placed a silver filling in over 20 years and does not use any type of filling material in her office that contains mercury. If you have a choice when having a new filling placed, Dr. Rich always recommends choosing something other than amalgam.



Amalgam (cont'd)

However, that does not mean that you should go out right now and remove every silver filling in your mouth, or that you should go without a filling at all if your only option is an amalgam filling. Just remember that mercury exposure from amalgam fillings is greatest when the filling is placed and when it is removed. If you plan on having one or more silver fillings removed, make sure to discuss the appropriate safety protocols that suit your situation with your dentist in order to limit your exposure to mercury vapors during the procedure. These protocols may include some or all of the following:

1. Use of high-speed suction during removal to drastically reduce the amount of mercury vapor that escapes from the area immediately surrounding the tooth.
2. Breathing oxygen or nitrous oxide (if you are nervous) during the removal to limit inhalation of trace airborne mercury vapor.
3. Wearing a rubber dam during removal of the amalgam fillings.

If you are already managing a known overexposure to mercury or other metals, additional treatment before and after your amalgam removal may be recommended. Those types of treatments are generally prescribed and administered by the primary physician or naturopath who is treating your overexposure.



The Benefits of Amalgam*

- Least expensive
- Fastest and easiest to place
- Durable
- Widely available

Best for:

Small to medium areas of decay in back teeth when no other option is available due to financial burdens or a rural situation where no other materials can be obtained.

Potential Drawbacks of Amalgam

- Mercury exposure during placement and removal
- Possible continued exposure to mercury especially in those patients who are heavy clenchers and grinders
- Increased incidence of temperature-related fractures in the surrounding tooth structure due to differing expansion/contraction rates of the tooth vs. the amalgam as compared to other materials
- Visibly different from surrounding teeth (not cosmetically pleasing)

May not be suitable for:

Patients who have an allergy to silver, tin, or copper (testing is available); patients who have a history of metals poisoning of any kind; extremely sensitive or medically fragile patients; front teeth; large areas of decay that would be better-restored with a crown.

**In our opinion, amalgam offers no clinically significant benefits over the other materials available that outweigh the serious drawbacks of potential mercury exposure and expansion fractures. However, the benefits listed above are the most commonly suggested reasons for the continued approved use of amalgam in the United States.*



Composite (Tooth-Colored Fillings)

Dental composite is a synthetic resin that is used to create bonded tooth-colored fillings. These fillings can be stacked in layers into the tooth or milled outside of the tooth by a lab or in-office CAD/CAM machine. Depending on where the filling is meant to be placed, dental composite is available in a variety of strengths, colors, and translucencies. No longer an option reserved strictly for front teeth, dental composite is now strong and durable enough to be considered a significantly better choice for fillings in back teeth than amalgam.

Depending on the manufacturer, dental composites can vary in formulation. All dental composites are similar in composition to plastics, and some do still contain BPA. However, BPA-free materials are now more and more available and becoming comparable in strength, beauty, and durability.

If you have specific concerns about the BPA content of the composite filling material your dentist might use for you or a family member, be sure to ask *before* the filling is placed. BPA-free alternatives are available, but depending on the location and type of filling being placed, some compromise in durability or cosmetics may need to be discussed.

The Benefits of Composite

- Matches tooth color
- Strong and durable
- Bonding process reduces leaking and margin decay as compared to amalgam
- Less expensive than gold or porcelain inlays

Best for:

Fillings of small to medium size in all teeth, front or back.



Potential Drawbacks of Composite

- May be reactive for some patients who have sensitivity to resins, plastics, or certain bonding materials
- Some brands of dental composite may contain BPA (ask your dentist)
- Very technique sensitive and may not be suitable in areas of the mouth that cannot be kept dry during placement

May not be not suitable for:

Patients who are allergic to plastics, resins, or certain types of bonding materials (testing is available); very large areas of decay that would be better-restored with a crown.

Gold Inlays

Unlike amalgam or composite, gold cannot be stacked into the tooth during your dental appointment. A gold filling, or inlay, must be made in a lab setting outside of the mouth and requires the patient to wear a temporary filling during the manufacturing process. Depending on the lab, this can take up to two weeks.

As a filling material, gold is extremely durable and has the least reactivity of all the metals in the mouth. Additionally, gold works beautifully with glass ionomer cements that are often far less sensitive for many patients than the bonding techniques used for composite and porcelain. However, even with all the advantages that gold provides, it is not always the best choice for every tooth or individual patient.



Gold Inlays (cont'd)

From a cosmetic standpoint, gold is not the best choice for a front tooth and may not be pleasing to many people even in the back teeth. Gold may also be the least reactive metal of all the metals used in dental restorations, but some patients can still be sensitive to a gold filling even if they do not have a specific gold allergy.

All gold restorations are alloys, meaning that the gold is mixed with other metals to give it added strength. Pure gold is too soft to be usable in the mouth except in the smallest of fillings. The best gold restorations are a high-noble alloy, meaning that at least 60% of the crown is made up of gold and other precious metals like platinum, palladium, and silver that are noted for their low-reactivity with human tissue and resistance to corrosion and oxidation.

Another drawback of any metal restoration, including gold, is that all metals conduct hot and cold quickly and efficiently. Patients with gold or amalgam fillings often experience some sensitivity to hot and cold food or drinks during the first several weeks after placement of the filling. In general, this sensitivity subsides over time, but patients whose teeth are already extremely sensitive to hot and cold may want to consider other options.



The Benefits of Gold

- Extremely durable and long-lasting
- Gentle on opposing teeth
- Strong even when thin, allowing for more conservative tooth preparation and the preservation of more healthy tooth structure
- Cementation process is less sensitive for many patients than composite or porcelain bonding techniques

Best for:

Small to medium areas of decay in back teeth where cosmetic concerns are lower; patients with habitual clenching and grinding habits.

Potential Drawbacks of Gold

- Conducts hot and cold temperatures quickly, resulting in some initial sensitivity for a few weeks after placement
- Significantly more expensive than composite or amalgam
- May be reactive in some patients with specific metal sensitivities (testing is available)
- Visibly different from natural teeth
- Gold can wear away over a period of years, especially when placed opposite a full porcelain crown or in patients who clench and grind heavily
- Gold is cast like jewelry from molten metal which can sometimes leave micro-gaps at the margins which are more vulnerable to decay

May not be suitable for:

Patients with specific metal allergies or sensitivities (testing is available); front teeth; patients with extreme sensitivities to hot and cold.



Porcelain Inlays

Porcelain restorations are the most lifelike and natural-looking restorations available. They are extremely beautiful and are often the best choice for the ultimate cosmetic result. Porcelain also does not conduct heat and cold very efficiently, so sensitivity to hot and cold foods during the initial placement period is often reduced. But porcelain has some unique properties that may not make it the best choice for a filling material in every case.

Porcelain is very strong against up and down forces, but only at a certain thickness. If porcelain is too thin, it can fracture very easily. Additionally, constant sideways flexion that is most common in habitual clenchers and grinders can fracture porcelain restorations and break open the bonding at the margins, making the healthy tooth structure surrounding the inlay more vulnerable to decay.

In order to guard against fractures related to thinness, a porcelain inlay must be thicker than a gold or composite filling. This means that more healthy tooth structure may need to be removed to allow for the porcelain to be thick enough for overall strength and durability. Additionally, porcelain must be bonded to the teeth differently than a gold or even a composite filling. Glass ionomer cements cannot be used. Some patients are more sensitive to these bonding procedures than others, and may experience extended tooth sensitivity during the initial placement period.

Given that a porcelain inlay must often be bigger than the area of decay for strength, the biggest question to ask when considering a porcelain restoration is whether to place the inlay or to go ahead and get a crown. All fillings weaken the teeth overtime, no matter what material is used. If the porcelain inlay will need to cover more than half the biting surface of the tooth, a crown may be a better long-term choice.



The Benefits of Porcelain

- Produces the most beautiful and lifelike cosmetic result
- Does not conduct heat or cold well, reducing temperature sensitivity
- Non-reactive in patients with metal sensitivities

Best for:

Any tooth where an exquisite cosmetic result is the primary concern.

Potential Drawbacks of Porcelain

- Fractures more easily than other materials
- More tooth structure must be removed than would be necessary for other materials
- Bonding process may be initially more sensitive immediately following placement for some patients
- Significantly more expensive than composite or amalgam; may cost almost as much as gold

May not be suitable for:

Molar restorations in patients who clench and grind; patients with sensitivities to specific bonding techniques and materials (testing is available); large areas of decay that would be better restored with a crown.



Temporary Solutions

Temporary filling materials are used most often to allow a tooth to heal after a root canal procedure, or to protect a prepared inlay area while a gold or porcelain restoration is being made. They can also be used in an emergency situation when follow-ups are expected after other more pressing injuries are addressed. Additionally, medically fragile patients in long-term treatment for other illnesses may not be able to tolerate the placement of a permanent filling. Temporary fillings may be the best solution for these patients until they are physically strong enough for a longer procedure.

Temporary fillings are very good at protecting vulnerable areas of your teeth for very short periods of time. But temporary filling materials are specifically designed to be easily removed. Over a period of just a few months, they will wear away and the inner portions of your tooth will be extremely vulnerable to decay. Even if your tooth has stopped hurting after a root canal treatment, it is very important to take the next step and have a permanent filling placed after 2 to 4 weeks of healing. Medically fragile patients who need temporary solutions for several months or longer may need to have their temporary filling replaced every 2 to 4 months depending on the materials used and the individual's ability to keep their teeth clean.



Making Your Final Decision

As always, when considering any dental treatment, the most important conversation you can have is with the dental professional who will be providing your treatment. This reference is intended only to help you better understand the basic pros and cons of the most tested and accepted filling materials currently available. Other materials including glass ionomers may be useful in some specific situations, but are far less commonly used. Additionally, each individual patient may have specific health conditions or anatomical considerations that may have a greater influence on treatment decisions than any of the information presented here.

Remember, all types of dental fillings have the potential to develop decay at the margins or may need to be replaced from time to time as the teeth flex with use. Any tooth that requires a filling may also still develop the need for a crown or a root canal treatment at any point in the future regardless of what type of filling material is used.

As always, we encourage you to gain as much information about your treatment choices as you feel necessary, and then to discuss how that information specifically applies to your condition with your dental provider. Current patients of Dr. Rich are always welcome to call the office with specific treatment questions or bring them to their next regularly scheduled dental appointment.