

Dental Material Fact Sheet

We are dedicated to protecting and improving oral health while providing safe dental treatment. This section will provide information about the benefits and drawbacks of each available dental restorative (filling) material in order to choose the best option for you and your family.

Direct Restorations

Dental Amalgam is a commonly used dental filling that has been used for over 150 years. It is a mixture of mercury with at least one other metal.

Advantages

- *Strong, durable and stands up to biting force;*
- *Can be placed in one visit;*
- *Normally the least expensive filling material;*
- *Self-sealing with minimal-to-no shrinkage and it resists leakage (leakage occurs when a filling does not completely seal, permitting food and bacteria to "leak in" and promote new decay behind or beneath the filling);*
- *Resistance to further decay is high;*
- *Frequency of repair and replacement is low;*
- *Amalgam is the only material that can be used in a wet environment, especially important when treating small children or special needs patients.*

Disadvantages

- *While agencies like the U.S. Food and Drug Administration (FDA), the U.S. Centers for Disease Control (CDC) and the World Health Organization (WHO) have not found evidence of harm from dental amalgam, there are some individuals and groups who have raised concerns about the very low levels of mercury vapor released by amalgam.*
- *Amalgam scrap (waste left over after repairing a cavity) contains mercury and requires special handling to protect the environment;*
- *Amalgam can darken over time as it corrodes. This does not affect the function of the filling, but many people find it less attractive than tooth colored materials;*
- *Placement of amalgam requires removal of some healthy tooth;*
- *In rare cases, a localized, allergic reaction such as inflammation or rash may occur.*

Dental Composites

There are circumstances in which composite (white fillings) serves better than amalgam; when amalgam is not indicated, or when a more conservative preparation would be beneficial, composite is the recommended restorative material. These situations would include small occlusal restorations, in which amalgam would require the removal of a more sound tooth structure, as well as in "enamel sites beyond the height of contour." The American Dental Association Council on Scientific Affairs has concluded that both amalgam and composite materials are considered safe and effective for tooth restoration.

Composite (resin)

Composite is a mixture of acrylic resin and powdered glass-like particles that produce a tooth-colored filling. This type of material may be self-hardening or may be hardened by exposure to blue light. Composite is used for fillings, inlays and veneers. Sometimes it is used to replace a portion of a broken or chipped tooth.

Advantages

- *Color and shading can be matched to the existing tooth;*
- *Composite is a relatively strong material providing good durability in small to mid size restorations that need to withstand moderate chewing pressure;*
- *Composite may generally be used on either front or back teeth;*
- *Fillings are usually completed in a single visit (with exceptions noted below);*
- *Moderately resistant to breakage;*
- *Often permits preservation of as much of the tooth as possible;*
- *Low risk of leakage if bonded only to enamel;*
- *Does not corrode;*
- *Generally holds up well to biting force (dependent on the material used);*
- *Moderately resistant to further decay, new decay is easy to find;*
- *Frequency of repair or replacement is low to moderate.*

Disadvantages

- *This type of filling can break and wear out more easily than metal fillings, especially in areas of heavy biting force. Therefore, composite fillings may need to be replaced more often than metal fillings;*
- *Compared to other fillings, composites are sometimes difficult and time-consuming to place. They cannot be used in all situations;*
- *Composite generally is more expensive than amalgam;*
- *May require more than one visit for inlays, veneers and crowns;*
- *May wear faster than natural dental enamel;*
- *May leak over time when bonded beneath the layer of enamel;*
- *In rare cases, a localized, allergic reaction such as inflammation or rash may occur.*

Glass Ionomer

Glass ionomers are tooth-colored materials made of a mixture of acrylic acids with fine glass powders that are used to fill cavities, particularly those on the root surfaces of teeth. They are primarily used for small fillings in areas that need not withstand heavy chewing pressure. Glass ionomers also are used to cement dental crowns.

Advantages

- *Tooth-colored so the filling looks more natural;*
- *Can contain fluoride that may help prevent further decay;*
- *Minimal amount of tooth structure removed;*
- *Low incidence of localized allergic reaction;*
- *Usually completed in a single visit.*

Disadvantages

- *Low resistance to fracture. Use is limited to small areas of decay on non-biting surfaces of teeth;*
- *Moderate cost, similar to composite (costs more than amalgam);*
- *As it ages, this material may become rough and plaque can build up increasing the risk of gum (periodontal) disease;*
- *Can be dislodged;*
- *In rare cases, a localized allergic reaction such as inflammation or rash may occur.*

Resin Ionomer

Resin ionomers are also made from glass filler with acrylic acids and acrylic resin. They harden with exposure to blue light. Resin ionomers are most commonly used in fillings on non-chewing surfaces and fillings in primary (baby) teeth.

Advantages

- *Tooth-colored, more translucent than glass ionomer;*
- *Can contain fluoride that may help prevent further decay;*
- *Minimal amount of tooth structure removed to place it;*
- *Low incidence of localized allergic reaction;*
- *May be used for short-term fillings in primary (baby) teeth;*
- *May last longer than glass ionomer but is not as durable as composite;*
- *Usually completed in a single visit.*

Disadvantages

- *Limited use because it is not recommended for biting surfaces in adult teeth;*
- *Moderate cost, similar to composite (more than amalgam);*
- *Wears faster than composite and amalgam;*
- *In rare cases, a localized allergic reaction such as inflammation or rash may occur.*

Porcelain (ceramic)

All-porcelain (ceramic) materials include porcelain, ceramic or glass-like fillings and crowns. They are used in inlays, onlays, crowns and cosmetic veneers. Porcelain fused to metal is another application for this material and has similar properties as described below with the notable exceptions of increased durability due to the meta substructure, the necessity for more tooth removal for that substructure and, in rare cases, a localized, allergic reaction may occur.

Advantages

- *Tooth-colored with excellent translucency; the color looks similar to natural tooth enamel;*
- *Very little tooth is removed when used as a veneer, more tooth is removed for a crown;*
- *Good resistance to further decay if it fits well;*
- *Is resistant to surface wear but can cause some wear on opposing teeth;*
- *Resists leakage because of precise shaping and fitting;*
- *Does not cause allergic reaction.*

Disadvantages

- *Material is brittle and is prone to cracking under biting force;*
- *May not be recommended for molars;*
- *Generally, requires a minimum of two appointments to complete;*

- *High cost, similar to gold.*
- *In rare cases, a localized allergic reaction such as inflammation or rash may occur.*

Gold Alloys

Gold alloys contain gold, copper and other metals that result in a strong, effective filling, crown or bridge. They are primarily used for inlays, onlays, crowns and fixed bridges.

Advantage

- *Excellent durability, does not crack under stress;*
- *Good resistance to decay if it fits well;*
- *Minimal amount of tooth structure needs to be removed;*
- *Wears well, does not cause excessive wear to opposing teeth;*
- *Resistant to corrosion and tarnishing;*
- *Resists leakage because it can be shaped and fit very accurately.*

Disadvantages

- *Gold is normally the highest cost material;*
- *A minimum of two appointments is required to complete the restoration;*
- *Not tooth colored;*

Allergic Reactions to Dental Materials

Just like any other material we come in contact with during our daily lives, substances in dental fillings may trigger a localized allergic reaction. For all dental filling materials the risk of this type of reaction is extremely low, but they do exist. No matter which material is used, a filling is not a natural tooth. Filling materials are man-made and as such are foreign materials to your body. Whenever something foreign is put into your body, there is a chance of side effects. This is why we need to know about your allergies. If you have or may be prone to allergies, let us know before a filling material is chosen. It may be an important part of determining what the right material is for you.

Health

Dental amalgam fillings are created by mixing elemental mercury (between 43 percent and 54 percent) and an alloy powder composed mainly of silver, tin and copper. In its elemental form, mercury can be toxic, although this form is far less toxic than organic mercury, such as the methylmercury found in some seafood such as tuna and swordfish. This has generated discussion about the potential risks and toxicity of the mercury in dental amalgam. When mixed as an alloy the vast majority of the mercury in the dental amalgam becomes stable, however a miniscule amount is released as vapor. How much vapor is emitted depends on the number of fillings you have. It also depends on how much time you spend chewing, grinding your teeth and drinking hot liquids. Miniscule amounts of this vapor can be inhaled and enter the bloodstream where it may then be taken throughout the body. The amounts absorbed are well below safety limits set by the federal government and are harmlessly excreted from the body. Should you swallow a bit of an amalgam filling, the mercury within it is very poorly absorbed and typically does not enter the bloodstream and is excreted. Scientific research continues on the safety of dental amalgam. Many public and private agencies reconsider this issue on an on-going basis. The U.S. Food and Drug Administration (FDA) and other public health organizations have investigated the safety of dental amalgams and concluded that "no valid scientific evidence has shown that amalgams cause harm to patients with dental restorations, except in rare cases of allergy."¹ The World Health Organization (WHO) reached a similar conclusion,² and the U.S. Centers for Disease Control (CDC) maintains that "At present, there is scant evidence that the health of the vast majority of people with amalgam is compromised, nor that removing amalgam fillings has a beneficial effect on health."³ While questions have been raised concerning the safety of amalgam fillings, no public agency has found evidence to support discontinuation of the material and the FDA places no restrictions on their use.

1 U.S. Food and Drug Administration (FDA), Consumer Update: Dental Amalgams, December 31, 2002

2 World Health Organization (WHO), WHO Consensus Statement on Dental Amalgam, September, 1997

3 U.S. Centers for Disease Control (CDC), Fact Sheet: Dental Amalgam Uses and Benefits, Updated February 2, 2005