

# dental fillings *facts*

## **About the brochure:**

Your dentist is dedicated to protecting and improving oral health while providing safe dental treatment. This fact sheet provides information you need to discuss with your dentist about the benefits and drawbacks of each available dental restorative (filling) material in order to choose the best option for you and your family. Your dentist wants to talk to you about the facts presented in this brochure and the treatment options that are available to you.



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## Choices in Restorative Materials (Fillings) – Advantages & Disadvantages

### Preventing Fillings – What You Can Do

You can avoid the need for fillings by preventing tooth decay in the first place. Brushing, flossing, eating a balanced diet and seeing your dentist regularly are important factors in staying healthy. Because of improvement in disease prevention and the availability of new materials, most people need far fewer fillings than they did in the past and many filling materials are more esthetically pleasing. Knowing what dental filling materials are available and the benefits and drawbacks of each of those is important. This brochure is designed to help you understand your filling choices and provide you with information on how to prevent tooth decay and avoid the need for any fillings.

### About Cavities and Dental Decay

A cavity (caused by a disease called caries) happens when bacteria in the mouth produce acids that attack your teeth. In time, this acid can dissolve away the enamel on your teeth and cause a hole, which is known as a cavity. Unlike some other diseases or injuries, a cavity will not heal by itself, but if the early signs of dental decay are promptly treated before a cavity forms, it can be stopped and even reversed by your dentist.

Without treatment by your dentist, dental decay may continue to advance. Extreme decay can result in the loss of the affected tooth or teeth, potentially preceded by great discomfort, infection and other health problems.

### Preventing Dental Decay

Over the past 60 years many successful preventive measures have helped to reduce dental disease. Preventing decay is the best way to protect your oral health. If you keep decay from starting, you won't need fillings and you'll save money.

Follow these basic steps to prevent dental disease:

- *Brush twice a day with a fluoride toothpaste;*
- *Floss or use an interdental cleaner once a day;*
- *Eat a balanced diet;*
- *Limit eating and drinking between meals. Give preference to nutritious foods for snacks;*

- *Visit your dentist regularly;*
- *Ask your dentist whether supplemental fluoride would be appropriate to strengthen tooth enamel and prevent decay;*
- *Ask your dentist about dental sealants.*

### Talking With Your Dentist

Because of the wide variety of potential dental procedures any patient may need, it is important to talk openly with your dentist. Therefore, during your appointment, let your dentist know of any changes to your health since your last visit. This information will help your dentist to recommend the best treatment options for you. Examples of the type of information you should tell your dentist include:

- *Are you pregnant or nursing?*
- *Do you have any allergies?*
- *Do you plan to have braces soon?*
- *What medications are you taking? For what conditions? Any over-the-counter medications or supplements?*
- *Do you have any other health conditions or specific health concerns?*

By knowing facts like these your dentist will be better able to help you make the best treatment choice.

If you need to have a tooth restored (filled), your options may include several different materials. Your dentist will discuss with you which material is best for you and the tooth that needs to be filled. Each material has advantages and disadvantages and you should know what these are so you can make an informed choice that is best for you.

If you have any questions or concerns about the types of fillings you already have, read this brochure and talk with your dentist about those questions or concerns.

What choice you make will depend on your needs and the best way to repair the cavity in your tooth. Many factors may affect your choice of filling material and the recommendations made by your dentist. These factors include: your oral and general

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### Talking With Your Dentist, *continued*

health; esthetics; the location of the filling; the biting force in the affected area of the mouth; the length and number of visits needed to place the filling; the durability required and the cost.

For many years the only available choices were metals. These are 1) gold alloy or 2) a mixture or “amalgam” of mercury, silver and other metals. In the past few decades, other materials have been developed for restoring teeth. They are “tooth colored” rather than silver-colored or gold. They include composite resin, glass ionomer and porcelain materials.

Dental fillings fall into two categories based on the method used to place them: They are: direct restorations and indirect restorations.

**Direct restorations** are fillings placed immediately into a prepared cavity in a single visit. They include dental amalgam, glass ionomers, resin ionomers and most composite (resin) fillings. The dentist prepares the tooth, places the filling and adjusts it during one appointment.

**Indirect restorations** may require two or more visits. They include inlays, onlays, veneers, crowns and bridges fabricated with gold, ceramics or composites. During the first visit, the dentist prepares the tooth and makes an impression of the area to be treated. The impression is sent to a dental laboratory, which creates the dental restoration (filling). At the next appointment, the dentist cements the restoration to the prepared tooth and adjusts it as needed.

This fact sheet outlines the alternatives available and will help you decide on the right choice for you.

**The final choice is between you and your dentist.**

## Direct Restorations

### Amalgam

The word “amalgam” when referring to dental fillings means a mixture of two or more metals in which mercury is a component. Dental amalgam is a mix of approximately 43 percent to 54 percent mercury with other metals, including silver, copper and tin. Dental amalgams have commonly been

called “silver fillings” because of their silver color when they are first placed. Today, amalgam is used most commonly in the back teeth. It is one of the oldest filling materials and has been used (and improved) for more than 150 years. Dental amalgam is the most thoroughly researched and tested filling material.

### 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. These concerns are discussed later in this publication;*
- *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.*

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### 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 sized 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 can not 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.*

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### 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.*

### Indirect Restorations

#### 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 metal 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.*

#### 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.

#### ADVANTAGES:

- *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;*
- *In rare cases, a localized allergic reaction such as inflammation or rash may occur.*



## Choices in Restorative Materials (Fillings) – Advantages & Disadvantages

### 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. Normally, an allergy is revealed as a rash and is easily reversed when the affected area is not in contact with the material causing the allergy (known as an “allergen”).

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. Dental materials may cause a localized allergic reaction in a very small number of individuals. This is why your dentist needs to know about your allergies.

If you have or may be prone to allergies, tell your dentist before a filling material is chosen. It may be an important part of determining what the right material is for you.

### Dental Amalgam and Mercury

#### 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.”<sup>1</sup> The World Health Organization (WHO) reached a similar conclusion,<sup>2</sup> 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.”<sup>3</sup> 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.

#### Environment

When new fillings are placed in teeth or when old fillings are removed, there is a certain amount of leftover material that needs to be discarded. Because dental amalgam contains mercury, that means dental amalgam waste also contains mercury. While this waste does not represent a major environmental concern as compared to other sources of mercury, your dentist employs best management practices to ensure that the vast majority of any waste amalgam is captured before it enters the environment.

In addition to using pre-measured amalgam capsules, dentists also use traps and filters to remove amalgam before it enters the sewer system. Most recently, some dentists have installed amalgam separators, devices that remove almost all of the remaining amalgam waste beyond that removed by the traps and filters. While the mercury used in dental amalgams is not a major contributor to the pollution that results in fish consumption warnings, these actions strive to ensure that any potential environmental impact is negligible.

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

<sup>2</sup> World Health Organization (WHO), WHO Consensus Statement on Dental Amalgam, September, 1997

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