

## **Restoring Your Smile: Dental Filling Choices**

Advances in modern dental materials and techniques increasingly offer new ways to create more pleasing, natural-looking smiles. Researchers are continuing their often decades-long work developing esthetic materials, such as ceramic and plastic compounds that mimic the appearance of natural teeth. As a result, dentists and patients today have several choices when it comes to selecting materials used to repair missing, worn, damaged or decayed teeth.

The advent of these new materials has not eliminated the usefulness of more traditional dental restoratives, which include gold, base metal alloys and dental amalgam. The strength and durability of traditional dental materials continue to make them useful for situations where restored teeth must withstand extreme forces that result from chewing, such as in the back of the mouth.

Dental amalgam is a compound of mercury and other metals and is often called a silver filling because of its appearance. While dental amalgam continues to be a commonly used restorative material, some have raised concern because of its mercury content, but their concern is unfounded. Although mercury by itself is classified as a toxic material, the mercury in amalgam chemically combines with other metals to render it stable and safe for use in filling and restoring teeth.

## What's Right for Me?

Several factors influence the performance, durability, longevity and expense of dental restorations. These factors include: the components used in the filling material; where and how the filling is placed; the chewing load that the tooth will have to bear; and the length and number of visits needed to prepare and adjust the restored tooth.

With so many choices, how do you know what's right for you? To help you better understand what's available, let's look at the advantages and disadvantages of commonly used dental restorations.

The ultimate decision about what to use is best determined by the patient in consultation with the dentist. Before your treatment begins, discuss the options with your dentist.

### **Types of Dental Restorations**

There are two types of dental restorations: *direct* and *indirect*.

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

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

### **Direct Restorative Dental Materials – One Visit**

#### **Amalgam Fillings**

Used for well over a century, dental amalgam is the most thoroughly researched and tested restorative material among all those in use. It is durable, easy to use, highly resistant to wear and relatively inexpensive in comparison to other materials. For those reasons, it remains a valued treatment option for dentists and their patients.

While questions have arisen about the safety of dental amalgam relating to its mercury content, the major U.S. and international scientific and health bodies—including the National Institutes of Health, the U.S. Public Health Service, the Centers for Disease Control and Prevention, the Food and Drug Administration and the World Health Organization, among others—have been satisfied that dental amalgam is a safe, reliable and effective restorative material.

Because amalgam fillings can withstand very high chewing loads, they are particularly useful for restoring molars in the back of the mouth where chewing load is greatest.

Amalgam fillings, like other filling materials, are considered biocompatible—they are well tolerated by patients with only rare occurrences of allergic response.

Disadvantages of amalgam include possible short-term sensitivity to hot and cold temperatures after the filling is placed. The silver-colored filling is not as esthetically pleasing as one that is tooth-colored, especially when the restored tooth is near the front of the mouth, visible when the patients laughs or speaks. And lastly, to prepare the tooth, the dentist may need to remove more tooth structure to accommodate an amalgam filling than for other types of direct fillings.

## **Composite Fillings**

Composite fillings are a mixture of acrylic resin and finely ground glasslike particles that produce a tooth-colored restoration. Composite fillings provide good durability and resistance to fracture in small-to-mid size restorations that need to withstand moderate chewing pressure. Less tooth structure is removed when the dentist prepares the tooth, and this may result in a smaller filling than that of an amalgam. Composites can also be “bonded” or adhesively held in a cavity, often allowing the dentist to make a more conservative repair to the tooth.

In teeth where chewing loads are high, composite fillings are moderately resistant to wear, but less so than amalgam fillings. The cost is moderate and depends on the size of the filling and the technique used by the dentist to place it in the prepared tooth. The time required to place a composite filling is usually longer than what is required for an amalgam filling. Composite fillings require a cavity that can be kept clean and dry during filling and they are subject to stain and discoloration over time.

## Ionomers

Glass ionomers are tooth-colored materials made of a mixture of acrylic acids and fine glass powders that are used to fill cavities, particularly those on the root surfaces of teeth. Glass ionomers can release a minute amount of fluoride that may be beneficial for patients who are at high risk for decay. When the dentist

prepares the tooth for a glass ionomer, less tooth structure is removed; this may result in a smaller filling than that of an amalgam.

Glass ionomers are primarily used as small fillings in areas that need not withstand heavy chewing pressure. Because they have a low resistance to fracture, glass ionomers are mostly used in small non-load bearing fillings (those between the teeth) or on the roots of teeth.

Resin ionomers also are made from glass filler with acrylic acids and acrylic resin. They also are used for non-load bearing fillings (between the teeth) and they have low to moderate resistance to fracture.

Ionomers experience high wear when placed on chewing surfaces. Both glass and resin ionomers mimic natural tooth color but lack the natural translucency of enamel. Both types are well tolerated by patients with only rare occurrences of allergic response.

### **Indirect Restorative Dental Materials (Two or more visits)**

Sometimes the best dental treatment for a tooth is to use a restoration that is made in a laboratory from a mold. These custom-made restorations, which require two or more visits, can be crowns, inlays or onlays. A crown covers the entire chewing surface and sides of the tooth. An inlay is smaller and fits within

the contours of the tooth. An onlay is similar to an inlay, but it is larger and covers some or all chewing surfaces of the tooth. The cost of indirect restorations is generally higher due to the number and length of visits required, and the additional cost of having the restoration made in a dental laboratory. Materials used to fabricate these restorations are porcelain (ceramic), porcelain fused to metal, gold alloys and base metal alloys.

### **All-Porcelain (Ceramic) Dental Materials**

*All-porcelain (ceramic) dental materials* include porcelain, ceramic or glasslike fillings and crowns. They are used as inlays, onlays, crowns and aesthetic veneers. A veneer is a very thin shell of porcelain that can replace or cover part of the enamel of the tooth. All-porcelain (ceramic) restorations are particularly desirable because their color and translucency mimic natural tooth enamel.

All-porcelain restorations require a minimum of two visits and possibly more. The restorations are prone to fracture when placed under tension or on impact. Their strength depends on an adequate thickness of porcelain and the ability to be bonded to the underlying tooth. They are highly resistant to wear but the porcelain can quickly wear opposing teeth if the porcelain surface becomes rough.

## **Porcelain-fused-to-Metal**

Another type of restoration is *porcelain-fused-to-metal*, which is used to provide strength to a crown or bridge. These restorations are very strong and durable.

The combination of porcelain and metal creates a stronger restoration than porcelain used alone. More of the existing tooth must be removed to accommodate the restoration. Although they are highly resistant to wear, porcelain restorations can wear opposing natural teeth if the porcelain becomes rough. There may be some initial discomfort to hot and cold. While porcelain-fused-to-metal restorations are highly biocompatible, some patients may show an allergic sensitivity to some types of metals used in the restoration.

## **Gold Alloys**

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

Gold alloys exhibit high strength and toughness that resists fracture and wear. This allows the dentist to remove the least amount of healthy tooth structure when preparing the tooth for the restoration. Gold alloys are also gentle to

opposing teeth and are well tolerated by patients. However, their metal colors do not mimic natural teeth.

### **Base metal alloys**

Base metal alloys are non-noble metals with a silver appearance. They are used in crowns, fixed bridges and partial dentures. They are highly resistant to corrosion and tarnishing. They also have high strength and toughness and are very resistant to fracture and wear.

Some patients may show allergic sensitivity to base metals and there may be some initial discomfort from hot and cold. The metal color does not mimic natural teeth.

### **Indirect Composites**

Crowns, inlays and onlays can be made in the laboratory from dental composites. These materials are similar to those used in direct fillings and are tooth colored. One advantage to indirect composites is that they do not excessively wear opposing teeth. Their strength and durability is not as high as porcelain or metal restorations and they are more prone to wear and discoloration.