

Restorative Materials Options: An Overview

When a natural tooth undergoes extensive damage, it cannot be successfully restored for the long term with a regular or conventional restoration or “filling,” which is the one directly placed by the dentist in a single office appointment. When the restorative area (lost tooth structure) is too large for this, a crown, or “cap” is usually indicated to restore the tooth.

Materials used for fabrication of a crown, that is constructed and processed indirectly in a laboratory, can be contoured exactly to the contours and shape desired, the shade can be controlled for optimum esthetics, and are stronger and will last longer. All materials for indirect (laboratory fabricated) restorations have advantages and disadvantages. The following is a summary of the materials that can be used.

Partial Coverage Restorations: Inlays and Onlays

Partial coverage restorations are indicated when there is still some sound remaining tooth structure that does not need to be included in the preparation, but still requires more than a direct restoration. Advantages of an inlay or onlay include less preparation (“drilling”) and is more conservative of your natural tooth structure, than for a full coverage crown. Because of esthetics and concern over potential allergic reactions to metal, dentistry is and has been moving away from any restorations that have metal in them. However, all ceramics are a metal oxide!

Full Coverage Restorations: Crowns and Bridges

Full coverage restorations are indicated when the entire remaining tooth structure needs protection or is vulnerable to fracture. A full coverage crown requires more preparation than an inlay or onlay.

Materials:

- **Cast Gold (*High Noble*) Alloy:** Made of a gold alloy, full cast gold is the longest lasting clinical recorded material for any of the laboratory-processed materials 20+ years, although some ceramic materials are now exhibiting exceptional wear resistance, and expected to surpass this with even less wear. The high noble alloy consists primarily of gold, with the addition of platinum, palladium, silver, and sometimes zinc, copper, as well as other rare earth metals, depending on the manufacturer. Although it is a very strong material, the characteristic gold-yellow color might be visible when you speak or smile and for that reason is not considered an esthetic material. It is, however, also useful for small to medium restorations and for those who brux or grind. The option for gold is now more commonly being replaced by dentists with the option of ceramic materials (see below).
- **Full Cast *Noble Alloy*:** Similar in properties and qualities to high noble gold, this material contains mostly palladium plus silver, gold, and other trace metals. Full cast noble material is usually more silver in color than a high noble metal.

- *Non-precious Alloy*: As is self-evident, there are no precious metals in this alloy. These are used where very high strength and wear resistance are needed. However, these alloys can cause problems if other metals are in the mouth, as they may react with them unfavorably, and in some cases have a metallic taste.
- *Porcelain-fused-to-metal*: This is a tried and tested technique where a thin metal coping of material is fit to the tooth and a ceramic/porcelain is fused (by heat in an oven) to the metal. These can be esthetic, but can also fracture in some cases, where the ceramic material separates from the underlying metal substructure coping. In addition, care in the esthetic zone for anterior teeth must be used because periodontal (gum) recession can leave a dark line in this area, that once did not show. There are some indications for this method/material choice for restoration but typically all ceramic options are now usually a better choice.
- *Laboratory-Processed/Milled Resin*: This is an excellent cosmetic choice because it can closely match natural tooth color. Laboratory-processed/milled resins are well suited for small to medium restorations but not as successful in patients with a tooth grinding habit. The restorations tend to break under extreme compressive forces. These are laboratory processed/milled resins are very well suited for provisional (“temporary”) restorations in more complicated cases. A mouthguard may be recommended for protection.
- *Porcelain/Ceramic*: No metal (although technically all ceramics are metal oxides) is used in the process, and therefore no “metal” will ever be visible. These materials are excellent for use in cosmetic dentistry, and are used to restore small- to medium-sized preparations, as well as more commonly placed full coverage crowns, and even connected crowns (bridges). The material is more wear-resistant than resin materials but in some cases can wear opposing natural tooth enamel. It is may or may not be as successful for patients who brux or grind and has the potential to break under extreme biting forces. A mouthguard may be recommended for protection. Milling this material is the newest technology in laboratory-processed restorations. Some processes in fabrication of the all ceramic or porcelain crown are controlled by a computer. It is also an excellent option for restoration of back teeth with an expected service life of 10+ years - and increasing every year now that these have been in service for longer and longer times. This type of restoration can be bonded in place, which creates a very secure bond and seal to the tooth. The same cautions exist as with any porcelain or ceramic material: it can wear opposing natural enamel, and a mouthguard may be recommended for protection from bruxing or grinding.

All the above materials and procedures involve at least two appointments to finish, although some office now offer crowns or single unit restorations in one, much longer appointment. These offices employ an on-site milling machine to fabricate the crown with placement the same day. At this time, we do not provide this option for many reasons, but primarily because our office is usually involved in more complex cases with multiple crowns. First: Tooth preparation, impressions, and provisional (temporary) crown, bridge, or inlay/onlay will be done at the first appointment. Second: Definitive bonding of the definitive restoration will take place during the second appointment.

We will recommend the best material to meet your specific needs and answer any questions you have. Longevity of any of the restorations depends on the quality of the materials (and we only use the best), the technical skills in construction and placement (and we provide the best service possible), and what you do to and with the restorations once they are in your mouth. Clenching, bruxing, and grinding habits will significantly shorten the useful life of *any* restoration placed. What can break your natural tooth can break any restoration. Your oral self-care will affect the length of service of the restoration. You will need regular dental examinations and hygiene maintenance (cleaning) at intervals determined by your oral health requirements. A rule of thumb is that the more restorations you have in your mouth, the more care you (and they) will need. Any problem that begins can be discovered and corrected when it is small: with regular dental examinations, you can protect your investment.

If you have any questions about restorative materials, please feel free to ask us.