

Porcelain – All Ceramic Restorations

Progress in dental materials has been significant in the past 20 years. Most indirect restorations, such as crowns, veneers, and bridges, if possible, are made in all ceramic/porcelain materials. The variety of materials continues to change, but in my practice there are three primary materials used, and each has its purpose based on the location, esthetics and function involved in treatment.

Porcelain or All Ceramic: Porcelain is a generic catch-all term for a ceramic in dentistry. If a material is All Ceramic it technically has No Metal (although technically all ceramics are metal oxides) used in the restoration, and therefore no “metal” will ever be visible. All ceramic substructures that can be layered like a metal substructure with a porcelain-fused-to-metal crown are frequently still made. Ceramic materials are excellent for use in esthetic/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).

Any ceramic can chip, break or fracture. The material is more wear-resistant than resin/composite materials but in some cases can wear opposing natural tooth enamel. This 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 posterior (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.

Three primary materials used in this office are:

1. *Lithium Disilicate* (Emax™) ceramic has been used in all areas of the mouth in my practice with success and in the past 14 years I have not seen but a handful of small chips, regardless of the area. The best, most durable is a non-modified monolithic form. However, a layered form that enhances the esthetics has also exhibited no problems.
2. *Feldspathic Porcelain* is a traditional porcelain that is usually layered onto a metal substructure, but also is used for esthetic *porcelain veneers*, and this is where it is primarily used in my practice. This porcelain is extremely versatile and esthetic. Longevity and durability is not a problem when bonded correctly. I have been placing bonded restorations before they were cutting edge. I started in the 1980's with orthodontic bonding resin (used for ceramic bracket to teeth), because specific materials for bonding this type of restoration were not even available. I did “benchtop” fabrication and testing of these at the University of

Texas, San Antonio while a faculty member and became very familiar with how to fabricate these and the limitations., as well as preparation “necessities.” I can attest that there are two of the original veneers I placed 35 years ago are still in and functioning, even though placed with these materials. I have really not seen failures due to materials. If planned correctly and fabricated in a great lab, placed correctly, and the teeth are cared for with diligent hygiene, they will last. As with anything, they can fracture, but usually do not “fall off” but rather have a cohesive fracture, which is a fracture in the material, but is stays bonded to the tooth. This is because they are thin, conservative restorations, and can fracture with force. Replacement can be made if they do fracture with another veneer if circumstances allow. In the past 14 years at this location of practice I have only had one fail due to fracture. All in all older tried and true materials work just great when in the appropriate location and are extremely esthetic.

3. *Zirconia* ceramic is an excellent material and becoming rapidly one of the most used materials for restoring crowns. They are not as esthetic as the other two materials above, and usually more opaque in appearance, but extremely strong, and best suited for posterior restorations or large, long spans, “bridges,” such as implant hybrids. Just like Lithium Disilicate, a monolithic form is stronger than a layers form. But if you want to use this material in the anterior esthetic zone, it almost always has to be layers for optimal esthetics. Even with layering, it is very strong and should have good longevity, but there has just not been enough time to determine how long it will last in service, as it is still a newer material. The real problem with a zirconia restoration is replacement. It is so strong that cutting through this material is very difficult and time consuming. So replacing a failed/failing restoration, or for whatever reason, if it needs to be removed it is much more time consuming.

All the above materials and procedures involve at least two appointments to finish, although some offices 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. In most office the procedure is - First: Tooth preparation, impressions, and provisional (temporary) crown, bridge, or inlay/onlay will be done at the first appointment. Then - Second: Try-in and adjustment (if needed) to assure exact fit and function, the definitive bonding of the definitive restoration will take place at the end of the 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 porcelain – all ceramics, please feel free to ask us.