

Technology offers affordable options for tooth restoration

Traditionally, the options for restoring a fractured tooth or a tooth with a large failing filling were limited to laboratory-processed crowns or onlays. Although durable and often esthetic, laboratory-processed restorations take at least two dental appointments: preparation of the tooth and temporary crown fabrication, and then crown cementation about 3 or 4 weeks later.

Traditional restorations like this, using an impression that is sent to an outside lab, often are still the best type of restoration for complex situations. However, for single-tooth situations where large fillings are not appropriate due to the extent of the restoration, challenges with achieving proper tooth form and function, and longevity considerations, CAD/CAM technology now enables some dentists to fabricate crowns, inlays, and onlays in a single visit.

CAD/CAM, which stands for computer assisted design/computer assisted milling, technology has been around for 20 or more years. It has been used in industrial applications and architecture with high success. In the late '80's, CAD/CAM was introduced as a way to make dental restorations. However, the technology was far from perfected. Over the decades, the technology has dramatically evolved. Today, restorations can be made quickly from a digital image captured by an intra-oral camera and designed with the help of an extensive digital library of tooth shapes and sizes. If indicated, the dentist can precisely replicate the original shape of a tooth prior to preparation, which often results in very



Dr. Kevin Huff

Dentist

comfortable restorations.

The basic process is simple. A picture is taken of a tooth after the decay has been removed and sound tooth structure is established with clean edges. Another picture is taken either before the tooth is prepared or of a bite material placed between the prepared tooth and the one that it functions against. The dentist or dental assistant outlines the edges of the preparation, the computer designs the restoration, and the dentist then refines the design much like cropping photographs on a computer. A button is pushed which sends the image to a milling machine that cuts the restoration from a block of porcelain or resin.

Either porcelain or composite resin can be used to make CAD/CAM restorations, depending on the situation. Both are very esthetic. In fact, I believe that many of the CAD/CAM crowns that we have made in our office rival the best esthetics that can be achieved in an outside dental laboratory. When properly designed, the fit is also exceptional. The benefit of a porcelain restoration is that it is much harder and will not wear like composite resin. The shade of porcelain can be modified with in-office characterization, and the final restoration strength can be improved 10 percent by oven firing and glazing. Composite resin restorations tend to be much less expensive and

serve nicely as a long-term provisional restoration when porcelain restorations are not financially feasible, or if biting forces are concerned. Resin CAD/CAM restorations are also a better alternative to conventional fillings because the contours and consistency of the restorations are far superior to directly placed "fillings."

Although fees for a porcelain CAD/CAM restoration may be moderately more than those of a laboratory processed crown, they are often less costly because a second appointment can be avoided and because core build-ups, or fillings under crowns, often are not necessary. Composite resin CAD/CAM restorations offer the same advantage of time but offer a more appropriate alternative treatment in many situations. If necessary, resin restorations can also serve as excellent foundations for laboratory-processed crowns in the future, if needed. Available literature and clinical reports suggest that the expected lifespan of a CAD/CAM porcelain restoration is similar to that of a laboratory-processed crown (5-10 years); little data exists about resin CAD/CAM restorations, but one can speculate that it would be better than a direct "filling" but not quite as long as porcelain restorations.

Dr. Kevin Huff is a general dentist in Dover, holds the status of "Master" in the Academy of General Dentistry, and is a clinical instructor at the Case School of Dental Medicine.

For questions about dental health or to schedule a complementary consultation, call 330-364-2011, visit www.doctorhuff.net, or ask your regular dentist.