

# Talking with Patients

## Chairside CAD/CAM in Dentistry

André V. Ritter, DDS, MS

### WHAT IS IT?

CAD/CAM is an acronym for computer-aided design/computer-aided manufacturing. With CAD/CAM, parts and components can be designed and machined with precision using a computer with integrated software linked to a milling device. CAD/CAM technology was introduced to dentistry in 1988 in Germany and is widely used today to generate tooth-colored fillings that are bonded to front and back teeth. CAD/CAM can be used for making fillings chairside in the dental office or for fabricating restorations in a dental laboratory. This review deals only with chairside CAD/CAM.

When creating a chairside CAD/CAM filling, the dentist makes a digital picture of the prepared tooth with a small intraoral camera. This digital image contains three-dimensional information about the size of the tooth and defect being restored, as well as the adjacent teeth. The dentist will then design the desired filling directly on a computer screen using CAD/CAM software. Once all of the pertinent information has been entered (such as type of filling, contours, etc.), a tooth-colored block of ceramic or composite material is machined by

### ADVANTAGES

Single-appointment procedure  
No temporaries  
No impressions

### DISADVANTAGES

Less conservative than direct composite fillings  
Slightly less exacting fit than laboratory-made restorations  
Esthetic capabilities are limited

fine diamond drills to produce the designed filling. The CAD/CAM filling is then tried in the mouth, adjusted, polished, and bonded in place with a composite resin bonding cement.

### WHEN IS IT NEEDED?

The current generation of CAD/CAM systems can fabricate inlays/onlays and, in some cases, full crowns. Dental porcelain is the material of choice for making CAD/CAM restorations, but highly processed, wear-resistant composite resins also are available for certain applications. Ceramic or composite CAD/CAM fillings can be very esthetic and durable.

CAD/CAM inlays/onlays and crowns performed chairside in the dental office are typically completed in one appointment. By contrast, two appointments are required for conventional inlay/onlay and crown techniques that also require impressions and temporary restorations.

### CONCLUSIONS

CAD/CAM systems are available in dentistry to generate computer-aided designed and machined esthetic fillings. CAD/CAM restorations are tooth colored and are bonded to the tooth, restoring its form and function. Clinical research has shown that CAD/CAM inlays and onlays can last as long as conventional inlays and onlays if properly done. No long-term research is currently available on CAD/CAM crowns.

The following photograph shows an example of CAD/CAM fillings placed in posterior teeth.



Figure courtesy of Dr John Sturdevant, University of North Carolina, Chapel Hill.