

FACULTY PERSPECTIVE

VIEWS ON DENTAL TOPICS & TRENDS

Chairside CAD/CAM Technology at Penn Dental Medicine

CHAIRSIDE CAD/CAM (Computer Aided Design/Computer Aided Manufacture) technology provides dentists the possibility of delivering ceramic restorations in a single appointment. Among the patients' benefits are the reduction of visits, avoiding unpleasant conventional impressions, and eliminating the need for a temporary restoration.

With the implementation of intraoral scanners, the information from the abutment tooth preparation, opposing dentition, and interocclusal record can be obtained in a few minutes. The possibility of reviewing the tooth preparation in relation to adjacent and opposing teeth and detecting undercuts or irregular margins and surfaces, gives the practitioner a better understanding of the clinical situation to optimize the quality of the final restoration. As a result, definitive ceramic restorations with proper material thickness and natural contours can be designed and milled following a simple workflow. This provides less invasive treatment while preserving more healthy tooth structure.



Scan and design of single all-ceramic crown.



Hybrid-ceramic block and milling preview.



Try-in of same-day definitive restoration.

Proper understanding of the ceramic material used and its respective bonding protocols are crucial for long-term clinical success. Today, we have the possibility of milling different types of materials, such as hybrid ceramics, silica-based ceramics, and even zirconia for same-day delivery. Optimized ceramic furnaces for clinical use provide shorter crystallization and sintering times. With the implementation of longer and specific implant solution blocks, fixed dental prosthesis (FDP's) and monolithic screw-retained implant-supported restorations as well as customized implant abutments bonded to titanium inserts can also be milled chairside.

Clinicians who do not want to get involved in restoration design, milling, and finishing can also incorporate intraoral scanners into their practices and use the connectivity options to send their cases to a laboratory of choice. This digital option speeds up the elaboration process compared to traditional analogue methods and enhances communication between the clinician and laboratory technician, one of the most important aspects in restorative dentistry.

When facing more demanding treatments, intraoral scanners are an excellent tool to capture and record patients' initial conditions. In combination with a CBCT image, the patient's Digital Clone can be evaluated and exported to an implant planning or surgical software. In-house fabrication of surgical guides is also a great benefit of this technology. Patients are delighted by the opportunity to receive their final ceramic crown, inlay, or onlay in one appointment.

The frequent updates in CAD/CAM technologies, materials, and software requires constant training of our students, residents, and faculty to stay at the forefront and benefit from these innovations.



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As part of Penn Dental Medicine's Digital Innovation Initiative, chair-side CAD/CAM technologies have been greatly accepted by faculty members and students. A focused teaching approach and newly developed "Train the Trainer's programs" for faculty members and residents have been quite successful. Most important, however, the combination of traditional restorative concepts with the latest digital technologies provides our students with the best tools for their dental career. ■

THE POWER OF PENN DENTAL MEDICINE

Visit www.dental.upenn.edu/powerofpenn to learn more about digital dentistry initiatives that are part of the Power of Penn Dental Medicine campaign.