Possibilities of CAD/CAM dentistry

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When I travel around the country giving lectures and presentations on the Planmeca FIT CAD/CAM system, I usually hear the same comments from my audience. The first comment is, “I can’t afford it.” I usually answer that question with a resounding, “You can’t afford to not have it!” You see, what most dentists miss is that it is costing them to not have a CAD/CAM system in their office.

The second comment is typically when a dentist talks to me privately, stating, “I don’t know if I am ready to buy into this technology.” My usual response is to ask them if they have digital radiography, or intraoral cameras, or if they are making appointments on dental software like Dentrix. Usually the answer is yes, so I move in for the common-sense progression of jumping into CAD/CAM.

It is really a jump, both getting the doctor on board and also the team. Most of the time, the team presents the biggest obstacle for the dentists. Having said that, though, some offices would like to make the jump and get very excited to implement the technology, but it is actually the doctor who is the resisting force in not moving forward with the new system.

Change can be scary, especially for dentists who have been practicing traditional methods of dentistry for the last 10 to 20-plus years. Why change if it is working perfectly for them now?

The third comment I usually hear is that they have seen CAD/CAM restorations in some of their patients’ mouths, and they look horrible. They are bulky buccal-lingually, they have little to no anatomy, usually pretty flat in the central fossa and cuspal area, and the incline planes show little or no development anatomically to the adjacent teeth.

This comment really hits home for me because I have personally seen many patients who have received poor-fitting restorations from previous dentists. But where they have a problem, I see the solution: Digital dentistry allows us to restore these patients’ less superior restorations.

Our skill level dictates how to make it right for the patient. While some older CAD/CAM crowns look great, others may not. Situations like these go the same for lab-fabricated restorations, so it is not exclusive to CAD/CAM restorations. We, as dentists, need to step up and always provide the best that we can with every patient we see.

To make a blanket statement that all CAD/CAM restorations are poor-looking and ill-fitting is short-sighted to say. The technology has come a long way and continues to evolve. Now, it is in the control of the crown designer.

If it is the dentist designing the crown, then he or she can design a crown tailored uniquely to fit the patient. However, as the dentist, I rarely scan the patient in my office because my assistants are trained to scan, design, mill and try-in the final restoration. Usually, I am in another chair prepping for another restoration or utilizing my time in other ways while having full confidence in their abilities to create a restoration.

Keep in mind though, that if the dental assistant
is designing the crown, he or she has to be properly trained to do so. The dentist can train the assistant to do this, or there are many educational training opportunities to send your team to in order for them to be the best designers in the country. The best place to start is at Planmeca University, the main training facility in Dallas. The training there is unsurpassed and your team will love the education they receive there.

An additional concern is how to incorporate the technology into an existing workflow of a busy office. If the office is moderately busy, the addition of the Planmeca FIT may be readily utilized in that environment. If the office is very busy, the addition of this technology may be a bit more challenging because the scheduling must be effective and timely.

The administrative side of the office will need to be aware of how long it takes to complete a restoration digitally. During the learning phase of CAD/CAM dentistry, restorations may take a longer period of time to complete, but as the team gets more proficient at it, restorations will likely take an hour to an hour and a half to complete.

In order to incorporate the Planmeca FIT into an office, the entire team must be trained and ready to implement. Most of this will coincide with how readily the team accepts change. If either the doctor or the staff are afraid of this new technology, then the CAD/CAM system may just sit in the corner and not be used, kind of like a treadmill that holds laundry on it. The team must be involved and fully accept the technology in order for it to be successfully implemented into the office.

_Return on investment_

To address the first question that is always posed to me, “Is it worth the cost?” (which, oftentimes is, “Can I afford to purchase this?”), I usually like to answer that question with one of my own, “How can you afford to not purchase one?”

Utilizing someone else to fabricate what can be done in your own office makes absolutely no sense to me. Yes, there was a time when dental labs were used exclusively to produce final restorations, but now, the dental office can produce that same quality of product without having the patient come back for a second visit.

There is still a place for modern digital labs in the dental community. If the lab is willing to change and adapt to these new technologies, it will remain a busy adjunct for dental offices. If it is stuck in the past and refuses to adapt, then its business may slowly decrease as more and more dental offices turn toward CAD/CAM dentistry.

The ROI for the Planmeca FIT digital system is potentially huge, depending on how it is utilized in the office. If used to its utmost ability, the ROI is amazing. For example, if the typical lab cost for a single unit crown is $200 and an office performs 20 units in a month with a patient charge of $1,000 per crown, the total produced is $20,000, and the cost to produce the final restoration from the lab would be $4,000.

Off set the cost of the lab because it would be produced in the office, and the $4,000 does not exist. One would then merely look at the costs of the block and monthly costs of the system itself.
If the monthly cost is $2,500 for the system and the cost of a block is $30, then the total monthly cost is $3,100 (system cost of $2,500 plus $600 in blocks). If the production is $20,000 minus expenses of equipment and blocks, the amount saved is $16,900. I would venture to say that is a great ROI for the CAD/CAM system and likely the best ROI seen on any single purchase for the dental office.

Clinical examples

As with anything for the dental office, the proof of how it works can be easily documented. The cases featured below range from the simple to the everyday to the complex — all of which I have done with the Planmeca FIT system. It is truly amazing what can be accomplished with the Planmeca FIT open CAD/CAM system.

First case

The patient presents a failing composite for tooth #19 on occlusal-facial surface. The resin has been worn and is breaking down because of occlusion patterns displayed by the patient (Fig. 1). Tooth is prepared, decay identified and removed (Fig. 2). Prep is scanned, margin drawn (Fig. 3), onlay designed (Fig. 4) and restoration milled. This is all done by my assistants, who have been trained extensively to perform this function for the office.

Once milled, restoration is cemented onto tooth. Cementation technique varies depending on material used. Here, a 3M LAVA block was used because restoration was not a supporting cusp (Fig. 5).

Second case

Patient presents with decay and fractured mesial-buccal cusp and mesial decay on radiograph. Prepped an MOB onlay for tooth #19. Proper prep design is critical and part of the learning curve with CAD/CAM dentistry (Fig. 6). Of particular note is the smooth margins.

The tapered axial walls of the tooth are smooth and allow for easy scanning and insertion of final restoration. There are no undercuts and all surfaces of the internal prep are visible from the occlusal view. Prep scanned, margin drawn, design of onlay and milled (Fig. 7). Restoration seated on same day.

Third case

Patient presents with fractured crown (Fig. 8) on tooth #9, with very little remaining tooth structure left to work with (Fig.9).

Patient is visiting from out of town to attend her granddaughter’s wedding the next day. ParaPost measured and cemented in canal and build up placed. Prepared tooth and scanned, designed, milled and cemented in place (Fig. 10). Radiograph of final restoration (Fig. 11).

This case may have a limited long-term prognosis, but it was an ideal solution for an emergency situation. Entire procedure completed in a single visit in one appointment.

Patient wrote a beautiful letter to my office and gave a Starbucks gift card to all of my employees to thank them for their skills on developing a crown that saved the day during her family visit.

Fourth case

As the skill level of the clinician increases with digital dentistry, situations such as the one shown in case No. 4 can be achieved. Veneers can be difficult for the most skilled clinician, but with experience and proper training, they can easily be completed with the Planmeca FIT system.
Patient selection is clearly a critical component. This patient presented to the office because his wife wanted his teeth and smile to “look better.” The patient was motivated to get his smile fixed because he was going for an interview to get a promotion in his job. See before pictures of teeth (Fig. 12). After reviewing his occlusal pattern and determining that veneers would be possible, we proceeded forward with his case.

Teeth #5–#12 were prepped, scanned and a temporary was fabricated. This is the only time I make temporaries in my office. After scanning, a polyvinyl impression was taken and poured up in die stone. This was only done to have a working model for the veneers.

Once the scanning process was done, margins were drawn, and the proposed teeth were then shaped, sized and contoured exactly how the patient wanted his new teeth to look. The patient gave his input while the designing was being created right next to him as he was sitting in the dental chair.

Once the design was complete, veneers were fabricated in the Planmeca PlanMill 40. After each veneer was milled, slight contouring can be achieved with select burs, if desired, prior to crystallization. For this case, hand glazing of the facial surfaces of the veneers was completed. The veneers were then placed in the oven for appropriate crystallization time.

Once cooled, the fit of the veneers should be rechecked on the working model again. At times, the glaze can accumulate at the interproximal contact areas and prevent adequate cementation of the final veneers onto the prepared teeth.

Cementation is achieved based on what material was used for the veneers. For this case, the veneers were fabricated with IPS Empress e.max blocks (Ivoclar Vivadent) shade BL-3.

Once veneers were seated, a final check was made to ensure all excess cement and/or bonding agent had been removed from all surfaces. Patient was very pleased with the final cosmetic result (Figs. 13, 14).

**Conclusion**

The ROI on the Planmeca FIT System can be tremendous, if utilized properly. Training team members to operate at optimal levels ensures the finest quality restorations for your patients, and their confidence shines with the patient as well.

Patients will further the ROI by referring their friends, families and co-workers to the office that employs this technology.