

Making CAD/CAM Work for You

By Chris Brown

After giving a tour of a local dental office that is using a 3M Lava™ Chairside Oral Scanner (COS), a laboratory owner shook his head and said that CAD/CAM systems like this will put laboratories like his out of business. This is a comment I hear regularly from laboratory owners and technicians. I feel like a broken record when I say repeatedly: Only if you let them. The fact is, CAD/CAM in the dental industry is here to stay. CAD/CAM technology brings better fits, fewer remakes and less seating time for the doctor. The laboratories and technicians that learn how to make this technology work for them are the ones that will survive.

How do you make the technology work for you? How do you decide where to position yourself as the CAD/CAM equipment manufacturers release new products every year? How do you keep up with changing technologies?

Laboratory scanners currently range from \$30,000 to \$50,000. Laboratories with scanners can realize a savings of up to \$20 per unit for zirconia substructures. Manufacturing five crown and

bridge units a day, 20 days a month, 12 months a year, can save the lab \$24,000 a year. Sounds good — the scanner will be paid for in a year and a quarter, right? Don't forget that somebody has to be paid to operate that scanner. The operator will have a learning curve that will most likely be measured in months rather than days or weeks. In addition, there is the maintenance, support and annual software support licensing fees which alone can equal a month or two worth of savings.

An old rule of thumb was if a piece of capital equipment could pay for itself in three to five years, it was a good investment. However, today, given the speed at which manufacturers are releasing new scanners, mills and other CAD/CAM hardware, you should be careful about capital expenditures that don't pay for themselves within one-and-a-half to two years. Newer systems inevitably will be faster, have new indications, work with new materials and will leave you wishing you could find a way to upgrade.

Scanners make the most sense for laboratories with sufficient production to pay for the scanner

Image 1



within two years. The right team members willing to embrace new technology and learn new skills are essential for success.

For laboratories considering the purchase of a milling system, an additional \$50,000 to \$150,000 investment is necessary. While the laboratory may realize another \$10-\$25 savings per unit, the system will come with additional maintenance costs, staff learning curves and installation costs.

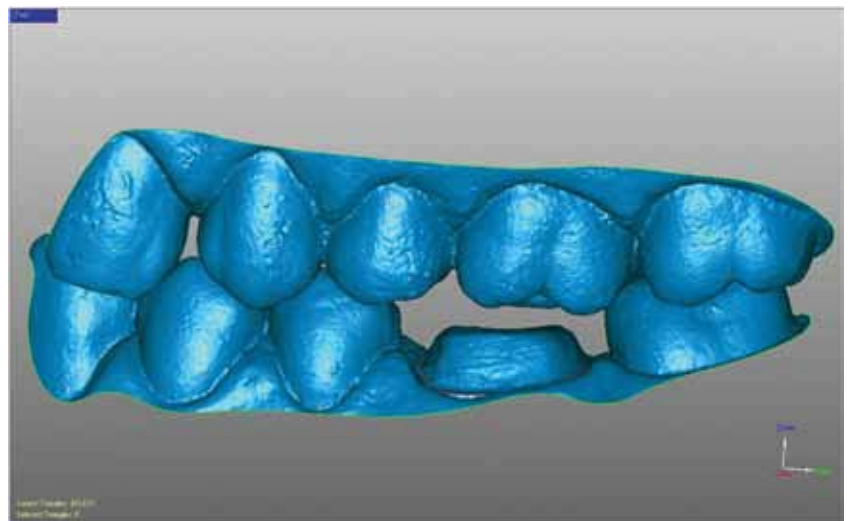
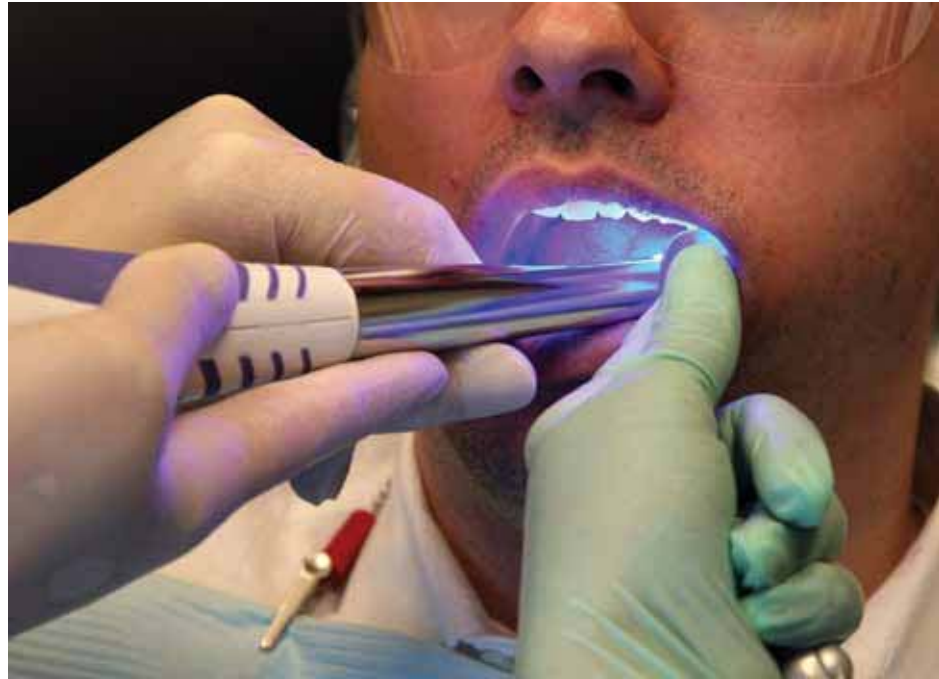
We've created a scanner payoff calculator at www.apexdentalmilling.com to help laboratory owners make informed decisions about how quickly they can pay off their investments.

Before you decide on a scanner or mill for your laboratory, you need to consider what your customers are using. Three major companies with in-office systems (Cadent, 3M and Sirona) are offering an acquisition only option with their systems. With these chairside scanners, the dentist acquires a digital impression (scan) of the patient's mouth and a digital file or CAM model is sent to the laboratory. At the moment, D4D (Henry Schein) does not offer a scan-only option to doctors, but it is anticipated that they will be offering mills to laboratories in the near future.

With chairside digital impressions, the doctor scans or images the operative arch, the opposing arch and a bite registration. The scan file is uploaded to the system manufacturer. The margins are marked using special software by a margin-marking facility or laboratory. After the margins are marked, the file is uploaded again to have the model fabricated. Any type of restoration, PFM, titanium, pressed-ceramic or milled zirconia can be made from a CAD/CAM scan and model.

With the 3M ESPE Lava™ COS and Cadent iTero systems, laboratories can purchase margin-marking software for \$7,500 and offer this service to their doctors or they can partner with an existing margin-marking facility paying \$8-\$10 per unit to have cases marked for them. Again, it is worth evaluating the return on investment for this kind of purchase.

Depending on the laboratory's amount of capital investment in these new technologies, they will either be able to take a case from start to finish or will have to find a partner to work with on various levels. The right partner will be open to communication on such matters as restoration



type, margin location, substructure and ultimately restoration design.

Images 2 and 3

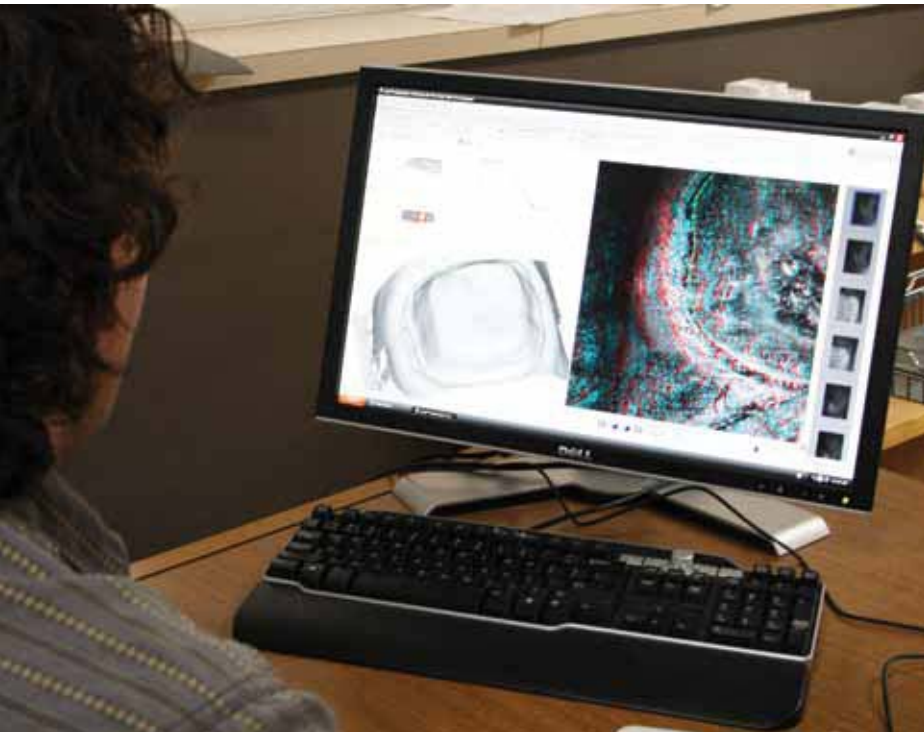
A majority of dental laboratories do not own CAD/CAM equipment, yet they offer CAD/CAM-based restorations to dentists. For the laboratories that do own CAD/CAM equipment, there will be times when doctors prescribe cases that are not compatible with the laboratory's equipment. Regardless of your level of investment in CAD/CAM, there is always a way to be involved in the process.

The following case is a great example of how a laboratory that does not have CAD/CAM equipment compatible with the doctor can still be in the digital workflow. The doctor chose to perform a digital impression with the 3M/

ESPE Lava™ Chairside Oral Scanner (COS). The laboratory does not have margin marking software for the Lava™ COS, nor do they have the LavaDesign software that comes with the Lava™ scanners.

While this may look like a bad situation for the laboratory, it really isn't. They rely on an outsource milling laboratory to perform the margin marking for COS scans and provide Lava™ copings/frameworks if the doctor prescribes a Lava™-based restoration.

Image 4 Photo: Patrick Bever



The patient presented with fractured porcelain on the distal aspect of a previous lithium disilicate pressed ceramic crown on tooth No. 19 (Image 1).

The fractured crown was removed and the tooth was prepared for a Lava™ crown. Preparation guidelines of 1.5mm axial reduction, 2mm occlusal reduction and 5° taper were followed. After adequate soft tissue retraction to reveal the margin, the COS was used to obtain images of the teeth (Images 2 and 3).

Once the scan was complete and the dentist satisfied with the scan, the file was uploaded for margin marking. Using special screen-sharing software, the milling center and dental laboratory are able to simultaneously review the digital impression (Images 4 and 5). This is particularly useful if there are questions on margin placement, or if there is something about the case that would prompt the laboratory to contact the doctor and suggest a different treatment plan.

After margins are marked and the case is ready for substructure design, the laboratory is invited to provide feedback or suggestions if needed (Images 6 and 7). The substructure is then milled, finished to the model and delivered to the laboratory to complete the restoration. In this case, no adjustments were required and the restoration was seated with 3M ESPE RelyX Unicem (Images 8 and 9).

The tools and technology are available for both simple and complex cases. They allow laboratories to work together to provide the best possible restoration for the patient.



Image 5 Photo: Robert Wisler, CDT

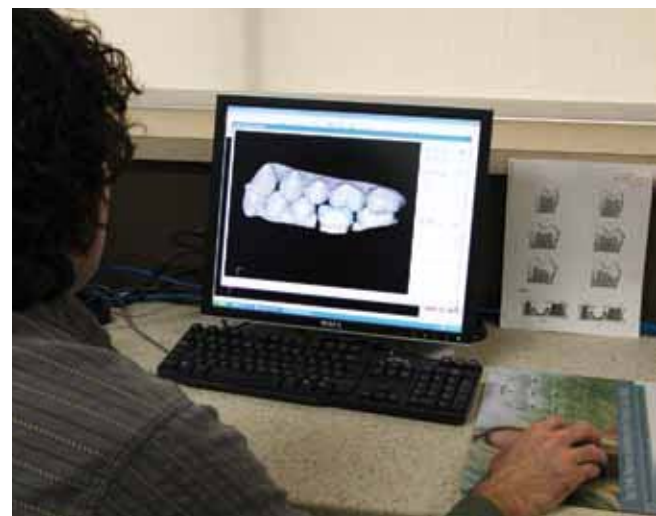


Image 6 Photo: Patrick Bever

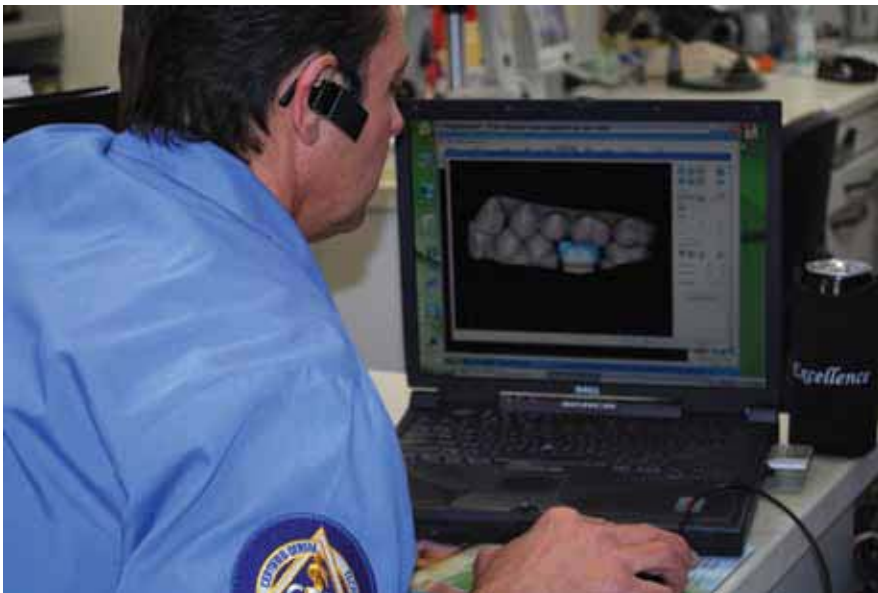



Image 7 Photo: Robert Wisler, CDT

Deciding whether or not to make a capital investment in CAD/CAM equipment should be based on numbers. If the volume is in place to justify the capital investment, and you have the staff or are willing to hire the staff capable of operating that equipment, it could be the best business decision you make. If the numbers are close, but not quite there, it can still make sense to make the investment, because it is likely that your production volume will grow as you become more familiar and confident with the equipment. However, if the numbers don't support investing in scanners, software or a mill, you can still be in the CAD/CAM digital workflow without breaking the bank, by nothing more than finding the right partner.

The morals of the story:

1. Do not be afraid that CAD/CAM technologies will put you out of business.
2. Be prepared to learn new skills, even if it is just how to run new software on a computer.
3. Look for strategic partners to work with until your volume justifies investment in additional equipment. 

Author Acknowledgements:

Thank you to Enspire Dental and to Robert Wisler, CDT, and Paul Ravenstone of Alpha Dental Studio for their participation in this case.

Image 8



Image 9

Earn CDT/RC credits for this article and quiz!

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About the Author:

Chris Brown is the business manager of Apex Dental Milling, an open architecture milling facility and Michigan's first Authorized Lava™ Milling Center. His experience in CAD/CAM dentistry, combined with his engineering degree, allows him to advise customers on both sides of the technical world of CAD/CAM.



Brown has hosted multiple customers in Apex Dental Milling's open educational environment, where CAD/CAM dentistry is the only focus. He is currently a laboratory consultant for THE DENTAL ADVISOR and works collaboratively with the publication on multiple research projects related to the areas of CAD/CAM, all-ceramics, and zirconia. He is a member of the Michigan Association of Commercial Dental Laboratories and Francis B. Vedder Society.





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1. What is the price range of a typical laboratory scanner?
 - a. \$20,000 - \$40,000
 - b. \$30,000 - \$50,000
 - c. \$40,000 - \$60,000
2. What is the average savings a laboratory with a scanner can realize on a zirconia substructure?
 - a. \$5
 - b. \$10
 - c. \$20
 - d. \$50
3. Laboratories should be hesitant to purchase a CAD/CAM system that will take longer than _____ to pay back.
 - a. 1.5 – 2 years
 - b. 2 – 3 years
 - c. 3 – 5 years
 - d. 2.5 – 4 years
4. How much additional investment should a laboratory who is considering purchasing a scanner plan for?
 - a. \$50,000 - \$100,000
 - b. \$75,000 - \$200,000
 - c. \$50,000 - \$150,000
 - d. \$100,000 - \$200,000
5. Which of the following companies provide in-office CAD/CAM systems?
 - a. Cadent
 - b. 3M
 - c. Sirona
 - d. All of the above
6. Any type of restoration can be made from a CAD/CAM scan and model.
 - a. True
 - b. False
7. If a laboratory is sent a digital impression, but does not have a CAD/CAM system what can they do?
 - a. Send it back to their dentist and let them know they should use another lab.
 - b. Immediately purchase a CAD/CAM system.
 - c. Rely on an outsource milling laboratory.
8. The majority of dental laboratories own CAD/CAM equipment, but do not offer these services to dentist clients.
 - a. True
 - b. False
9. A laboratory should consider what when deciding whether to make the capital investment in a CAD/CAM system?
 - a. Numbers
 - b. Trends
 - c. What a laboratory's clients are demanding
10. Which of the following was not a moral of the story
 - a. Do not be afraid that CAD/CAM technologies will put you out of business.
 - b. Be prepared to learn new skills, even if it is just how to run new software on a computer.
 - c. CAD/CAM systems are not worth investment and will probably fall of the radar within several years.
 - d. Look for strategic partners to work with until your volume justifies investment in additional equipment.

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