FROM CHAIRSIDE TO BENCHTOP TO
Following the All-Digital

For years, dentists and laboratory technicians have dreamed about an all-digital workflow. Well: It’s here, and it’s changing everything. Here’s how. [By Robert Elsenpeter]

THIS MONTH, DENTAL PRODUCTS REPORT AND DENTAL LAB PRODUCTS HAVE TEAMED UP TO BRING YOU AN EXTENSIVE LOOK AT THE NEW PROCESSES POSSIBLE IN BOTH A DENTIST’S OFFICE AND A DENTAL LAB, THANKS TO THE INNOVATIONS PROVIDED BY AN ALL-DIGITAL WORKFLOW. DPR WILL TELL THE STORY OF HOW DIGITAL IMPRESSIONS ARE CHANGING HOW CASES BEGIN AND HOW DIGITAL ADVANCES CREATE RESTORATIONS THAT ARE BETTER FOR THE PATIENT AND THE BOTTOM LINE. DLP WILL EXPLORE HOW DIGITAL TECHNOLOGIES ARE PROVIDING WAYS FOR LABS TO INCREASE ROI AND EFFICIENCY, WHILE MAINTAINING THE QUALITY AND ESTHETICS DENTISTS EXPECT. FOR THE WHOLE STORY, CHECK OUT THE JUNE ISSUES OF BOTH DPR AND DLP!
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Polyvinyl siloxane is probably not the first thing most people want to put into their mouths. But while the classic material used for making dental impressions has been around for decades, there is a new way to develop restorations—and it doesn’t involve a mouthful of glop.

By utilizing an intraoral scanner (IOS), dentists can not only forgo creating a physical impression of a tooth meant for restoration, but they can create more accurate and cleaner scans that the lab can use to turn into quality restorations. Not only that, but the work is faster and can be done for less money. Best of all, that savings can be passed along to the customer.

Faster restorations, easier workflow for both the doctors and the labs, along with less cost for everyone along the way—what’s not to love?

The all-digital workflow starts at the doctor’s office with a scan of the patient’s affected teeth. Dentists who perform all-digital work either send the digital files to their laboratory to have the restorations completed, or they can get processed on an in-house mill.

“We use it on a daily basis—hopefully more than once a day,” said Dr. Michael Young, DDS, from Detroit, Mich. “We do the majority of our crowns and partial crowns this way. I still have to send some to a lab to be made in a traditional fashion, but most of them go with the scanner.”

Immediate benefits
There are a number of benefits to scanning the patient’s mouth and then sending the digital file to the laboratory.

“There’s a great deal of touching involved when you deal with a traditional case, versus digital, starting with the doctor in the office,” said Bob Belouin, Information Technology Supervisor at Biogenic Dental Corporation in Utica, N.Y. “The doctor takes a digital scan, captures that scan, hits the ‘Send’ button, and it comes to us. There’s no packaging, no staff that has to package it, there’s no shipping cost. It comes to us digitally. We open it up right into our software. For a lot of cases, that job starts that day. You’re not limited on cutoff times as much.”

Once it gets to the lab, the process continues, expeditiously.

“One of the major attributes of CAD/CAM dentistry is the patient experience,” said Dr. David Fantarella, DMD, PC, North Haven, Conn. “It’s like any surgical procedure—the least invasive procedure usually leads to the best outcomes. So, for a vital tooth you’re going to do a crown on—if you don’t need to prep it; put a temp on it; wait for the patient to come back for the impression; and then do the insert, that tooth tends to be less traumatized, and we see fewer irreversible pulpitis or root canal situations afterwards.”

While the old method of taking impressions with polyvinyl siloxane is tried and true, there is another a big motivator for dentists to move to an all-digital workflow: money.

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“Where it benefits both me and the lab is if we don’t need models, it reduces the laboratory costs, which ultimately reduces my cost, which ultimately can be passed on to the patient,” observed Dr. Bryan Couch, DDS, of Coppell, Texas.
Keeping it in-house

For doctors who have an in-house mill, the all-digital workflow can mean a same-day turnaround on restorations.

“Typically, if you send something to the laboratory, it takes two or three weeks,” observed Dr. Young. “We are now doing crowns in about two hours. Some of them take 90 minutes.”

And the relationship between the doctor and the lab can be very dynamic, each taking more or less of the project as the case demands.

“Most of what we do is milled in-house,” Dr. Young continued. “We have some capability to send a scan to the lab, they can do some designing, then they can send the file back to us, and we can mill it right here.”

Whether or not a case is milled in-house depends on how complex a case is. In some cases, esthetics are an important consideration. “Some dentists, including us, have been hesitant to do many front teeth with [in-house milling],” Dr. Young said. "If I have a really high-end esthetic case, I’ve sent those to a lab in the past. We’re starting to do some of that on our own now, where we can characterize the teeth, and make them highly esthetic, apply custom staining, adding custom characterizations—that would be one case in the past.”

When to involve the lab

Adopting an all-digital workflow doesn’t mean the doctor has to mill it in-house. The work can still be sent to a lab, where they can do some designing, then they can send the file back to us, and we can mill it right here.”

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What system?

There are plenty of systems on the market from which to choose. Which one should you buy?

There isn’t a hard and fast rule about which system is the best—each one offers its own features and capabilities that will appeal to doctors differently.

One factor to consider is whether the system will work with the components made by other manufacturers.

“The key for the doctor who’s thinking of purchasing these things, is really if you’re going to expand the services you offer through the use of technology, is it open architecture enough that if you’ve already purchased something, it’ll work with the new system?” Dr. Couch asked.

“You need to be inclusive. As a doctor, trying to provide the best to my patients, I need open architecture with an inclusive attitude from manufacturers. I can’t keep buying new equipment, when the equipment I have is good. I need it all working together.”

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Streamlining with intraoral scanning

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Patient preparedness

Once the doctor decides to invest in an intraoral scanner—and possibly a mill—how can patients be prepared for the work? One approach is to make the patient as involved in their care as possible.

“I’m a big proponent of ‘Knowledge is power,’” Dr. Fantarella said. “I feel that when patients are brought into the decision making process, they become more invested in their dental health. And when I say ‘decisions’, I mean just about all of them, because if they understand why we’re doing things, if there is a hiccup on the procedures, we can adjust, and they understand why. It’s a better patient experience with better outcomes.”

Understanding what patients want—be it a traditional treatment, a same-day procedure or some combination of treatments—naturally results in happier patients.

“If I concentrate on patient experience, the patients push me to the right treatment,” Dr. Fantarella noted. “They tell me, if I’m listening, what they would desire, and I try to make sure the outcomes are good and accommodate them. Many patients say, ‘I want to come in, be numb once, do the drilling once, and place the restoration.’ They bring some work, we have an area where they can work or use the phone, and then place the restoration.”

And in 2014, many patients are starting to get used to intraoral scanners, so much so that doctors can’t dismiss their usefulness.

“A lot of patients expect it, but they don’t know the differences between the conventional way and the digital way,” Coyle said. “On the patient experience side, there are quite a few patients out there who are afraid to go to the dentist, just because they don’t want to have an impression done. A lot of that comes from people when I explain what I do and the equipment that I work with. I don’t think that I can count the number of times that people have said, ‘I hate going to the dentist because of getting an impression.’ This eliminates that.”

Beginning the process

Starting an all-digital case is deceptively simple and something that the doctor doesn’t even have to do him- or herself. Dr. Couch even involves the patient in the process.

“We’ll place a little camera in their mouth and it’ll take a video of all of this. I walk them through and I let them see it,” Dr. Couch said. “Then we let the assistant design it right there in front of them. So now I have an assistant who’s an integral part of taking over a procedure that I can delegate once I’ve trained them. Then they design the crown, they can walk the patient in to where the mill is, the patient gets to put the little block in, and they get to see the designing and all the steps along the way.”

The ease and speed of a same-day visit has great appeal to patients.

“If the patient has never had a crown before, they don’t know the difference,” Dr. Young said. “But if the patient’s had a crown before, but they haven’t had a same-day visit, we do tell them the appointment is going to be about two hours, but most of the time is going to be sitting here while we’re designing the crown on the computer. And then while it’s being milled right in the office, you can watch your favorite TV show, or you can bring a book, or you can bring your laptop and you can do some work. That’s really all the preparation we tell them. It’s only going to be one visit. You don’t have to come back. You only have to take a short time out of your life.”

Training

As seemingly simple as intraoral scanners are to use, there is still a learning curve, and these systems can’t be used without some upfront training.

“There’s definitely a learning curve,” Dr. Young said. “I think a lot of [dentists], especially older guys and gals that aren’t technologically inclined, would find this to be quite a step for them. My experience with E4D was that you go to Dallas for training before you even get the unit in your office. So you have to be trained on it before they’ll deliver it to you. I think that cuts down on problems significantly.”

The doctor isn’t the only person who receives training on the equipment.

“The other great thing is that they trained my staff,” Dr. Young added. “I took both of my assistants with me. They both learned how to do the scanning. They both learned how to do the designing. They both learned how to maintain the milling unit. Since we got back from Dallas, I haven’t had to do anything except prepare the tooth. Everything has

THE EVER-GROWING WORLD OF INTRAORAL SCANNERS

Intraoral scanning technology is a key component to the digital workflow. It can save dentists time and money, and can help prevent errors and miscommunication in dealings between dentists and labs. Here are some of the leading intraoral scanning options on the market. For full write ups on many of these products, check out the June issue of Dental Lab Products.

- 3M™ True Definition Scanner (3M ESPE): 3mespe.com
- CS 3500 (Carestream Dental): carestreamdental.com
- iTero (Align Technology): itero.com
- Lythos (Ormco): ormco.com
- TRIOS (3Shape): 3shape.com
- CEREC AC with Omnicam (Sirona): sironausa.com
- Bluescan-I(a.tron3d): a-tron3d.com
- Planmeca PlanScan (E4D Technologies): e4d.com
- IOS Fastscan (IOS Technologies): ios3d.com
- Densys3D System (Densys3D): densys3d.com
- Condor Scanner System (Condor): condorscan.com

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now been delegated to a staff person—they love it; it’s empowering. It frees me up to be more productive with other patients. It’s really a win-win situation.”

Materials
While the machines get most of the spotlight’s shine in a CAD/CAM discussion, materials matter. “If I didn’t have a good product, good materials, this would not be as easy,” Dr. Couch said. "Ivoclar is the one who makes the materials, and they are key. If they can make materials that continue to improve and give us better quality, and it can be used in the system I have, that’s golden for me. I’m sitting here thinking that I can finish my career with the products that I have now.”

“We use Empress, Lava Ultimate, and e.max,” Dr. Fantarella added. “Based on the characteristics of those materials, we would discuss with the patient why we’re using it, and of course we want them to be involved in that. For instance, [with] PFM crowns: Traditionally, when used in the posterior, if the porcelain was thin, it would chip away and you’d get some metal show through. For me, that’s a failure. With CAD/CAM and all-ceramic crowns, a failure would be fracture. The important factor of not getting that fracture is making sure the best material is utilized and you have the correct thickness of the material, so we discuss that with the patients and why we use it there.”

To and from the lab
For the doctors who send their digital files to a lab for production, the next steps involve further digital manipulation of the file before it’s manufactured and sent back to the doctor for final placement.

(Editors note: To learn more about how labs handle the all-digital workflow, check out the June issue of Dental Lab Products!) Once the lab has completed the case, it comes back to the doctor. Because the scans use very precise measurements, fit is usually a given. “Especially for us, as a large lab, we always had consistency issues,” observed Dr. Mike DiTolla, DDS, FAGD, Director of Clinical Research and Education at Glidewell Laboratories. “Now, in digital design, we can always put the same 60 microns of die spacer on every crown. And we can always have the occlusion at the same measurement, and the contacts at the same measurement, and it really creates a consistency that dentists crave.”

—DR. MIKE DI TOLLA

After the mill
That level of consistency and reliability makes digital dentistry a safe bet when it comes time for final placement.

“There’s usually minimal-to-no adjustment that needs to be done,” Coyle said. “A lot of times, it’s just placing in the restoration, doing a final test and letting the patient go.”

In the event there is a problem with placement and fit, that’s when the doctor and the laboratory have to work together to find a solution. But thanks to digital solutions, the process can be done very quickly, as opposed to having to wait for another goopy impression.

“It would involve collaboration between the dental office and the laboratory,” Coyle added. “If another digital impression had to be taken and sent to the laboratory, that could be done. Maybe there was an issue with the prep side of things. Maybe it was a reduction side that needed to be handled. That could be taken care of and another digital impression sent over to the laboratory.”

Doctors who mill their own restorations will have to perform some final steps themselves. Those steps depend, largely, on the type of material being used.

“For Lava Ultimate, for instance, the internal surface would be prepared for bonding and the external surface would be polished,” Dr. Fantarella said. “For Empress, it’s the same, but it does lower the strength, slightly, so it’s better to fire it and then prepare the internal surface. E.max has to be fired, because it is milled in a precrystallized state which is not the final shade and a quarter of its fired strength.”

In-house restorations also have to be colored appropriately.

“Ceramic crowns are chameleons,” Dr. Fantarella explained. “If you pay attention to the shade of the surrounding teeth, and pick the appropriate block, they really take the hue and translucency of

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the surrounding teeth. It’s not like selecting the shade like you would for a PFM crown. With PFM crowns, you have to opaque the metal, you lose the translucency, and you manipulate the shade. With ceramic restorations, if you take the conditions that I just described and come up with the correct block, the restoration tends to blend in the mouth over time with the other teeth.”

**Spreading the word**

Amazon.com founder Jeff Bezos once said, “If you do build a great experience, customers tell each other about that. Word of mouth is very powerful.” And that is certainly true of care at the dental office. If the doctor does a poor job, patients make sure that word gets around. By the same token, if a doctor does a great job, people will hear about that, too.

Dr. Young, for instance, helps the process along by soliciting patient testimonials for his website, helping spread the word to potential patients. But even without a formal mechanism to share opinions about doctors, word still seems to spread. “The whole time they’re waiting, nine times out of 10, they’re on the phone telling people, ‘You won’t believe this. They’re making the crown while I’m waiting,’” Dr. Couch said. “Or they’re texting or sending pictures to friends. The whole thing becomes a ‘Wow’ experience, and it all started with me putting the little video camera in there and they say, ‘I don’t have to have all that other stuff in my mouth?’”

And when patients have work done digitally, often they don’t want to go back to the old way.

“Once I’ve done a crown on a patient, most of the time, if they break another tooth, they don’t want it done the old way,” Dr. Couch said. “They say, ‘Good thing I don’t have to wear that temporary or maybe get another shot. ‘It looks good.’ ‘It feels great.’ They have some time and can wait. We have plenty of treatment rooms, so we can get them some bottled water or a coffee or something. We make them feel comfortable. Because they have laptops or iPads, they may do work. They bring their e-readers. They sit there and read a book. It’s all done start to finish and they don’t have to worry about coming back.”

**Words of advice**

Adopting the all-digital workflow may not be a business necessity in the immediate future, but it is a process that can’t be ignored.

“For the dentists who aren’t using it, I would encourage them to investigate it, and open their minds to it,” Dr. Fantarella said. “Not only will it be better for their patients, it’ll get them invigorated about their career again.”

Dr. Young observed that younger patients are likely to expect their dental work to be completed all digitally. “Just dismissing it out of hand would be a big mistake,” Dr. Young noted.

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“I think it’s definitely the wave of the future. There’s no denying it now. It’s been around a long time and it’s not going away. You’re going to see it more and more. In fact, with the younger generation, the Millennials, are going to expect this. In order to keep your practice cutting edge, this is one technology you should definitely consider.”

“This is where it’s going,” Dr. Couch added. “The minimum you’re going to see is that dental offices need to look into scanning. They’re going to have to be aware that whatever they purchase will work open architecture-wise as they grow into some more of the high-tech, 3D technology and procedures/services they might go into? It has to at least be able to work with their specialists if they don’t want to do some of those procedures. The key always boils down to how do you deliver the highest quality product and service to the patient. It’s amazing what it can do now.”

The technology has proven itself, and not learning it has the potential to be detrimental to a doctor’s practice. “If you’re afraid of technology, afraid of change, and you don’t think you can master the computer, that’s why you have your assistant you can delegate it to,” Dr. Young said. “By now, we’ve shown that the quality of these restorations are excellent. It’s here to stay. You can’t make fun of it anymore.”

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**Materials that change everything**

Materials like e.max (Ivoclar Vivadent, above) and 3M ESPE’s Lava Plus (below) can be milled either chairside or at a dental lab and provide non-metal esthetics in a fully digital workflow that couldn’t have been dreamed of a decade ago.

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