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Here We Are

Makes much more sense to live in the present tense

Present Tense, Pearl Jam

Well, here we are wrapping up 2020. I'm sure we can all agree that this year has not quite been the same as other years. In my close to 70 years on this Earth, I can't remember a year like this one. Plenty of people have constantly let us know how bad things have been. And, to use lyrics again, are we getting something out of this all-encompassing trip? It's our choice, and **NOW**'s the time to decide.

Personally, I believe **NOW** is the time to get better at **ALL** we do. And I fervently believe that there is always so much more to learn. And I'm not saying to forget the past and what has happened because we can learn from that also. Dr. Gary DeWood has an article based on concepts that he wrote about almost 15 years ago. The concepts were applicable then, and I believe, are especially applicable now.

NOWadays, when performing treatments for our patients, dentists need to be efficient in delivering that care. Dr. Pete Gardell's article shows how decisions in treatment materials can greatly increase the efficiency of care. And he answers the question about how one restores a quadrant using direct multi-surface restorations and a proximal indirect restoration.

NOW, Dentsply Sirona is bringing to the dental practice new and better imaging systems. Developing a better imaging solution helps provide better patient experiences, achieve greater efficiency in care delivery while helping the practice expand treatment options.

NOW is the time to decide to continue to get better in all one does in the practice. And, as always, CDOCS is here to help in that endeavor. Whether it's CEREC®, cone beam, endodontic, orthodontic, or implant education, we are your trusted partner in your education journey. Our world-class faculty supports you with the knowledge and tools to successfully incorporate what you learn into day-to-day practice life.

So, here's to moving on from this year. Here's to learning from this year. Here's to the present time to getting the best out of this all-encompassing trip! And we are here to help. Take care and be well!

For questions and additional information, Dr. Fleming can be reached at mfleming@cdocs.com.

Mark Fleming, D.D.S.
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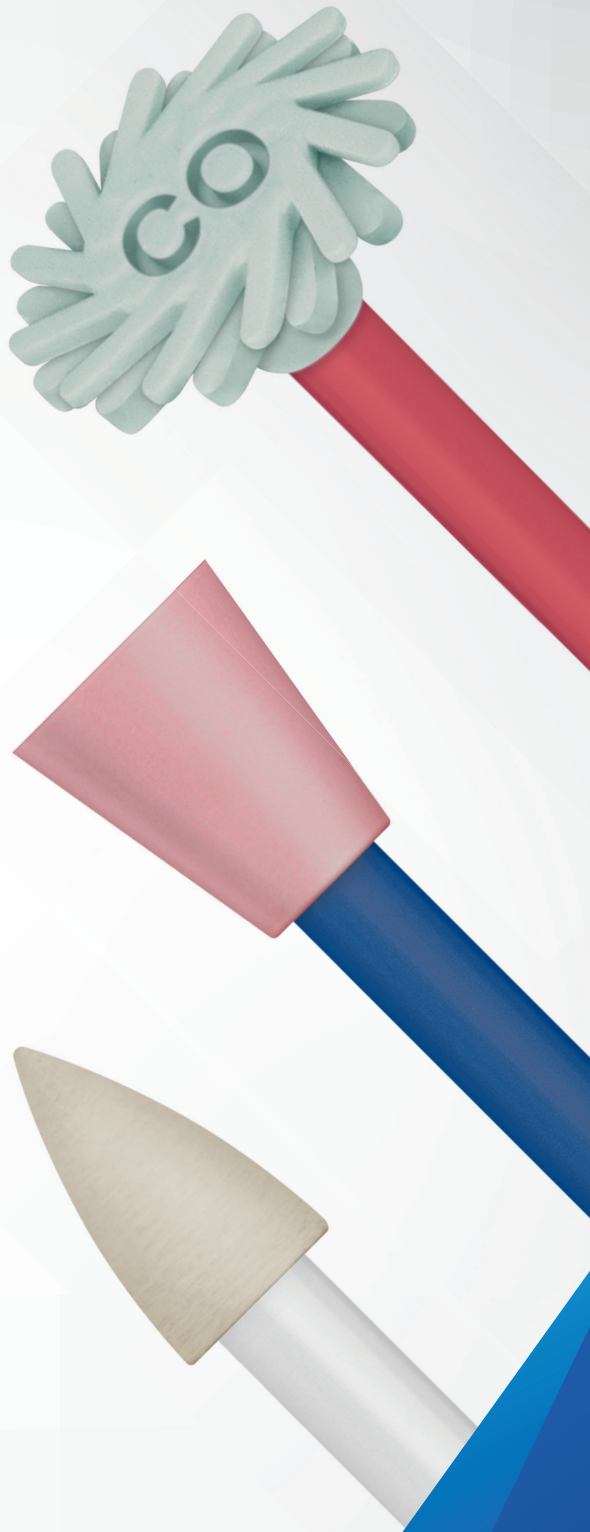

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Imaging Reimagined with Dentsply Sirona

Excellence in diagnosis and treatment planning begins with the right image. Dentsply Sirona is committed to developing technologies that deliver superior images to support not only a new standard of excellence but also patient satisfaction and practice success. With that in mind, Dentsply Sirona is excited to introduce Axeos™ — the company's newest extraoral imaging system that delivers the largest field of view of any Dentsply Sirona 3D/2D imaging solution (Fig. 1), and Schick AE — the latest innovation from the Schick family of intraoral sensors (Fig. 2).

Building a successful practice requires more than just state-of-the-art technology; it requires combining the art of technology with people working together seamlessly to make a difference that is not just felt within a small X-ray room, but throughout your practice, as well. Together, Axeos and Schick AE help deliver that difference through enhanced clinical confidence, smart connectivity, and an exceptional experience. Supporting a broad range of treatments, it also helps you build a healthy practice by enabling better patient experiences, greater practice efficiency, and the opportunity for procedural expansion.

Clinical Confidence

Axeos delivers high-quality, sustainable solutions designed to provide exceptional images to support greater diagnostic reliability, treatment precision, and

Fig. 1–Axeos extraoral imaging system from Dentsply Sirona

Fig. 2–Schick AE intraoral sensor

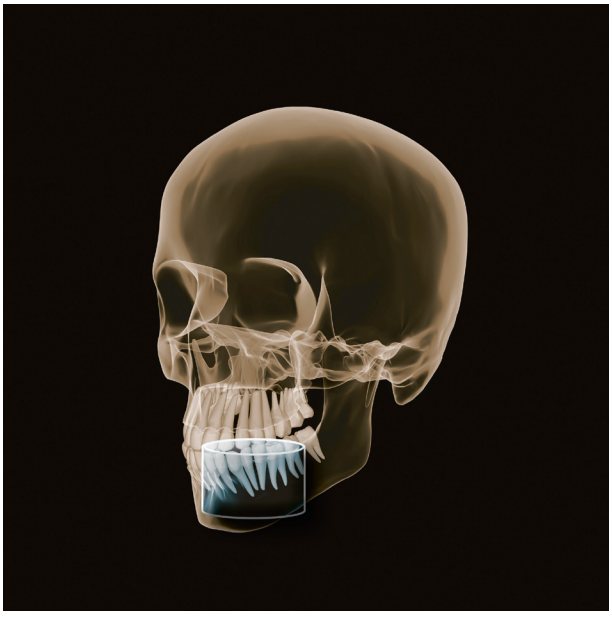

Fig. 3–Axeos offers multiple 3D volume sizes (as depicted in Figs. 3–6). Volume 5 x 5.5

Fig. 5–Volume 11 x 10

Fig. 4–Volume 8 x 8

Fig. 6–Volume 17 x 13

clinical safety. Axeos' multiple 3D volume sizes (up to Ø17x13) (Figs. 3–6) and excellent 2D panoramic images with autofocus (Fig. 7) and sharp layer technology ensure everyday practice flexibility and offer more possibilities for your practice when it comes to treatment. The patented auto-positioner automatically determines the correct head tilt and positions patients quickly in the occlusal plane — without needing a second exposure. In

Fig. 7–Axeos offers excellent 2D images with autofocus.

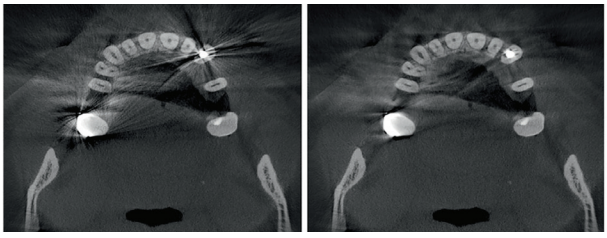

Fig. 8–Metal artifact reduction software detects and reduces metal artifacts in 3D images.

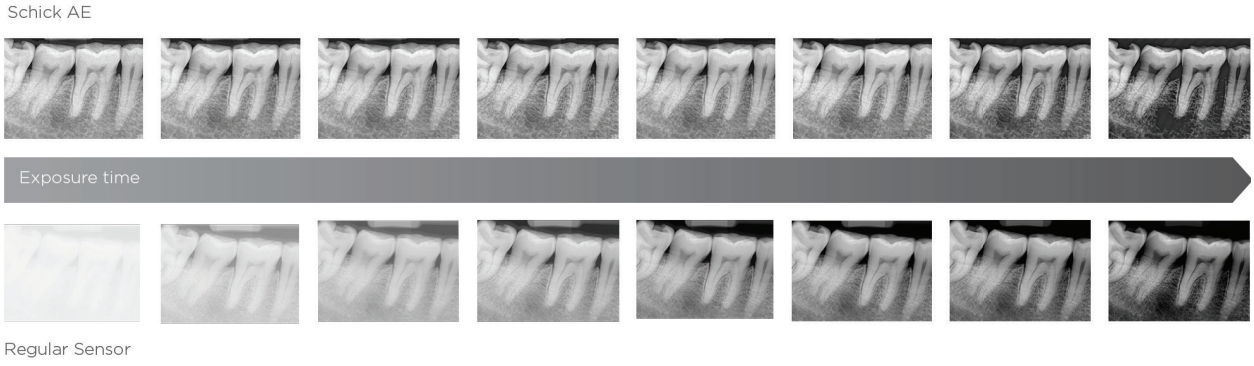

Fig. 9–Exposure time comparison between Schick AE and a traditional sensor

addition to ensuring optimal images, this feature saves time and supports patient safety by limiting exposures.

Metal artifacts can present a challenge for 3D imaging, but Metal Artifact Reduction Software (MARS) automatically detects and reduces metal artifacts in 3D images using innovative algorithms that help facilitate a quality diagnosis (Fig. 8). At Dentsply Sirona, MARS is a standard integration in our 3D solutions. Additionally, Axeos has a High Definition mode in which up to 1,400 single images are captured per circulation, ensuring a high-resolution, low-noise X-ray within the selected volume, while the Low Dose mode (at a greatly reduced dose) maps dense structures, such as bone, and provides support for your treatment analysis in a number of different clinical situations.

Built-in image quality allows for minimal retakes and improved diagnostics with ease and confidence. Schick AE's advanced filtering, increased sensor sensitivity, and enhanced low-dose optimized exposure spectrum allow for increased visibility. A dynamic sharpening slider further optimizes the image, enabling sharpness, brightness, and contrast adjustments (Fig. 9). Resulting

With Axeos, you can make full use of the digital potential of your practice while simplifying and accelerating virtual communication channels.

Fig. 10–Combining Axeos and Schick AE with Sidexis 4 diagnostic software creates an integrated workflow.

Fig. 11–The Axeos EasyPad is user-friendly and intuitive.

images are preferred by more than eight out of 10 clinicians when viewed side-by-side with images from competitive systems.*

Smart Connectivity

Axeos and Schick AE offer smooth, integrated workflows with Sidexis 4 diagnostic software (Fig. 10). It is characterized by numerous well-thought-out interfaces and connectivity of devices and software products. With Axeos, you can make full use of the digital potential of your practice while simplifying and accelerating virtual communication channels. And brilliant images are only truly at their best when viewed in the corresponding software, and the intelligent Sidexis 4 software provides

Fig. 12–The Axeos integrated cabinet provides easily accessible accessory storage.

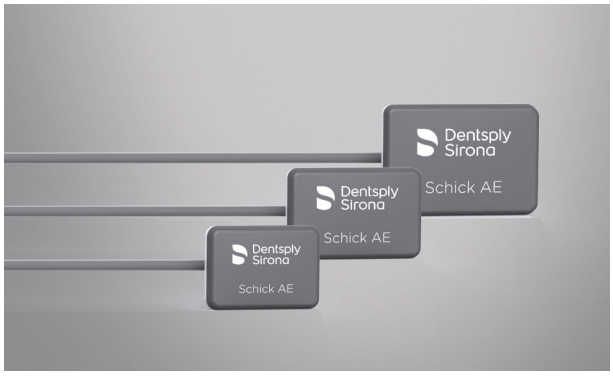

Fig. 13–Schick AE family

support during treatment analysis. With its award-winning user interface, it is easy to use and saves valuable time, all while your patients feel well-informed and comfortable.

The new Sidexis iX iPad App is now available for those who wish to access X-ray and patient data directly on their iPad for a more convenient consultation tool. At the same time, the patient can fill out and sign the medical history form directly on the iPad for a seamless experience.

Additionally, whether you want to expand into orthodontics and/or clear aligner therapy, implantology, endodontic treatment, or sleep apnea treatment, your options are plentiful with Axeos and Sidexis 4 software. Not to mention, Sidexis 4 is compatible with more than 200 practice management software packages. The ability to import DICOM, .stl, and CEREC® data or export DICOM data allows for practice workflow flexibility.

Exceptional Experience

There's no wonder Axeos has already won the 2020 Red Dot Award for design. The system's individual, innovative design and ease of use supports the practice team in working more efficiently, which reduces errors and provides a comfortable patient experience. The Patient Positioning and Image Assistant (PIA) has smart height adjustment that reduces patient waiting times, and the unique auto-positioner is ideal for image reproducibility. Meanwhile, the EasyPad is user-friendly and intuitive (Fig. 11), making operation simple, and the integrated cabinet offers another layer of convenience with easily accessible accessory storage (Fig. 12). Plus, ambient lighting on the system creates a pleasant environment.

Axeos is the 3D/2D imaging system that was developed together with dentists and clinicians, and provides the fullest range of functions of all Dentsply Sirona extraoral X-ray systems. In addition to excellent image quality and tailor-made 3D volume sizes, the system is fully optimized for high performance, enhanced patient comfort, and to equip clinicians with the option to expand treatment offerings.

During a time when everyone is more cautious about cross-contamination risk, Axeos is designed with high-quality materials that are smooth and easy to wipe and disinfect between patients. Single-use bite tabs adhere to infection prevention protocols and help mitigate cross-contamination risks, offering you and your patients a higher level of confidence.

Patient-centered features continue with Schick AE's three sensor sizes for easy adaption to specific clinical situations and patient anatomy (Fig. 13). In addition, single-use accessories, such as the AimRight Adhesive positioning system single-use sensor sheaths, help eliminate cross-contamination risks.

Axeos and Schick AE help provide better patient experiences, achieve greater practice efficiency, and realize opportunities for procedural expansion.

By reimagining imaging, Axeos and Schick AE by Dentsply Sirona Imaging Solutions help provide better patient experiences, achieve greater practice efficiency, and realize opportunities for procedural expansion. It's an approach that supports what matters most: more healthy smiles and a healthy practice.

**Results from a double-blind study involving 200 clinicians nationwide and images from Schick AE intraoral sensor as compared to images from DEXIS Titanium, KaVo IXS, Gendex GXS-700, and DEXIS Platinum. Data on file.*

To learn more about Axeos and Dentsply Sirona Imaging Solutions, visit www.dentsplysirona.com/newimaging

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Practical Tips for Integrating Clear Aligners into Your Practice

Meena Barsoum, D.M.D.

In today's world of instant gratification, patients will expect your practice to produce a seamless, transparent, and convenient clear aligner solution — and you should, so you can achieve quick case acceptance. This article will review relevant issues and provide solutions that will help you quickly, efficiently, and profitably adopt clear aligners into your practice.

The integration of clear aligners into a general dentistry practice requires more than product training and motivation; there also may be some minimal workflow tweaks to ensure efficiency, especially for deploying staff, technology, and marketing messages.

After transitioning from one clear aligner brand to another for about a decade, I settled on Dentsply Sirona's SureSmile Aligner primarily because of its quality, flexibility, and control from scanning to treatment. After that 10-year experience, I have identified five main barriers to delivering the most effective clear aligner office experience and gaining patient case acceptance.

1. Poor communication
2. Improper fee structure
3. Inefficient scheduling
4. Inconsistent messaging
5. Poor technical case presentation.

Below, I'll explore these barriers in more detail and provide some practical solutions that work well for me and my practice.

Improving Communication with Patients

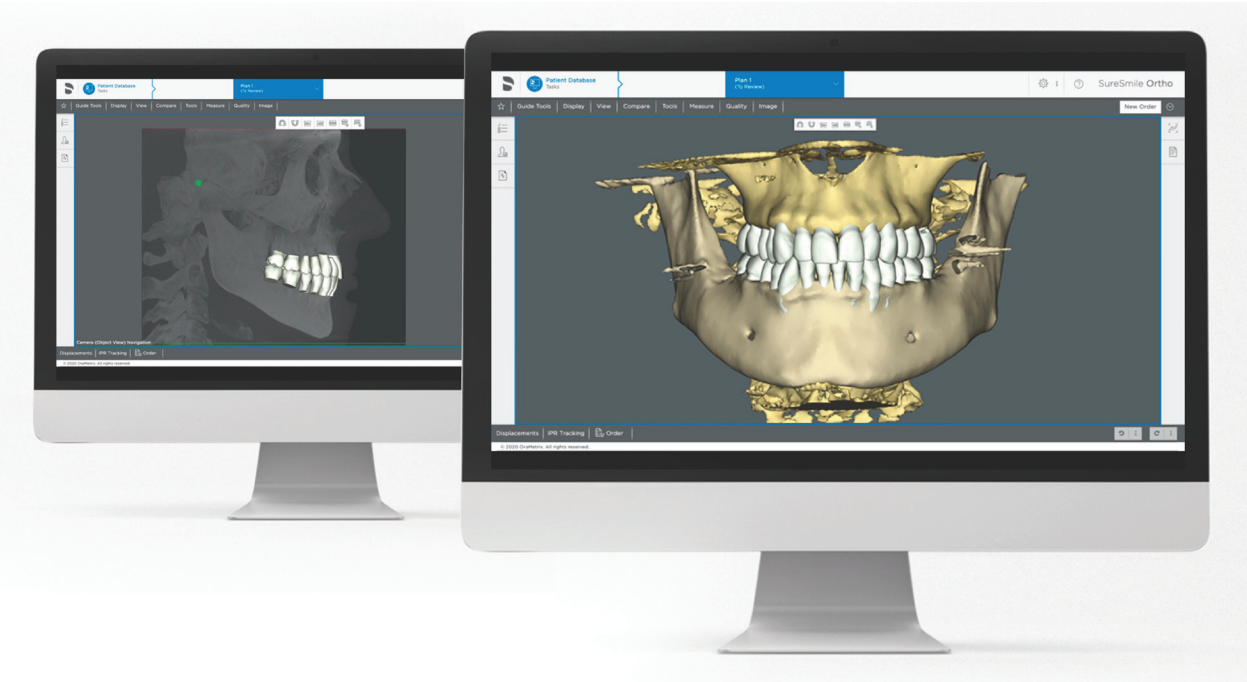
When I think of patient communication, I think beyond verbal. Providing visual cues also is helpful to show patients novel views of their problem teeth from different angles that they cannot normally see, even with a mirror. When a patient sees this new view of their poorly aligned teeth and asks how to fix it, I'm ready with my SureSmile solution. Beyond your typical diagnostics, I advise taking a series of six digital photos of each patient's teeth: frontal open, frontal closed, upper occlusal, lower occlusal, and right and left buccal. These pictures can be uploaded whenever the patient moves forward with the case, without another office visit. I recommend you immediately invest in a high-quality digital camera and start snapping this series of photos on every patient. Once your staff learns the process, it will only add a well-worth-it 2 to 3 minutes to the office visit.

Enhancing Fee Structure for Profitability

Two areas of focus when maintaining profitability are costs and what you will be paid.

Having flexibility in my cost structure is critical. SureSmile gives me the options I need during the entire

I settled on Dentsply Sirona's SureSmile Aligner primarily because of its quality, flexibility, and control from scanning to treatment.



scan-to-treat process, from full-service to in-house design and fabrication. In-house is more time consuming for staff but less expensive than full-service. SureSmile's full-service is like pressing the "easy button" — great when you're climbing the learning curve, but it adds more cost to your practice. I like to mix and match my approach depending on the price point I need to hit and the in-house planning/fabricating time we have available. Sometimes, I'll use my 3D printer to create one aligner for a patient compliance trial; with case acceptance, we'll digitally upload and have aligners within two weeks when the patient is ready for their next aligner.

You want an industry partner with the highest quality standards so you don't waste time and experience customer dissatisfaction — both are costly. Highly trained technicians (not artificial intelligence) and multiple quality checks from Dentsply Sirona's SureSmile Digital Lab generate careful initial plans. I rarely make treatment plan changes, and when I do, they are mostly patient-directed scale backs from full-arch treatment to focus on the "social six."

Additionally, I have a mix of private pay and insurance patients. Know what each insurance plan will pay for orthodontic work and try to match your aligner out-of-pocket cost to meet your profitability goal. If the insurance payment doesn't match what you need, consider referring the case out to an orthodontist. Regarding payment options, it's human nature to want a smaller monthly expense rather than one large case fee. In my office, we don't finance private pay patients, but we do work with CareCredit and LendingClub to offer affordable solutions.

I also categorize my aligner cases as comprehensive (more complex, many aligners, longer treatment time) versus limited (two or three teeth to move, few aligners, short time frame). I try to have a mix of both in process, mixing and matching how much in-house planning, designing, and fabricating we manage, and ultimately controlling cost and profit. I recommend less experienced doctors start with a few limited cases, using the SureSmile full-service option, spending less time and taking less risk while climbing the learning curve on these still profitable cases.

Another component of keeping costs down is being able to use your current scanner or cone beam computed tomography (CBCT) unit to upload cases. SureSmile's open architecture platform accepts files from virtually all intraoral scanners. I happen to have CEREC® Primescan but, with SureSmile you also can load CBCT images

straight into the case file, providing even more accuracy as teeth and bone are considered in the plan.

Fixing Schedule Inefficiency

Efficiency refers to my practice process and my industry partner, Dentsply Sirona. We both have to be efficient to make the whole process work smoothly.

My main in-office tip is to get as much as possible done on the initial visit — the scans, photos, CBCT (if applicable) — so you are ready to move the case forward as soon as the patient decides, offering a safer and more efficient alternative without another appointment. Some patients have researched other clear aligner brands and may ask about my SureSmile choice. In these cases, I refer not only to process efficiencies but also some key aligner patient benefits such as the aligner clarity with no striations, comfort with a choice of scalloped or straight edges, and durability/performance with Essix ACE plastic.

In addition to patient efficiencies, Dentsply Sirona has ensured its software platform allows quick and easy case submission. Their Digital Lab provides impressive turnaround times on treatment planning and fabrication, as well as dedicated customer service to deliver results that help me meet my clear aligner growth goals.

Aligning Team on Messaging

I work with my team to ensure they are consistent and use the same verbiage and language with patients when it comes to clear aligner therapy. For example, if a person calls and asks our receptionist if we do Invisalign, I've trained them all to say, "Yes, we do clear aligners." After all, the caller wasn't really asking about a brand; they were calling about clear aligner solutions.

Likewise, I work on messaging in tandem with my hygienists, who spend more time with patients than I do. At the hygiene appointment, we have a clearly defined, scripted process that includes showing patients their photo of hard-to-clean, crooked teeth with plaque buildup, then discussing aligner solutions to improve hygiene. When I come in the room, it's a short punt to case acceptance if the patient is a good candidate.

Speaking of good candidates, I've found four common characteristics that I look for when determining if a patient will be a good fit for aligner therapy: cases with an expected duration of 12 months or less for Class I and mild to moderate crowding or closing spaces, pre-prosthetic to position teeth ideally for veneers, making restorations more predictable, and, above all, a compliant patient willing to wear aligners for 22 out of 24 hours.

We will take on more complex cases occasionally, but we remain strong orthodontic referral partners.

Using Technology to Motivate Patient Acceptance

It's a digital world in dentistry, which I have talked about a bit above. Another point I'll add here is that in addition to showing the patient photos of the "before," I also like to show them what their smile could look like after treatment. To do this, I use the CEREC Ortho software right from CEREC Primescan, which allows me to illustrate the before and after digitally. This step frequently improves case acceptance and we move forward immediately. When this is the case, we smoothly transition them to staff who can discuss payment options, so solutions are in place before they head out the door.

Conclusion

I believe your SureSmile aligner integration will go smoothly if you address the five barriers I've faced and learned to overcome. It's particularly important that your team works together with the same message and workflow, getting the right clear aligner candidates to "yes" by demonstrating efficiency, building patient confidence, and showing the convenience of aligners. The solution must be profitable for you, while still affordable for the patient. The solutions I've outlined offer simple real-world answers with minimal interruption to your workflow.

For questions and additional information, Dr. Barsoum can be reached at mbarsoum@cdocs.com

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3D Printing Leaves Stone Models in the Dust

Dan Butterman, D.D.S.

In preparing for this article, I wanted to take a picture of my wet lab. It's a small lab with a sink, a vacuum mixer for stone, a model trimmer, and bins for stone and impressions. It's probably similar to most labs you'll find in dental offices across the country. When I went in with my camera, however, I was surprised to find that the stone, the model trimmer, and the vacuum mixer had vanished. I asked my assistant, but she just laughed and shook her head. She said that it's been over a year since she retired those relics to the storage room, next to the X-ray film processor, to make room for our 3D printers, cure box, and print wash station. It was then that I realized one of the most integral parts of a dental office — the wet lab — had changed forever. In my office, we haven't taken a physical mold, poured an impression, or trimmed a model in nearly two years.

You may be wondering whether making a printed model is faster and easier than taking an alginate impression and pouring it in stone. As CEREC® users, we understand that it's more efficient to scan a full arch than to take a physical impression. Accuracy is lost during a physical impression if the stone-to-water ratio isn't perfect or if a vacuum mix isn't used. Additionally, humidity and temperature can negatively affect the setting of the stone.

Traditional vs. Digital

Let's assume we need models for a bleaching tray. The first steps would take 10 to 15 minutes with the old-school method: mix the alginate, take the impression, confirm accuracy, and disinfect before pouring. Then another 5 to 10 minutes to pour the model and make the base. The stone takes approximately an hour to set before we can trim the model, which takes another several minutes. In total, the traditional method takes more than 90 minutes.

The digital method is significantly faster. First, it takes about 5 minutes to do a full-arch scan with CEREC Primescan. Then, just a few seconds to export as an .stl file and import it into SprintRay's RayWare software (or other printer slicer software). A base can be added to the model with the click of a button, and the model is ready to print. Models can be printed in less than 30 minutes, and with postprocess cleaning, the model is ready to use in less than 45 minutes (Fig. 1). It takes half the time to print a model than it does to pour one, and it costs only $5 to $7 depending on the type of resin. When you calculate the cost of a stone model, including the impression tray, alginate, stone, and staff time, you're likely saving money with a printed model.

3D Printing — It's About More than You Think

But 3D printing is so much more than saving time and money. And it's so much more than making models. As an early adopter of 3D printing, I've seen the evolution of printers, resins, and workflows grow exponentially over the last few years. At the outset, 3D printing was limited to printing models. With the Food and Drug Administration's (FDA's) approval of resins, the technology quickly evolved to surgical guides and other workflows (Fig. 2).

As practicing dentists, we're all about workflows. A piece of technology is only as valuable as its ability to improve an existing workflow, or to create a new workflow that makes practicing dentistry easier, faster, and more

As CEREC® users, we understand that it's more efficient to scan a full arch than to take a physical impression.

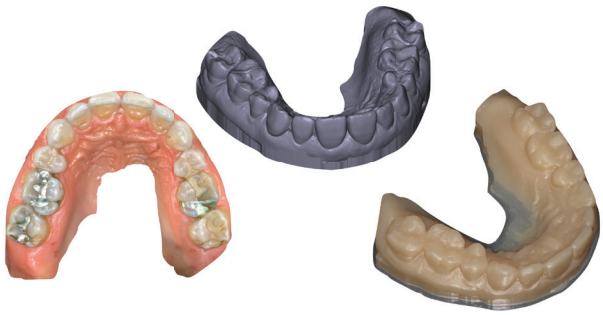

Fig. 1: Full-arch scan with Primescan, .stl model in RayWare software, and printed model at 170 microns with tan model resin

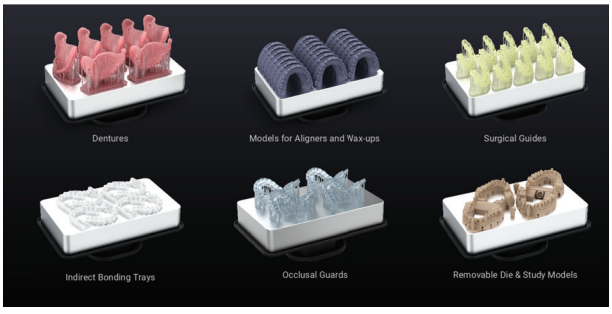

Fig. 2: Sample printing workflows (image courtesy of SprintRay)

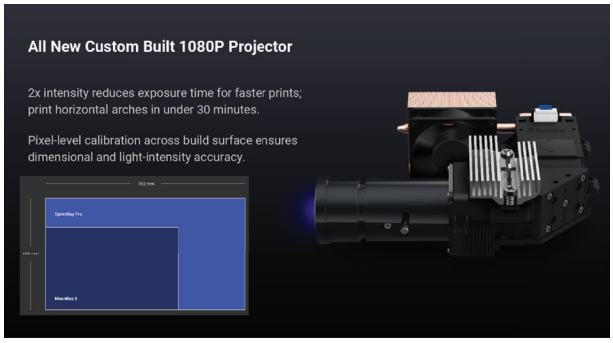

Fig. 3: DLP projector (image courtesy of SprintRay)

fun. The second part of the equation is versatility. Dentists fabricate a wide variety of devices, and we need an arsenal of materials and resins designed for both speed and accuracy. Most importantly, the process needs to be user friendly so that we can delegate it to our support staff.

In the dental setting, we have a choice among a variety of printers that use different technology at different price points. It's beyond the scope of this article to explore all the options, so we'll focus on one of the newest printers, the SprintRay Pro. This printer has several advantages, including:

- the speed of printing using digital light process (DLP) technology (Fig. 3)
- a variety of available resins from SprintRay and third-party sources
- a large build platform to produce multiple print jobs simultaneously
- user-friendly software that can quickly repair models and add bases/supports that are easy to remove.

Whether you choose the SprintRay or another printer on the market, it's not difficult to incorporate 3D printing into your practice. For offices that have CEREC Primescan, it's even easier. CEREC Primescan makes it possible for us to quickly scan full arches and edentulous ridges. We also can scan objects such as dentures or nightguards. These "models" can be exported in .stl format and pulled directly into the RayWare software to print.

For CEREC users, one of the biggest advantages of this technology is the ability to 3D print models for larger restorative cases so the restorations can be tried on and contoured on the models. Another advantage is the cost savings in printing models for clear aligners versus paying a lab to fabricate them. Although it is labor intensive to print models and make aligners for a large case, I typically print a single model from the preop imaging and fabricate a passive aligner for patients to start wearing the same day they agree to treatment. This allows them to get used to the first aligner without any discomfort, and it enables me to bill out the case immediately.

With the FDA's recent endorsement of resins that can be used in the mouth long-term, many new uses have emerged for 3D printing. For example, we now can print a nightguard in-office using soft splint material. A growing number of labs can accept a full-arch scan, design an occlusal splint, and provide an .stl file of the design within a day.

Dentures also can be designed in a lab, but instead of fabricating a physical denture, the lab can provide the dentist with a digital file containing the denture base and the teeth. The dentist then uses a pink resin to print the base and choose from a variety of shades to print the teeth.

The final step after 3D printing is bonding the teeth to the base. The technology also serves as a quick fix for broken dentures. A fractured denture can be bonded

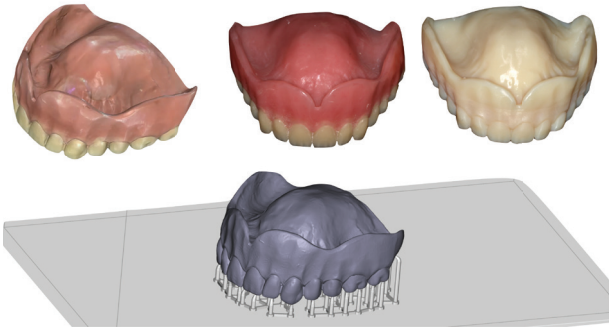

Fig. 4: Denture scan with CEREC® Primescan, .stl model in RayWare software, printed denture next to original denture

Fig. 5: Preop and postop full-arch digital wax-up and clinical case

together, scanned with CEREC Primescan, and printed as a duplicate denture in minutes. The patient can then use the duplicate until the fractured denture is replaced. A duplicate denture also can be repurposed as a custom tray, which can be relined with polyvinyl siloxane wash material and used for jaw relations. Finally, duplicate dentures can be used to fabricate a cone beam computed tomography scanned appliance for implant planning (Fig. 4).

My favorite application of 3D printing is digital smile design for full-arch or esthetic cases. A preop scan can be sent to a lab via CEREC Connect, and the lab can digitally create a diagnostic wax-up and send a file that can be printed. This model can be scanned and used for the BioCopy catalog to aid in the design of the final

Fig. 6: Printed shell of diagnostic wax up with DENTCA A1 crown and bridge resin (SprintRay)

restorations (Fig. 5). If the case won't be completed in a single visit, a putty matrix can be formed on the printed model to transfer the wax-up to the mouth and used to fabricate temporaries. This technique eliminates the wait for physical models to arrive from the lab and is a huge time saver. The lab can even take it a step further and create a shell of the wax-up that can be printed and relined as temporary crowns (Fig. 6). The patient then gets to test drive an exact duplicate of the final restorations, and we have a perfect temporary to BioCopy for the restoration design.

3D Printing — Here to Stay

I believe that 3D printing is here to stay and will evolve into better, more efficient workflows. With seamless printing and processing, it may be time to let go of your old analog workflows and repurpose your wet lab into a digital oasis. But before you get rid of the stone, take a picture for the history books.

For questions and more information, Dr. Butterman can be reached at dbutterman@cdocs.com.

True Dental Leadership Never Goes Out of Style

Gary DeWood, D.D.S., M.S.

What's old is new…here we go again. Truths that stand the test of time are all the more powerful in our lives for their resilience.

That power and resilience was evident for me again as dentistry began to awaken after a complete shutdown of our profession by the COVID-19 pandemic. Despite early surges in patients returning for care, I remain nervous about the economic impact of a continued public health crisis on our profession. I felt myself transported to 1987, reliving the health and safety fears I experienced then due to a virus. That event led to an economic downturn for dentistry, one of many I've lived through, including the 2008 recession. This ain't my first rodeo.

For those of you who cannot say "here we go again" because this *is* your first rodeo, rest assured that survival is possible, and someday you too will have the unfortunate opportunity to say both of those phrases for yourself.

"Work smarter, not harder" is another one of those frequently stated truths, and one that I'm going to follow today as I dust off some old writing that was published in *Dentistry Today* in 2006. My more than "20 years of experience" in 2006 has become more than 40 today, but the thoughts I expressed then still ring true.

The Question of Need: Accepted vs. Optimal Care

Whenever dentists gather and talk about the profession, one of the most commonly recurring themes is the difficulty of having patients *want* optimal care. This is certainly not a new concern.

I recall being told in dental school by several instructors that, "out there in the real world," dentistry is not about what's best; it's about what patients are willing to pay for.

Having practiced for more than 20 years in that real world, I understand the frustration that comes from seeing a different future for patients than they see for themselves. I was left wondering why this great rift continued to exist as my technical abilities and the science of dentistry grew ever more sophisticated. I also wondered what, if anything, dentistry and I had done to create and maintain this rift.

Freedom of Choice

The divide between what is known (optimal care) and what is practiced (accepted care) is, after all, a direct result of my attitude and beliefs about the services I provide for patients.

I have heard dentistry described as an elective service, which explains the reluctance of many patients to request the best. That meant if I told them about their options, then I had done everything I needed to do, patients could

I understand the frustration that comes from seeing a different future for patients than they see for themselves.

elect to act on what I knew was in their best interests or not. I had, after all, fully educated them. If they still declined to act on my recommendations for the optimal, appropriate solution, I had done my duty as a professional.

But had I really done my professional duty? Free to choose, patients choose the easiest, the least costly, the least whatever selection as they see it. But is a blind thoughtfully informed choice what they desire? Of even greater import, is it what they deserve? As a professional, do I have a duty beyond that of giving my patients options and asking them to choose?

When I see all the options as a cafeteria plan of electives, have I created a self-fulfilling prophecy: Patients who choose other than the best I have to offer.

One patient, Bob, was a Vietnam War veteran who lost his leg in the service. We hit it off immediately, developing a rapport during his initial visit that made the discussion of findings and solutions one that I really looked forward to.

Bob had significant dental problems. While caries and periodontal disease would never drastically damage his dental health, the destructive forces of tooth against tooth had made his dentition that of an old man. I wondered what he would want to do about it.

Understanding Options

I place very high value on autonomy. I do not want others directing my life, and so I operate under the belief that I should not direct others.

So, I gave Bob options. Wear is normal, after all. My responsibility was to inform him fully, educate him, and let him decide what was best. We talked — in truth, I talked, and Bob listened courteously.

At some point, he sat back in his chair and studied me. "What do you want me to do?" he asked.

"We could (option A) ... or we could (option B) ... or we could do nothing," I answered, comfortably assuming that he would choose the best option for him.

"No," he said, "What do *you* want me to do?"

"I want you to do what's best for you, Bob," I said, and sat back to listen for questions.

Bob thought for a moment and looked me in the eye.

"Gary, I spent almost eight months in military hospitals after being wounded in Vietnam. From just above the ankle my leg was gone, from there to my knee was a shredded mass of muscle, skin, and shattered bone.

The medics in the field saved what they could and sent me back to the states.

"When I met the doctors who examined and evaluated me stateside, no one suggested that I wait until more destruction had occurred and then replace the whole leg. No one asked me to decide what to do, but instead agreed that my health should be restored to whatever state the science of restorative medicine could bring me to. And no one advised me I could do nothing. I guess that those decisions were in my power, but not one of those doctors saw those as options. What do you want me to do?"

I realized what Bob was telling me but did not have enough information to answer his question. There was a choice to be made, yet I didn't know enough to tell him what that was. I didn't know enough about Bob to tell him what I wanted him to do.

Doctor: The Essential Teacher

The word *doctor* traces back to the Greek word for *teacher*, otherwise considered a deliverer of information.

Teaching a student the sounds made by the 88 keys on the piano does not teach him or her how to play music. The keys pressed, rather, will create the music that builds an individual song or impacts a person.

When Bob asked what I wanted him to do, it was as if he asked me to recommend the appropriate notes to play his song and, as a teacher, I should assist him in that endeavor. Instead, I had given him the scales and said, "Pick from these notes." I had failed to be his doctor.

Bob did not expect his surgeons to talk about wheelchairs or crutches when a prosthesis was possible — then turn it back to him and ask him to choose.

He did not want me to consider that a "shoe on his

stump" might be what he wanted. He wanted me to believe that he expected, he *needed*, to be restored. Why should I expect or want other than that for him?

How have dentists stifled the expectations of the public through our attitude about optimal dentistry as an elective procedure?

When I expect that every patient wants to be whole, to be restored to health, comprehensive dentistry becomes the only path I see, and thus the only option.

No medic would stop at saving whatever he or she could in the heat of battle without fully expecting that the next step, the restoration, is the inevitable outcome of those efforts on the patient's behalf.

As professionals, we have an obligation to hold out for what is in our patient's best interest, even in the face of resistance.

With the advances in dentistry, we are capable of seeing years into the future. If I had the ability to predict how Bob's leg would be lost, I know he would want to know as well. Would he not take appropriate action to avoid it? Would you?

Walter Haley of Boot Camp fame once said, "Dentists are addicted to being liked." This applies to me. I wanted Bob to like me, and I believed that by placing all the choices with him, he would see that I wasn't trying to sell him something (specifically, something elective).

I falsely believed that all Bob wanted was a dentist who would give him complete control over all decisions about his dentistry.

Doctor: The Essential Leader

Bob wanted me to be his doctor; he wanted me to be a professional who would never imagine he could want, or expect less, than my best. He wanted a professional who would seek to understand what optimal treatment was for him and tell him what that was.

In offering choices, I created the impression that the multiple solutions were all roads to Bob's goals for himself. He wanted to keep his teeth. He wanted to go to dinner with his grandchildren and order what he wanted, not simply what he could chew. He wanted me to tell him what he needed to do and assist him in getting there. He needed a doctor; he needed a leader.

Patients look to us daily for assistance with problems that interfere with the goals they wish for themselves. They come with unique circumstances and objectives,

with an individual question of need. The answer to their need is you. So, we need to step up and assist them choosing the best care possible.

Be the leader. Be the doctor they seek and deserve.

See the Person

Reflecting on my 2006 article now, I realize that Bob's insistence that I spend time knowing him, listening to him, understanding what he really wanted, empowered him to lead me to his preferred future, one he wasn't capable of clearly seeing from a "dentistry" perspective. He empowered me to offer my best and achieve his goals with him. The leadership action in that is observing, hearing, asking, and staying in the question, until the questions come from the patient.

No one asks for what they don't want, and their asking leads you to the answer that is truly their choice. Slow down to speed up, see and know the person before you see the solution to that person's problem, and give the doctor in you the power to emerge.

Leaders are always looking forward, and the most effective leaders even more so when everything old is new again.

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For questions and additional information, Dr. DeWood can be reached at gdewood@speareducation.com

Restoring Endodontically Treated Teeth in the Anterior

Mike Skramstad, D.D.S.

Treating anterior teeth can be one of the most rewarding procedures for a dentist, especially when one learns to do it in a single visit with CEREC®. Very few things in dentistry are more satisfying than watching our patients smile again with confidence. That being said, one of the most important lessons I've learned over the years is managing patient expectations. Not every case is going to be easy. Many clinical situations can complicate treatment outcomes. Previously over-prepared crowns, endodontically treated teeth, and restoring teeth with monolithic restorations are all factors we need to consider when setting patient expectations.

In this article, we discuss treating two central incisors, one of which is endodontically treated. This scenario can be extremely difficult because we have to take into account not only a tooth that is potentially going to be much darker, but we also have to manage ceramic thickness to make the teeth look optically similar. Several techniques for handling these situations have been described in the literature. Some of the more common techniques are internal bleaching, using an opaquer coping, or masking the dark tooth with an opaquer material. We also are going to describe one of the more predictable techniques, which is using a masking agent at the cervical. This is often more effective than internal bleaching because we do not have to worry about relapse, and it is easier than creating a coping because it allows us to use the monolithic materials we have available with CEREC.

Case Report

A 23-year-old woman presented with older composite bondings on #8 and #9 (Fig. 1). She was unhappy with the esthetic appearance of the teeth and reported trauma to #9 as a child that required root canal treatment. She had noticed that #9 appeared darker, and this was the original reason the bondings were done. Although the treatment masked the discoloration somewhat, it was still apparent that #9 was darker.

Fig. 1: Preop condition

Fig. 2: WRC Anterior Bur Kit

Treatment Options

We discussed a couple of treatment options, including internally bleaching tooth #9. At this point it was unknown how discolored the central incisor was, so we set expectations by explaining that we might have to change treatment considerations depending on what we found after preparing the teeth. Since both of the teeth needed to be treated, the decision was made to start with three-quarter crowns on both. Crowns were chosen over veneers because the teeth also had Class III composite restorations that extended beyond the contact points.

Fig. 3: Initial facial reduction

Fig. 4: Preparations completed

Fig. 5: Cervical ditch prepared

Preparation

The preparation is the most important consideration when creating esthetics with monolithic materials in the anterior. We must prepare enough for the material, but also not too much. Excessive restoration thickness has diminishing returns. One of the more common mistakes is overpreparing the tooth in an effort to mask discoloration. This dramatically affects the optical properties of the final restoration and frequently creates value issues with the ceramics, typically resulting in a low value restoration. We want to maximize the enamel to take advantage of not only increased bond strengths, but also the inherent optical properties of the tooth structure.

Many bur kits have been created to "guide" dentists into correct reduction. The one used in this case, the Winter Restorative Concept (WRC) CAD/CAM Anterior Preparation System (Brasseler USA), was created by Bob Winter of Spear Education (Fig. 2). The highlight of the kit is the three plane facial reduction burs. In this case, we used the Winter Depth Limiting Conventional bur (WDL CONV), which reduces the facial surface .3 mm at the cervical, .5 mm in the body, and .7 mm in incisal of the facial surface. The main purpose of this depth cutting bur is proper reduction of the facial surface while maximizing the enamel. It also has a "safe" tip at the end to minimize tissue damage during the initial reduction.

One of the most important lessons I've learned over the years is on managing patient expectations. Not every case is going to be easy.

The first clinical step in this case was to image the preoperative situation in the Biocopy folder. We decided not to create a wax-up for this case and used Biogeneric Individual Design for the restorations. To keep track of both the length and facial/lingual position of the design, it is imperative to add a Biocopy folder and scan the preoperative position of the teeth. After imaging the Biocopy, the initial facial reduction was completed using the WDL CONV depth limiting bur (Fig. 3).

The crown preps were completed using the CAD/CAM Anterior Preparation System (Fig. 4). To minimize "overmilling" the ceramics and ensure the most intimate fit of the restorations, the preparations were polished with Sof-Lex Discs (3M). This simple technique is strongly recommended with all anterior preparations.

After preparations were completed, #9 discoloration became apparent. One technique to deal with this situation would be to prepare the discolored tooth a little more and let the extra thickness of the final restorative material block out the discoloration. This can be problematic in most cases because the difference in ceramic thickness as

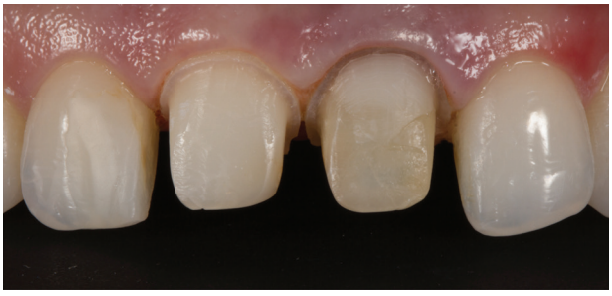

Fig. 6: Polished buildup at margin

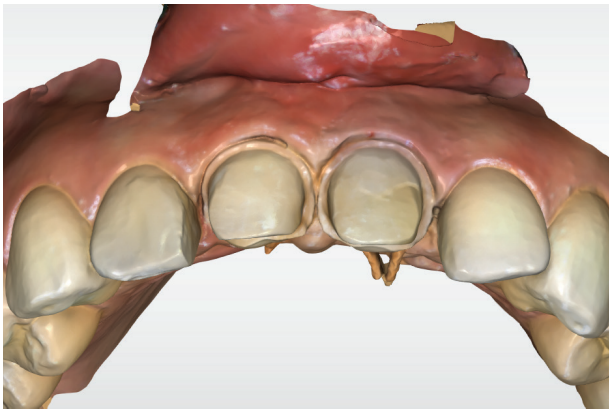

Fig. 7: Model preparations

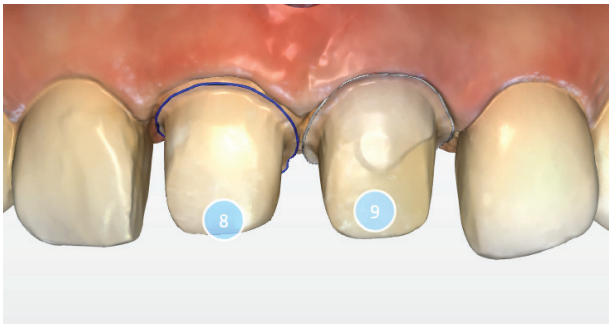

Fig. 8: Margins placed

Fig. 9: Initial proposals

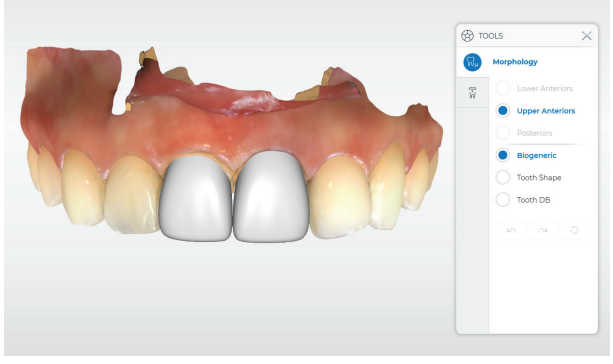

Fig. 10: Morphology tool activated

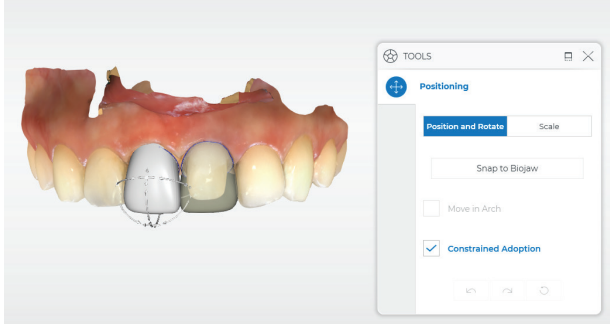

Fig. 11: Group tool activated

previously described can affect the value. In most cases, it is beneficial to keep the ceramic thicknesses the same on both restorations. For that reason, masking the discolored tooth is required.

Because the cervical portion of the restoration frequently is the most problematic area when dealing with a dark endodontically treated restoration, a cervical "ditch" is created from the mesial to distal facial line angles of the preparation (Fig. 5). This allows masking the area and creating a more ideal preparation shade in the most affected area. Many materials can be used as a masking agent, but it is best not to use a "white" opaquer because it potentially can result in a margin with a value that is too high and not vital. In this case, we used an opaque composite (GrandioSo Bleach Shade, VOCO). This universal nano-hybrid restorative has high filler content and excellent light resistance. The final preparation was again polished to create an optimal mill (Fig 6).

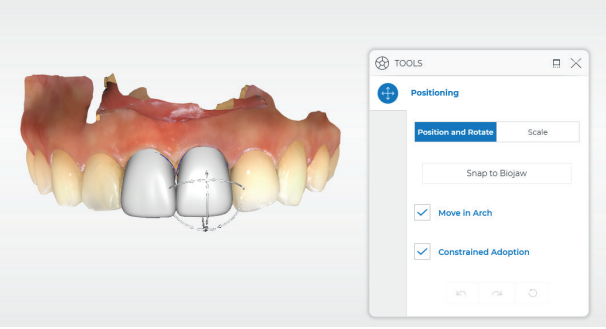

Fig. 12: Position and Rotate tool activated

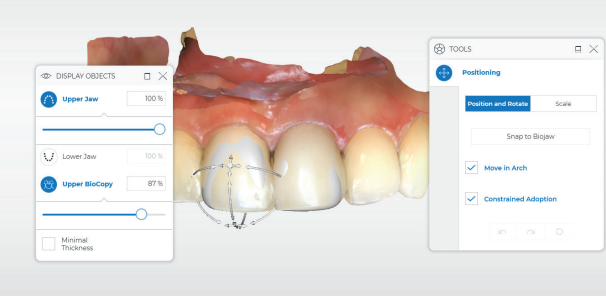

Fig. 13: Biocopy model overlay

Fig. 14: New proposals, facial view

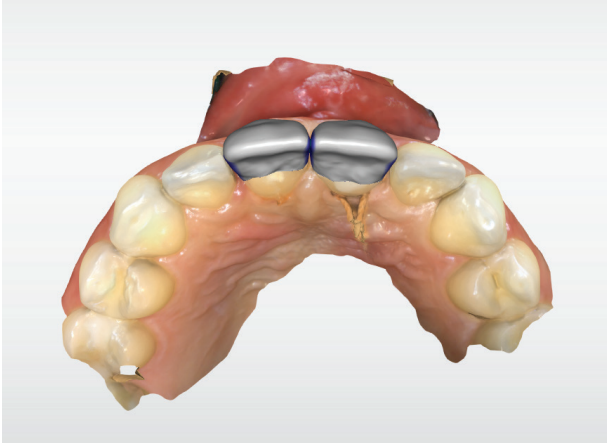

Fig. 15: New proposals, incisal view

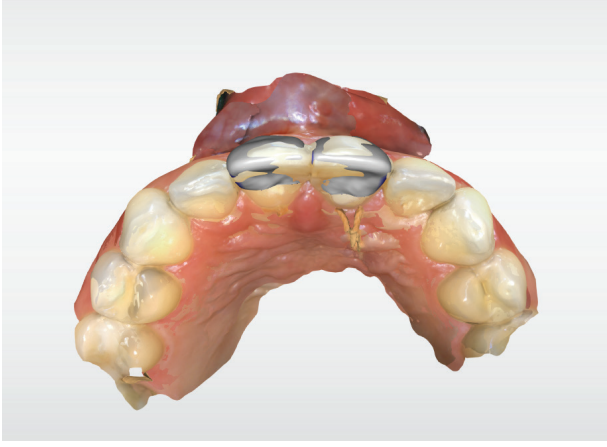

Fig. 16: Biocopy overlay, incisal view

Restoration Design

After final preparation and masking, 0 sized cord was placed to slightly retract the tissue and the upper arch, lower arch, and buccal bite were imaged with CEREC Primescan (the Biocopy scan was taken previously). The margins were clear and apparent, and subsequently marginated using a combination of auto and manual margin finder (Figs. 7-8).

One consideration when using the Biogeneric Individual design technique is that the initial proposals may not be perfectly symmetric and require extensive software manipulation (Fig. 9). One excellent tool available with the CEREC Software is the BioJaw — the Morphology and Positioning tools located in the bottom step menu of the Design Phase. Before using these tools, adjust the minimal thickness setting in the local parameters (also in the step menu of Design Phase). Since the minimal thicknesses of the restoration are based on the selected material, we almost always have to adjust them when doing anterior restorations (regardless of the material chosen). For all materials, the recommended minimal thickness setting for occlusal and radial is 500 microns.

After adjusting the local parameters for minimal thickness, we selected the Morphology tool in the step menu (Fig. 10), which allowed us to stay with the Biogeneric morphology or select custom tooth shapes or

Fig. 17: Biocopy overlay, facial view

Fig. 18: Final restorations

databases that best fit the case. When selecting this tooth, the proposal shells are not attached to the margins and it automatically makes them symmetric.

Once the morphology was chosen, we selected the positioning tool. It is standard to choose only one restoration. One trick to manipulate both restoration positions at the same time is to link them. In this step, the easiest way to link the restorations is to select the "Link Options" button on the right side of the screen and group the restorations together. When Group is checked off, it will turn the nonactive restoration transparent (Fig. 11). If using an Omnicam or design station, grouping can be accomplished by holding down the "Ctrl" key on the keyboard.

After grouping the restorations, we used the Position and Rotate and Scale tool to correctly position the shell proposals in the ideal positions (Fig. 12). Make sure the margins are covered in this step; it may be necessary to unlink the restorations and work on individual proposals. In addition, the Biocopy folder in Display options must be turned on to correctly position the teeth in relation to the preoperative location (Fig. 13).

Once positioning was complete, we selected "Edit" in the step menu to calculate the new proposals. This results in a much-improved starting position and allows using the tools to finalize the design (Figs. 14–15). Again, it is important to turn on the Biocopy folder in Display Objects to make sure the final designs are in the correct position relative to the initial preop position (Figs. 16–17).

Restoration Placement

We chose IPS e.max CAD MT BL2 (Ivoclar Vivadent) as the final restorative material because the medium translucency material is translucent enough for optimal esthetics, yet opaque enough to help block the discoloration of tooth #9. Also, a shade one shade lighter than the actual tooth was chosen to account for a probably slight value shift. If you are unsure of the shade, select a block one shade lighter than the actual shade and tone down the value with warm cements. Doing this in reverse — trying to increase the value with brighter cements — frequently results in restorations that appear too opaque or the effect of the resin cement can be seen at the thin cervical margin.

The final IPS e.max CAD MT restorations were bonded in place using Variolink Esthetic Warm (Ivoclar Vivadent). After bonding, the incisal embrasures were slightly modified and corrected using Sof-Lex Discs, and the restoration was adjusted and polished with WRC CAD/CAM Extra-Oral Ceramic Adjusting & Polishing System (Fig. 18).

Conclusion

Executing anterior ceramic restorations with CEREC when an endodontically treated tooth is involved can be daunting, so set patient expectations before performing the procedure. However, with proper preparation, ceramic thickness control, and correct cervical masking, treatment can be accomplished predictably. If you are struggling with design, material selection, or anterior preparation or are looking to increase your skills with anterior CEREC restorations, I encourage you to challenge yourself to improve and educate yourself on these techniques because nothing is as satisfying as a patient with a new smile.

For questions and more information, Dr. Skramstad can be reached at mskramstad@cdocs.com.

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A Story 35 Years in the Making…And You Were There

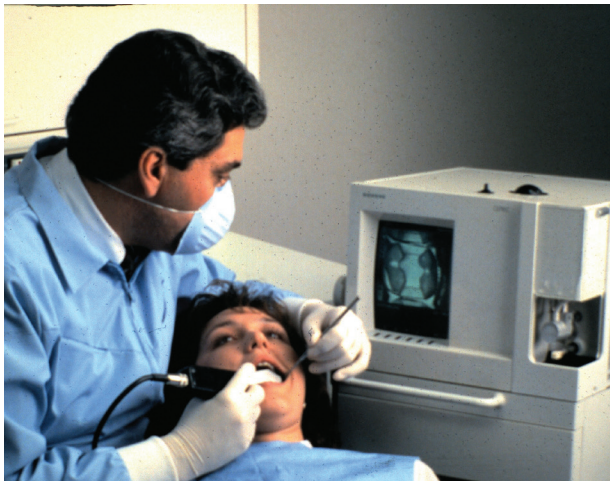
As CEREC® celebrates the momentous milestone of its 35-year anniversary, we kicked off 2020 with a Global Introduction for CEREC Primemill — another big step forward in completing an all-new CEREC system — in Berlin, Germany, with 200 international dental professionals, key opinion leaders, and press representatives. Together with the completely redesigned CEREC Primescan and CEREC Software, CEREC Primemill creates an exciting, modern solution for achieving excellent results with a completely new chairside experience for users and patients.

The all-new CEREC system takes on a new dimension in single-visit chairside dentistry. For those customers who want to step into the chairside CAD/CAM world and use the technology in their practices, the new CEREC gives them a full system with great flexibility for reliable results. Users who are already successfully using CEREC in their practice will be re-energized by the system with its new speed, high quality, and convenience.

"It was important for us to continually create real added value with CEREC, both for the CEREC newcomer and for those who have been passionate CEREC users for years," explained Dr. Alexander Völcker, Group Vice President, CAD/CAM & Orthodontics at Dentsply Sirona. "We have noticeably increased the process speed while delivering outstanding restoration results. The variety of applicable materials leaves nothing to be desired, and operating the unit has never been easier. The complete system does not require any data imports or exports. All processes are coordinated with one another and fully validated for an excellent and seamless chairside experience."

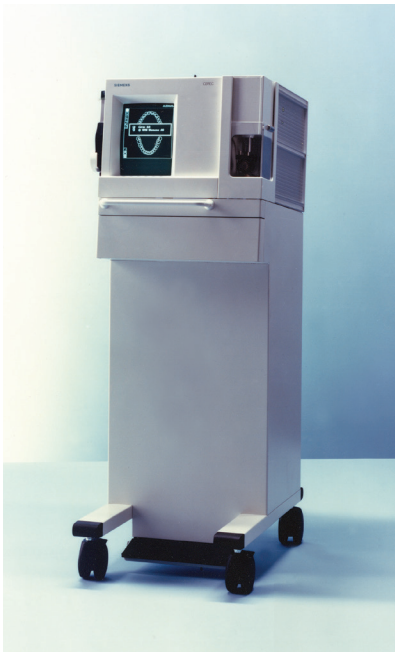
That drive to innovate and deliver the best experience in CAD/CAM has been evident throughout the CEREC 35-

The CEREC 1 prototype unit, the "lemon," with Dr. Werner Mörmann (left) and Marco Brandestini, Dr. sc. techn. ETHZ.



CEREC 1 introduced for patient use 35 years ago.

Creating this fresh, exciting platform to inspire and bring renewed passion for what we do every day is at the center of these meetings and celebrations.



CEREC 1 unit

CEREC 2

CEREC 3 with 3D software

year journey. When we look back now at the introduction of CEREC 1 in 1985, one might ask whether we really thought we could create a single-visit chairside solution that would be adopted by dental professionals worldwide? Over the next 20 years, CEREC created a steady path of innovation with the introduction of CEREC 2 in 1994, CEREC 3 in 2000, and CEREC 3 with 3D software in 2003. Then, in 2005, the CEREC community came together to celebrate 20 years of innovation for the first-ever CEREC meeting, unlike any the dental community had ever seen.

At CEREC 25 in 2010, Dr. Werner Mörmann, the original developer of the CEREC system, presented The Evolution of the CEREC System. Dr. Mörmann reflected on CEREC's progress from its introduction (as a small, mobile CAD/CAM unit integrating a computer with a monitor and keyboard, trackball, foot pedal, and an opto-electronic 3D-scanning-mouth camera) to its evolution into the CEREC AC unit with Bluecam and CEREC Connect, which at the time represented advanced CAD/CAM technology for dentists and dental technicians.

Main stage at CEREC 25

Main stage at CEREC 30

Ringing the closing bell at NASDAQ from Dentsply Sirona World 30

All-new CEREC Primemill launch 2020

Dentsply Sirona World 2019 Las Vegas with 7,500 attendees

CEREC Primemill launch, Berlin, Germany

CEREC Primemill launch, Berlin Germany

Just two short years later, at CEREC 27 and a half, more than 4,000 dental professionals gathered in Las Vegas to witness the launch of the new CEREC Omnicam 3D intraoral camera, a major part of the anniversary celebration. CEREC Omnicam took center stage with a live scan in front of the entire audience, showcasing the revolutionary design features, the new ergonomic handpiece, and special optics to guarantee unsurpassed intraoral access with powder-free ColorStreaming capture.

Realizing how important the CEREC community is and the value of bringing us all together, in 2015 we began to host yearly meetings with CEREC 30. Creating this fresh, exciting platform to inspire and bring renewed passion for what we do every day is at the center of these meetings and celebrations. What has come to be known as the Ultimate Dental Meeting, Dentsply Sirona World provides a comprehensive curriculum of disciplines driven by digital dentistry, including digital radiography, orthodontics, and implantology through breakout sessions, hands-on training, and featured keynote speakers. And the tradeshow has grown, displaying the latest technological advancements in dentistry.

35-Year Highlights

1985 CEREC 1 launched for patient use

1994 CEREC 2 launched

2000 CEREC 3 launched

2003 CEREC 3 with 3D Software launched

2005 CEREC 20, the inaugural CEREC Anniversary Event with entertainment from Penn & Teller and Jay Leno

2007 CEREC MC XL launched and the advent of single-visit chairside dentistry

2009 CEREC Bluecam launched

2010 Biogeneric software introduced. CEREC 25 with a live show featuring Dennis Miller.

2012 CEREC Omnicam introduced at CEREC 27.5 to 4,000 attendees, setting the standard in scanning for over 10 years. Laughs were provided by Steve Martin and Martin Short.

2015 CEREC 30 saw the launch of CEREC SW 4.4, ORTHO SW, CEREC Guide 2, CEREC AF/AI, and PatientActivator. We had 6,000 attendees who joined Wall Street live from main stage to ring the closing bell on the NASDAQ exchange and were inspired by keynote speaker Tony Robbins. Oh, and were you one of the lucky ones who got to dance on stage with Train?

2016 CEREC Wet and Dry Milling units and CEREC Speedfire launched. CEREC 31 at Dentsply Sirona World featured Sir Richard Branson, comedian Jerry Seinfeld, and One Republic.

2017 CEREC 32 at Sirona World brought major updates to software, new titanium-base options, and CEREC Hub. This was the largest CEREC event ever with 7,000 attendees, keynote speaker Simon Sinek and entertainment by Will Smith and Imagine Dragons.

2018 CDOC's East Campus at Dentsply Sirona Academy launched. CEREC 33 at Dentsply Sirona World celebrated with keynote speaker Doris Kearns Goodwin, comedian Jim Gaffigan, and award-winning performer Katie Perry.

2019 CEREC 34 at Dentsply Sirona World was a sold-out event and included the launch of the highly anticipated CEREC Primescan and CEREC SW 5.0. We had over 100 break-out sessions, and entertainment included the return of comedian Jerry Seinfeld and a performance by the award-winning Zac Brown Band.

2020 CEREC Primemill launched. CEREC 35 at the first-ever virtual Dentsply Sirona World

2055 CEREC 70. We can't wait to see what it brings. We'll see you there.

It is at these anniversary events where we come together to celebrate and learn from each other, get the first look at where the industry is going, and become inspired to do more digital dentistry. The CEREC family that was created from Dr. Werner Mörmann's idea of chairside dentistry is never more present than during these anniversary celebrations. CEREC technology thought leaders, educators, and advocates will continue to inspire the next generation of digital dentists as the community continues to grow and evolve for another 35 years. Every CEREC user has played a part in the story. We couldn't have done it without you. Thank you.

For information about this year's Dentsply Sirona World, visit www.dentsplysirona.com/en-us/ds-world.html.

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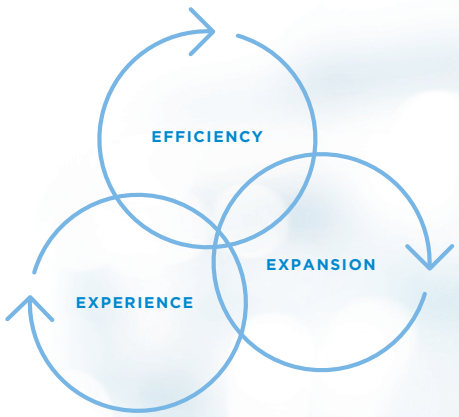

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The F.A.D.E. Concept for Full-Arch Digital Edentulous Therapy

Ross Enfinger, D.M.D.

Although the "All-on-Four" technique was first published over 20 years ago, intraoral digital applications for full-arch implant therapy have emerged only recently. The primary limitation has been the previous inaccuracies of intraoral imaging systems across the edentulous arch; most CAD/CAM systems, including CEREC®, were engineered exclusively for hard-tissue restorative purposes. However, with the global release of CEREC Primescan in 2019, imaging across edentulous spans is finally a reality because of the camera's unique ability to progressively stitch intraoral imaging using only soft-tissue references.

The following case study outlines the necessary steps for fabricating an implant-supported fixed hybrid prosthesis using an all-digital approach and the F.A.D.E. (face, alveolus, dentition, export) concept for full-arch digital edentulous therapy.

Case Study

The patient presented with terminal dentition and the desire to rehabilitate his dental condition with a fixed prosthetic solution for both the maxilla and mandible. (Only treatment sequencing of the maxillary arch will be featured in this article; however, the mandible was treated similarly).

The first step in any reconstructive process is extensive record-gathering. We want to be thoroughly prepared for the case and clearly understand our desired clinical end point. To simplify records collection, I developed the F.A.D.E. concept as a stepped formula to gather and apply data for edentulous cases.

F.A.D.E. Records Collection

Face — Digital photographs were taken using Facially Generated Treatment Planning (FGTP) concepts per Spear Education standards. As the preoperative photographs demonstrate, the patient's existing incisal and occlusal planes were in acceptable positions relative to his smile line, so they were used as strict references for the new smile design. Keynote and Spear FGTP templates were used to generate a guided smile design for developing a virtual wax-up in subsequent steps (Figs. 1–2).

Figs. 1–2: Preoperative condition and Facially Generated Treatment Planning template

Alveolus — An 8 x 8 x 8 cm cone beam computed tomography scan (Orthophos XG 3D, Dentsply Sirona) was taken to assess bone volume and generate a prosthetically driven virtual implant plan. Implant sites

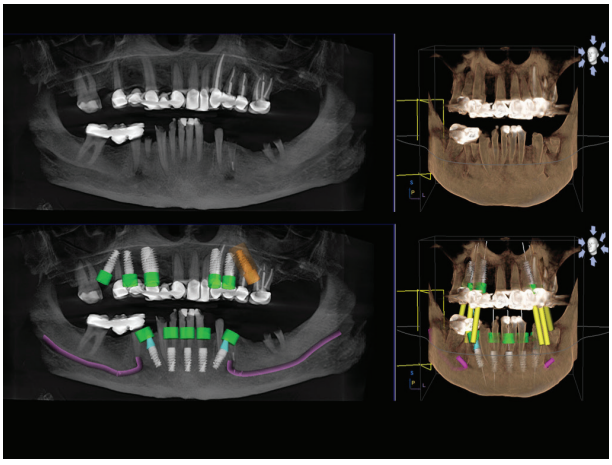
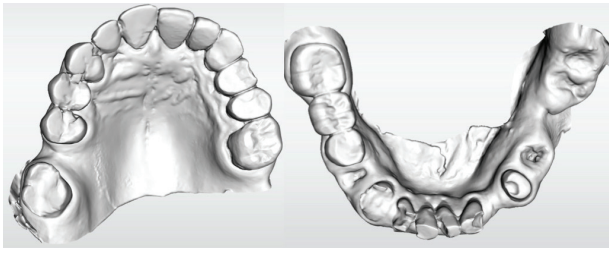


Fig. 3: CBCT image and virtual implant plan



Figs. 4–5: Virtual models and wax-up

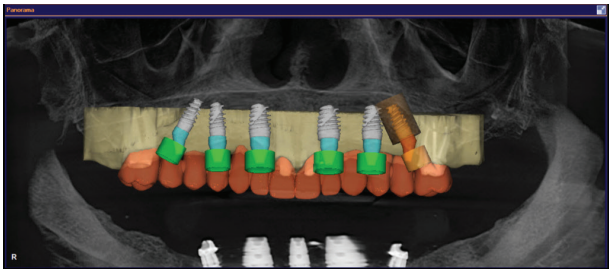
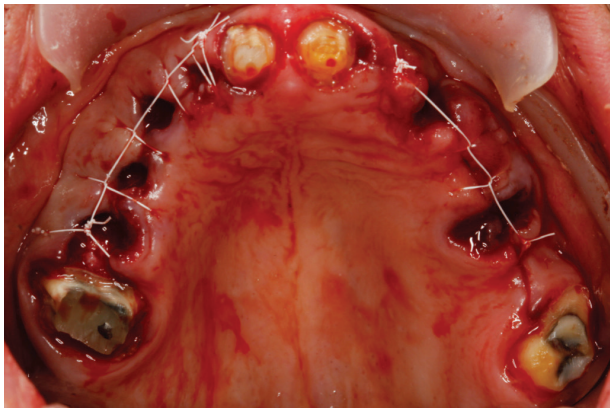
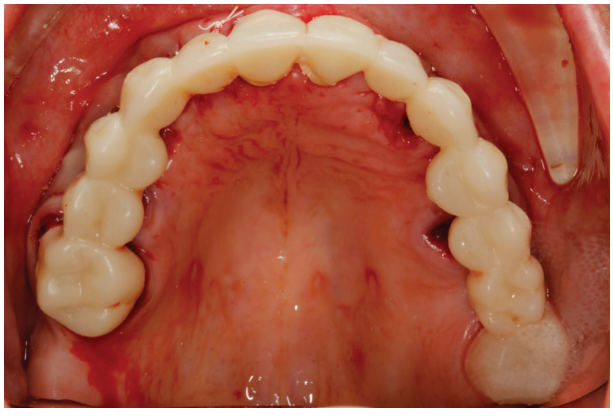


Fig. 6: Virtual implant plan by GALILEOS Implant planning software





Figs. 7–8: Partial extraction and milled provisional bridge

To simplify record collection, I developed the F.A.D.E. concept as a stepped formula to gather and apply data for edentulous cases.

were planned where adequate bone volume existed and were placed in favorable positions relative to the desired multiunit abutments and screw-access channels in the planned prosthesis (Fig. 3).

Dentition — Diagnostic models were taken with CEREC Omnicam using the CEREC Ortho imaging software, on which a virtual wax-up was developed using exocad laboratory software (exocad GmbH) (Figs. 4–5).

Export — Relevant diagnostic and treatment planning data, including the virtual implant plan and .ssi files,

Figs. 9–10: Final virtual plan and CEREC® Guide 2

were exported to generate surgical guides and provisional restorations. In this case, GALILEOS Implant planning software (Dentsply Sirona) was used to develop a fully integrated, prosthetically driven virtual implant plan, and CEREC Guide was used for fully guided implant placement (Fig. 6).

With the F.A.D.E. records collection process completed, we can now take a closer look at the clinical treatment sequencing.

Clinical Treatment

Because of the presence of multiple periapical abscesses in the patient's maxilla as well as his smoking history, immediate implants were contraindicated. Instead, delayed implants four months after extraction healing were preferred. However, instead of extracting

Figs. 11–12: Flap access and guided implant placement

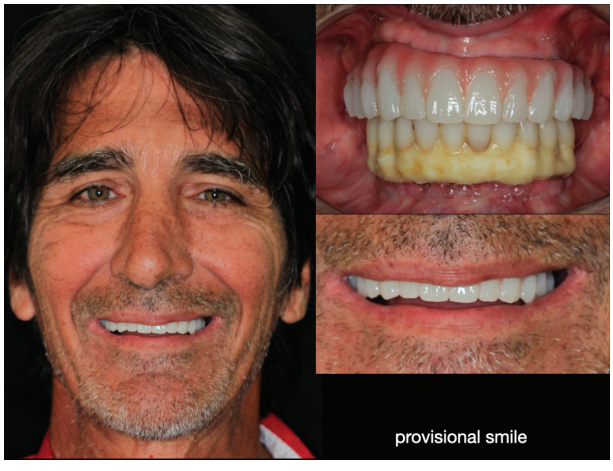


Fig. 13: Screw-retained implant provisional

all of the teeth in the arch entirely and relying on a removable denture during the healing phase, the decision was made to strategically maintain several teeth to retain an interim tooth-borne fixed bridge.

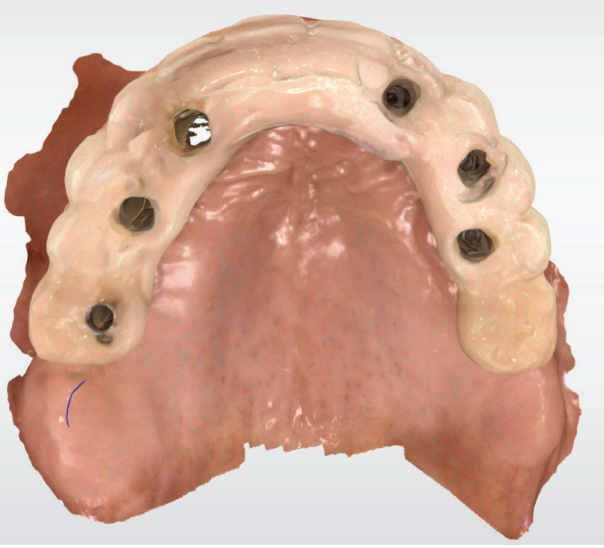
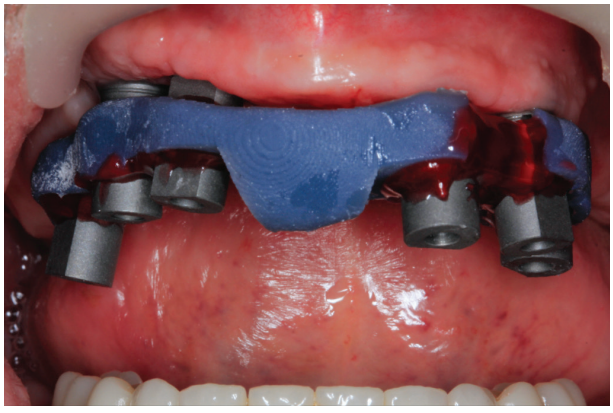


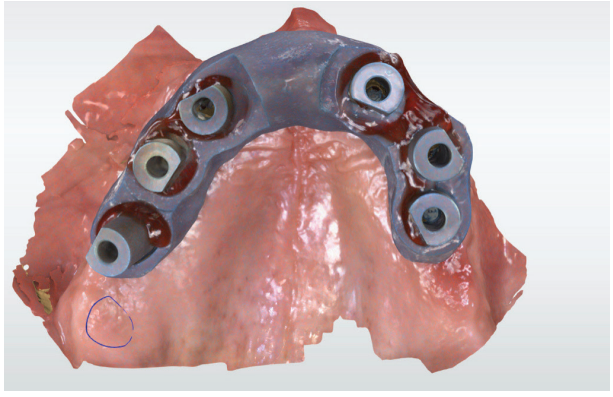
Fig. 14: Biocopy scan of provisional

Fig. 15: Dual buccal bite

The locations of these support teeth were specifically chosen to be away from the eventual implant sites. The remaining teeth were extracted and a full-arch provisional bridge was milled using inLab software and Harvest PMMA (Harvest Dental Products). The interim bridge was then cemented with temporary cement and verified for occlusion and esthetics (Figs. 7–8).

After an appropriate healing period, a post-partial extraction CBCT was taken, and the .ssi file from the interim bridge was used to develop a refined prosthetically driven implant plan. From there, the CEREC Guide 2 was definitively planned and 3D printed using the MoonRay S (SprintRay) (Figs. 9–10).





Figs. 16–18: Target 3D Scanbodies and imaging jig

Surgical Guide

The CEREC Guide 2 was designed to be supported on the remaining teeth while allowing fully guided implant placement. Six Nobel Active RP implants (Nobel Biocare) were torqued to 35 ncm and multiunit abutments were placed as planned (Figs. 11–12).

After the implants were placed, the tooth-borne

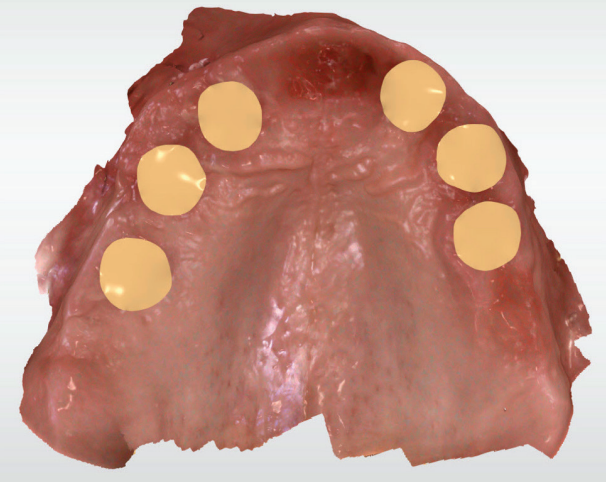
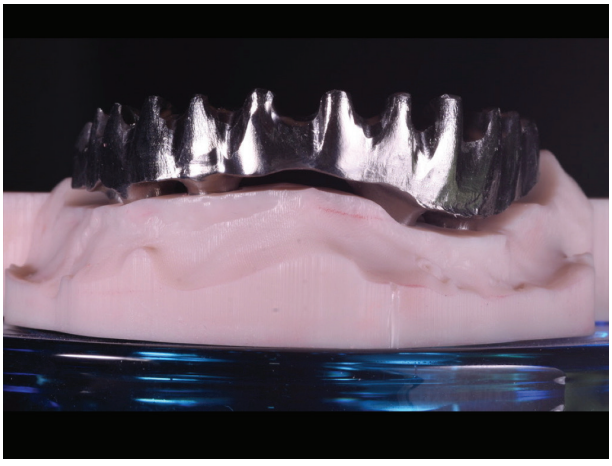


Fig. 19: Gingiva Mask scan



Figs. 20–21: Printed model and titanium substructure

Fig. 22: Zirconia superstructure

temporary bridge was converted onto the implants, creating an implant-supported, screw-retained provisional. Finally, the remaining teeth were extracted and an appropriate time for implant integration was observed before moving on to the final prosthesis (Fig. 13).

With the fixtures now integrated, our attention turned to the restorative phase. In this case, the final prosthesis of choice was a titanium bar substructure with a zirconia superstructure over top. This prosthesis provides maximum strength and esthetics, and it is easy to clean; however, accuracy of the final impression is paramount since the rigid titanium bar requires a passive fit onto the multiunit abutments. To achieve this, the F.A.D.E. restorative concept was developed to ensure accuracy across imaging of the edentulous arch.

F.A.D.E. Imaging Process with CEREC Primescan:

- **Fixed provisional —** A Biocopy scan was taken of the screw-retained implant provisional (Fig. 14).
- **Articulation —** Dual buccal bite images were taken and the arches were stitched together for an articulated virtual bite (Fig. 15).
- **Digital jig —** A 3D printed verification jig was luted to the Target 3D multiunit Scanbodies (Target 3D) using Pattern Resin (GC America) and imaged using CEREC Primescan (Figs. 16–18).
- **Edentulous scan —** A Gingiva Mask image was taken of the edentulous arch and merged with the Biocopy and Scanbody images (Fig. 19).

Figs. 23–24: Final prosthesis

Final Prosthesis

After gathering all the final records outlined in the F.A.D.E. restorative concept, the final bar design was completed using exocad software and milled from titanium. A 3D printed model was used along with press-fit multiunit analogs to verify the virtual prosthesis and to serve as a solid working model (Figs. 20–21).

With the substructure completed, a super-translucent zirconia superstructure was designed with exocad and milled from KATANA Zirconia STML (Kuraray) (Fig. 22).

The zirconia superstructure was milled with cutback and layered with CZR ceramic (Kuraray) to create a natural, life-like appearance. The bar was tried in, verified to passively seat, then the sub- and superstructures were bonded together using PANAVIA V5 (Kuraray). Once assembled, the prosthesis was inserted and torqued to the manufacturer's specifications. The access holes were filled with Tetric EvoCeram universal nanohybrid composite (Ivoclar Vivadent) (Figs. 23–24).

Imaging across edentulous spans is finally a reality because of the camera's unique ability to progressively stitch intraoral imaging using only soft-tissue references.

Conclusion

The F.A.D.E. concept for full-arch digital edentulous therapy is a novel approach to providing digital solutions for processes that were previously limited to analog techniques. With the assistance of an imaging jig, CEREC Primescan is accurate enough to produce a fully digital, passive titanium bar supported by multiple cross-arch implants. With the entire scope of digital dentistry now available to us as CAD/CAM users, CEREC Primescan has proven itself to be the future of digital scanning for complex cases.

For questions and additional information, Dr. Enfinger can be reached at renfinger@cdocs.com.

The Immediate Implant

Anthony Ramirez, D.D.S., M.A.G.D., D.I.C.O.I.

Replacing damaged natural teeth is quick and easy to accomplish with dental implants. The success rate for these procedures is comparable to dental implant placement with healed natural bone and regenerated bone. Implants provide patients with several benefits, including a fixed tooth provisional where applicable, reduced time to complete the final restoration, and no additional surgeries.

Typically, insertion torque, which is a one-time value, is used to assess implant stability at placement, but it measures only rotational stability. It has been shown that implants can integrate with a wide range of insertion torque values, but I rely on the use of resonance frequency analysis (RFA) to establish whether the implant has been inserted with the initial stability required for an immediate restoration. Osstell IDx is a digital device that records implant stability quotient (ISQ), which is a value on a scale of 1 to 100 that correlates bone-to-implant contact. The higher the value, the higher the stability. These objective measurements can be used to determine initial stability and then are repeated as osseointegration progresses from mechanical to biological stability. Achieving primary stability is a prerequisite for providing a provisional restoration at the time of implant placement, and these measurable parameters provide me with an objective value for confident clinical decisions.

In my experience, guided implantology is necessary for safe, precise, and optimally positioned implants. With the end in mind, I integrate the data derived from a cone beam computed tomography (CBCT) scan and the dental anatomy from a CEREC® Primescan scan to plan and place implants. The CBCT and CAD/CAM workflows are seamless, offering a streamlined process for digital implantology. This protocol provides several benefits, but the most important are positive patient experiences, faster healing, reduced surgical chair time, and less postoperative discomfort. It's a safer, higher standard of care that, in my opinion, is unmatched by conventional freehand implant surgery. Using a guide will result in more accurately placed implants that are easily rebuilt with CAD/CAM restorations. The surgical guide safeguards the preplanned 3D position of the implant with regard to depth and spatial relationship to the adjacent teeth with proper angulation and timing.

This article features several examples that illustrate the protocols needed to make immediate implant dentistry part of your overall treatment therapies. When immediately implanting an extraction site, the first goal is to gain primary mechanical stability. This initial stability will, over a healing period, be replaced by biologic stability and produce osseointegration. Having 2 mm of buccal bone is a minimal guideline to ensure that excessive remodeling is minimized on the facial plate. This bone volume is necessary to support and maximize the muco-gingival peri-implant soft tissues and protect the implant.

Any gaps that exist between the implant and boney walls are filled in with a bone substitute (xenograft such as Bio-Oss, Geistlich Biomaterials), an allograft (cortico-cancellous cadaver bone), autogenous bone chips, or a

Our objective must be to reduce morbidity, decrease risk, and regenerate enough bone to establish an esthetic and functional tooth replacement.

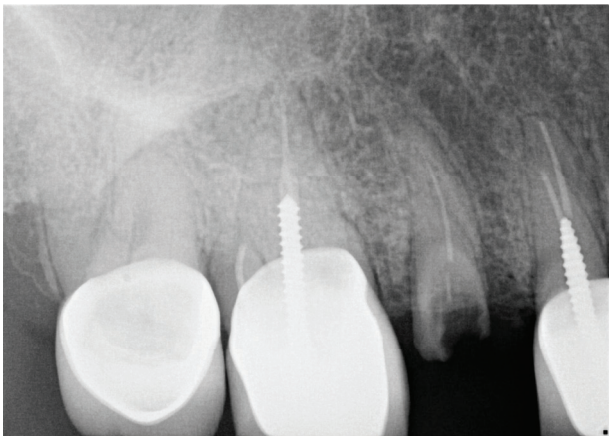


Fig. 1: Initial presentation of the maxillary right quadrant

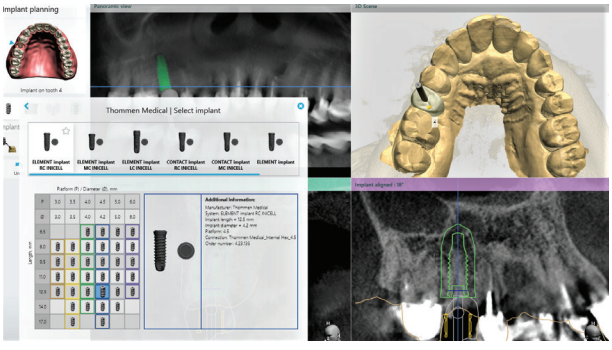


Fig. 2: Implant (immediate) plan for tooth #4

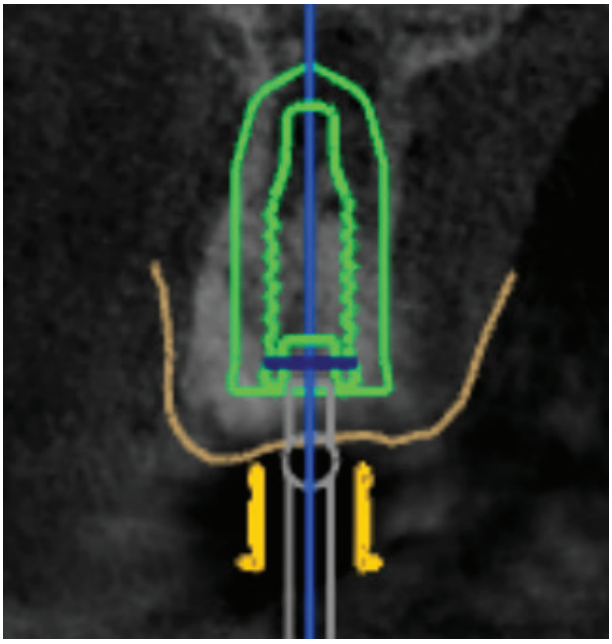


Fig. 3: Close up of cross-sectional view of Simplant virtual implant ELEMENT MC 4.2 x 12.5 mm

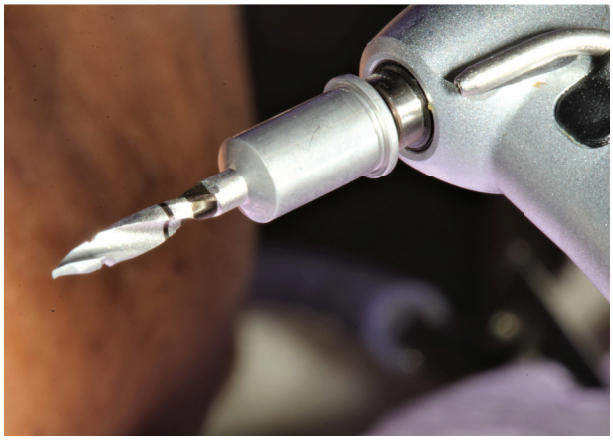


Fig. 4: Thommen Medical guided surgery VECTOdrill

combination of materials. This will create buccal bone volume and a convex contour. If indicated, you may place a contoured provisional crown or two-stage the implant. Delay implant placement if acute infection or pus is present or if a large chronic defect precludes the ideal 3D position. In these situations, remove the diseased tissue and augment or wait for soft-tissue healing and then graft. Our objective must be to reduce morbidity and decrease risk and to regenerate enough bone to establish an esthetic and functional tooth replacement.

Retired and Ready to Improve Her Dentition

A 70-year-old woman with controlled thyroid disease and hypertension presented to improve her dentition. Over the years, almost her entire dentition had been restored with porcelain-fused-to-metal crowns and bridges. She traveled extensively and did not want to have any dental issues while out of the country. A complete examination revealed the need to replace failing restorations #3 and #30, and extract and place an implant at #4. CAD/CAM restorations were planned for the molars, and the necessary CBCT and CAD/CAM integration was completed in preparation for a surgical guide. I planned an immediate implant to replace the fractured tooth (Figs. 1-3). Because the patient had scheduled a trip out of the country and my office did not have time to secure the proper Osstell peg or temporary abutment, I did not expect to place an immediate restoration regardless of the initial stability; instead, I planned a two-stage procedure.

I selected a Thommen Medical 4.2 x 12.5 mm ELEMENT MC INICELL fixture to replace the tooth.

Fig. 5: Final drill to depth of osteotomy

Fig. 6: Thommen ELEMENT MC INICELL implant picked up by guided driver

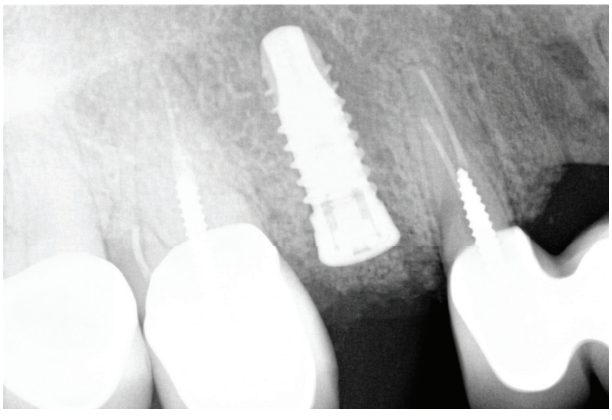


Fig. 7: First Thommen implant placed to replace tooth #4

INICELL is Thommen Medical's patented surface, which is chemically modified so that it becomes superhydrophilic, meaning it can be wetted very easily.

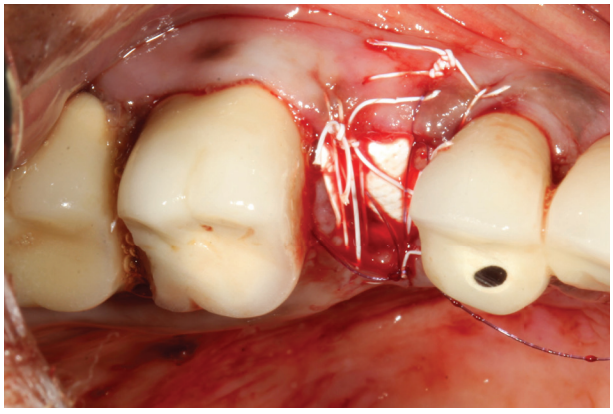


Fig. 8: Immediate implant #4, two-staged and covered with a d-PTFE membrane; note the fractured distal marginal ridge of the #3 PFM crown

This improves the direct cell reaction at the bone-implant interface. INICELL represents the development of the clinically validated, sandblasted, and thermal acid-etched Thommen surface, which is currently considered the best surface topography for fast and reliable implant healing. Thommen Medical's studies indicate only a .5% early failure rate in almost 3,000 implants conducted by Le Gac and Grunder in 2015, which they attribute to higher bone-to-implant contact during the early healing phase. Note that when extracting oval root geometries, you must be prepared to augment the site after insertion unless you can obliterate it with the diameter of the implant.

In this case, I virtually placed the Thommen fixture in 3Shape Implant Studio software, and the lab designed and fabricated a well-fitting surgical guide. This was my first use of the Thommen guided system, and the surgery proceeded smoothly. After atraumatic extraction, I precisely prepared the osteotomy and inserted the implant. I obtained implant stability by engaging the mesial, distal, and apical bone. The placement was guided and flapless, followed by a mini-flap to access the crestal gaps and begin bone grafting. I torqued the fixture at 35 ncm and filled the gaps with a cortico-cancellous mineralized allograft (alloOss, ACE Surgical). Next, I placed a cover screw and covered the area with a d-PTFE nonresorbable membrane, which negated the need for primary closure (Figs. 4-8). While the fixture was integrating, I restored the maxillary and mandibular right first molars with IPS e.max (Ivoclar Vivadent) CAD/CAM restorations.

I uncovered the fixture 10 weeks later and placed a

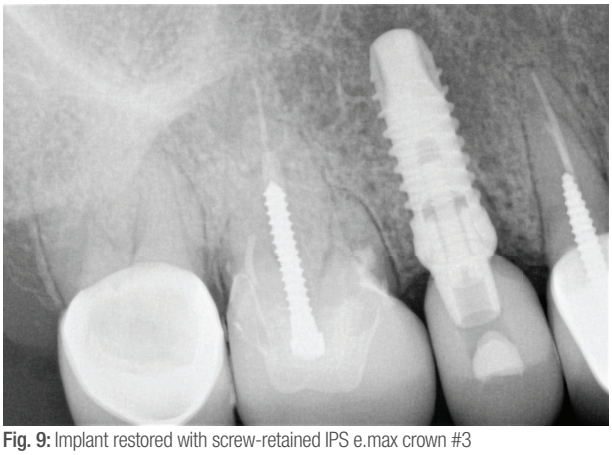


Fig. 9: Implant restored with screw-retained IPS e.max crown #3

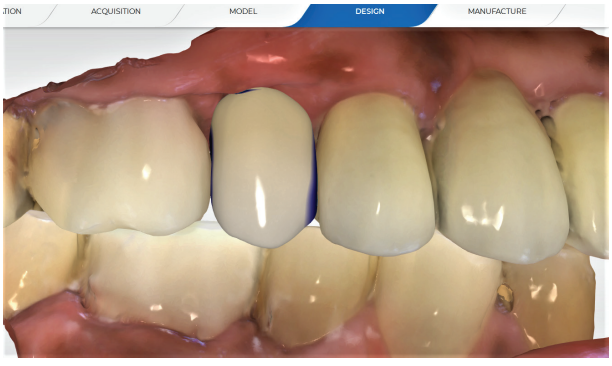


Fig. 10: CAD/CAM design of #4 IPS e.max crown

Fig. 11: Right side restorations #3, #4, and #30

site-specific peg and recorded Osstell ISQ values of 76 BL and 76 MD. This confirmed osseointegration, so I restored the implant with a Thommen Medical titanium abutment and imaged, designed, and milled an IPS e.max crown to produce a screw-retained restoration that was torqued in at 25 ncm.

Treatment went so well that the patient agreed to

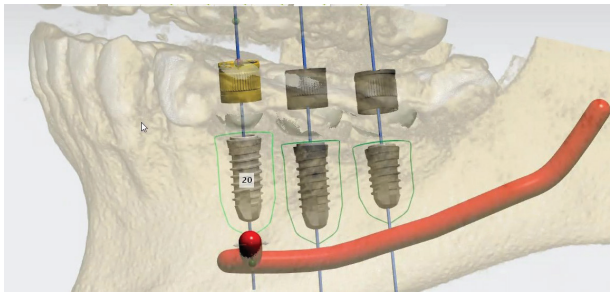


Fig. 12: LL implant plan to replace long span bridge pontics #18-20 with safety margins and nerve mapping

replace a mandibular left bridge that spanned #17 to #21 with three implants in the existing pontic areas. An implant plan was developed, and a surgical date scheduled. Once again, the power of using guided implantology protocols to advance implant dentistry gained an advocate for this innovative optimized workflow. The final images document the implant placement and three well-fitting, functional, and esthetic in-office restorations (Figs. 9-12).

Replacing a Fractured Lateral Incisor

An 82-year-old woman in good health (with controlled hypertension) presented with a fractured lateral incisor. The crown had been restored numerous times with resin, and after many years completely detached from the root. The canal was calcified, and it was prudent to consider an immediate implant if the bone was favorable. A CBCT scan and CEREC Primescan files were obtained and transferred to the Dentsply Sirona implant lab to fabricate a surgical guide. I planned the virtual implant based on developed guidelines for implants in the esthetic zone, which aim to install the fixture for optimal prosthetic positioning.

Working in the digital world allows us to accurately measure and position the virtual implant in the correct 3D position. The implant platform should be 3 to 4 mm apical to the gingival margin of the proposed crown, 1.5 mm palatal to the emergence of the adjacent teeth, and I prefer 2 mm of space between the adjacent natural tooth roots and the implant. Less mesiodistal space can create a problem with the abutment and restorative emergence contours of the final restoration. If necessary, I'll choose a narrower diameter implant to meet these criteria (Figs. 13-14).

Fig. 13: Preop hopeless tooth #7

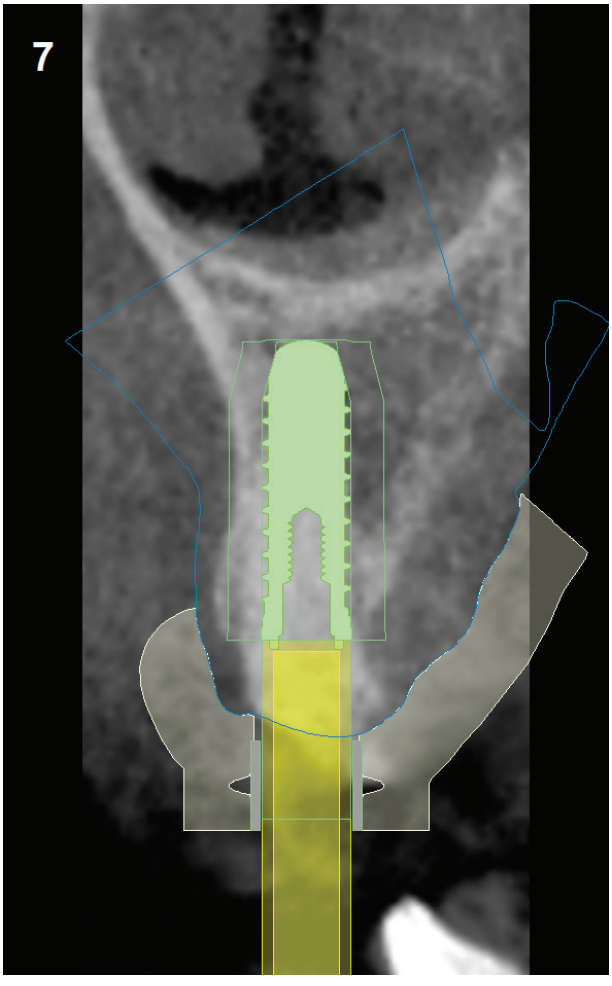


Fig. 14: Simplant cross-sectional centric view of #7 placed in the correct 3D position

Day of Surgery

In advance of the patient's surgical visit, I prescribed a broad-spectrum antibiotic based on studies that favor antibiotic use to reduce early implant failure. My experience supports this. After administering local anesthesia, I atraumatically extracted the maxillary right lateral without damaging the buccal plate. I prepared the flapless osteotomy using the Simplant SAFE Guide and placed a Thommen Medical 4.0 x 12.5 mm ELEMENT MC INICELL fixture into the extraction site. I inserted the appropriate Osstell peg for the 4.0 platform and obtained ISQ values of 72 BL and 75 MD. These values indicate high initial stability, so I produced an immediate provisional crown. The implant did not encroach upon the adjacent teeth, providing enough room for mesial and distal emergence

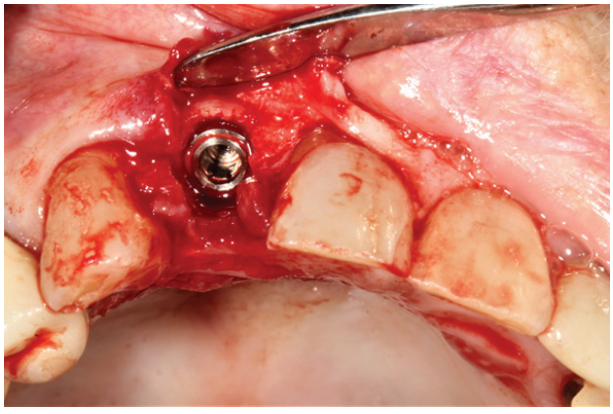


Fig. 15: Immediate implant replacing #7

I planned the virtual implant based on developed guidelines for implants in the esthetic zone, which aim to install the fixture for optimal prosthetic positioning.

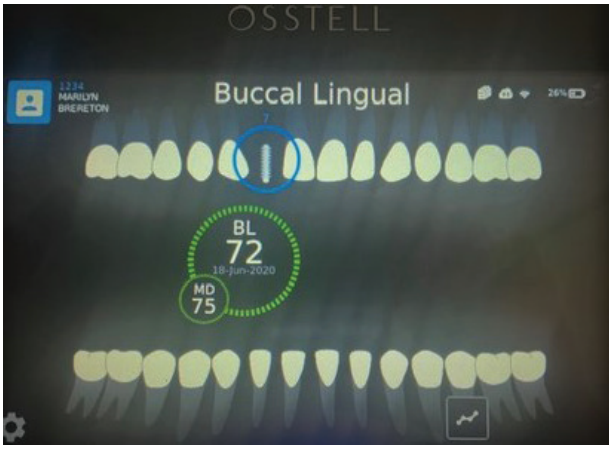


Fig. 16: Osstell values BL72, MD75 immediate implant #7

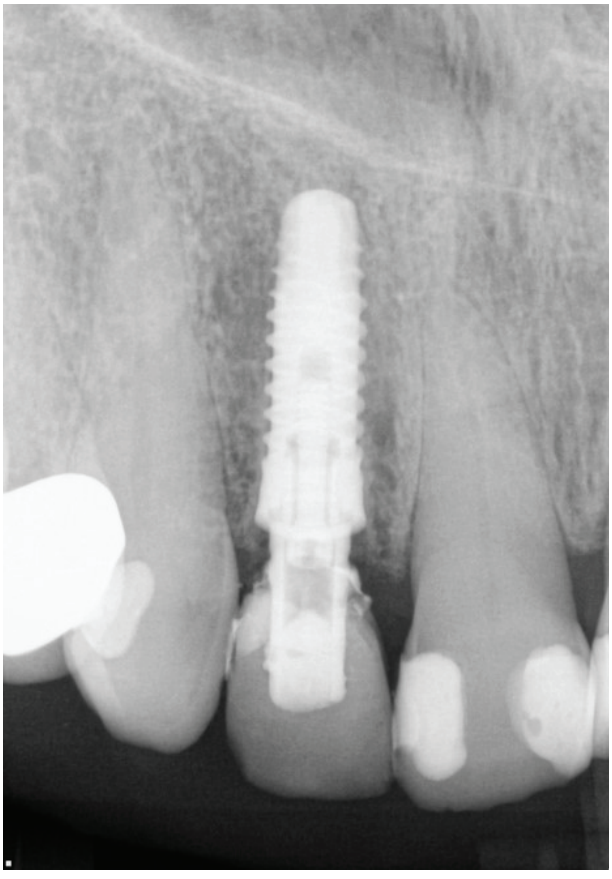


Fig. 17: Immediate implant provisionalized

in the immediate provisional. A precise preparation led to accurate placement and reduced surgical chair time.

The guide safeguards the preparation and mitigates

Fig. 18: Visalys temporary crown restoring immediate implant #7

Fig. 19: Premolars in 2014 during initial clinical examination

the chances of the osteotomy drifting to a more buccal position (the original apical position of the natural tooth). This is a distinct possibility when attempting to freehand these surgeries. This guided system provides some unique features, including keyless drill protocols and a definitive sequencing of VECTOdrills (Thommen Medical) to facilitate the osteotomy.

The implant was placed through the guide and X-rayed to validate correct depth. Any gaps between the implant and socket walls were filled in with Bio-Oss collagen,

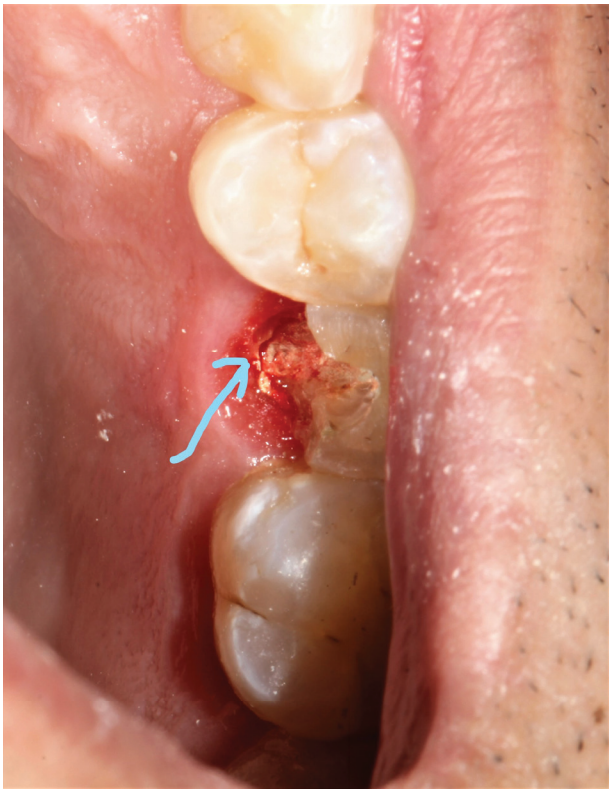


Fig. 20: Photo documenting nonrestorable premolar #13 after unnecessary endodontic treatment requiring immediate implant

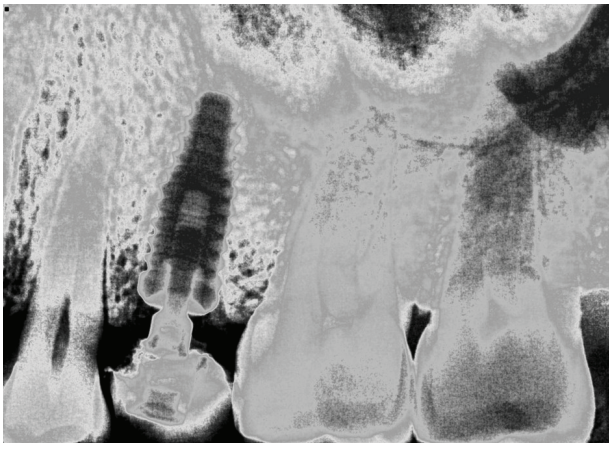


Fig. 21: Follow-up of implant #13 placed eight months before emergency visit for #12

which is an anorganic bovine bone within a 10% collagen carrier. This simplified grafting procedure avoids donor site morbidity and reduces surgical time. I carried this material over the buccal bone to gain additional volume. A prefabricated titanium abutment was modified and

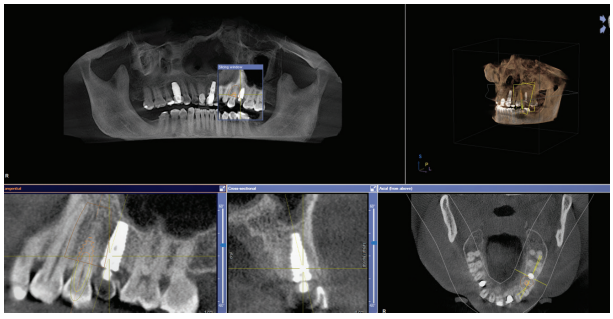


Fig. 22: Updated CBCT for implanting planning #12 and to assess previously placed implant #13

seated into the fixture, torqued at 25 ncm, and restored with a Visalys Temp (Kettenbach) temporary crown. The restoration was kept out of occlusion against the antagonist tooth to ensure no chance of overloading the implant during the healing phase of osseointegration. Periapical imaging documented the immediate fixture with its provisional. At follow-up, the patient reported an uneventful postop and was thankful not to have a removable tooth (Figs. 15-18).

I Have Another Problem

A 42-year-old male patient had multiple tooth fractures over the past six years. Figure 19 shows his initial maxillary left quadrant of pristine natural teeth in 2014. Over the past year, he lost both premolars, and a review of his dental history shows that he fractured many natural and restored teeth. His parafunction is contributing to his breakdown and he has experienced increasing stress on the job. Unfortunately, he began but never completed orthodontic clear aligner therapy and lost a couple of night guards. During an emergency in July 2019 the patient visited another dentist who performed endodontic therapy on #13. He arrived in my office for restoration of this tooth. Upon examination, I diagnosed the tooth as non-restorable because of a vertical fracture and palatal perforation (Fig. 20). He agreed to move forward with an implant plan. This would be the patient's third implant and fourth tooth that required extraction over the past six years.

Integration of a CBCT scan and CAD/CAM optical scan provided the foundation for the surgical guide and we proceeded with the necessary preparation for an immediate implant. I used a local digital lab to fabricate

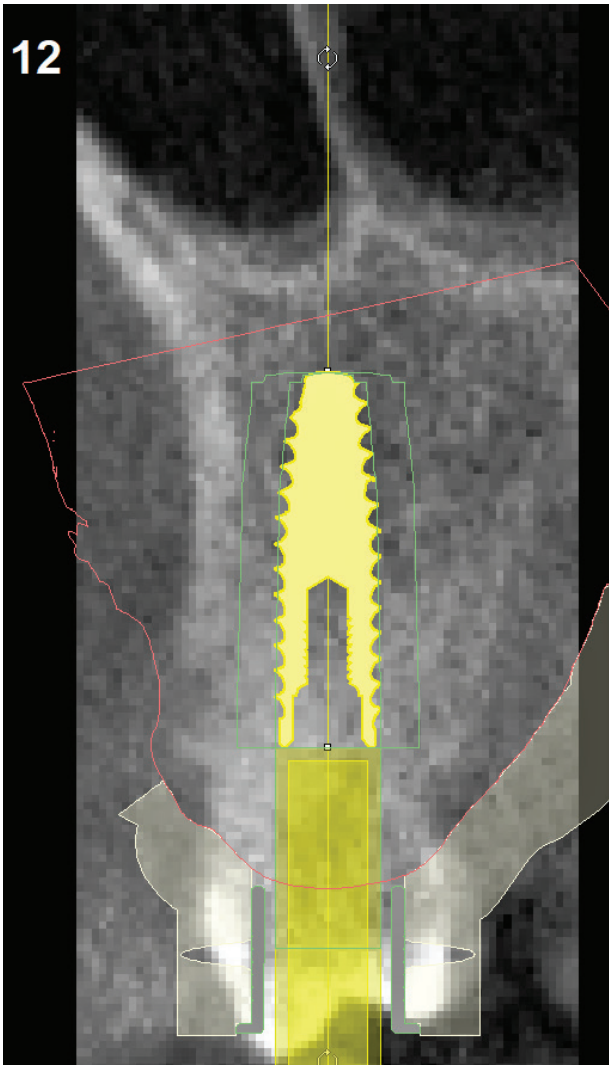


Fig. 23: Simplant centric view of implant #12 virtual position

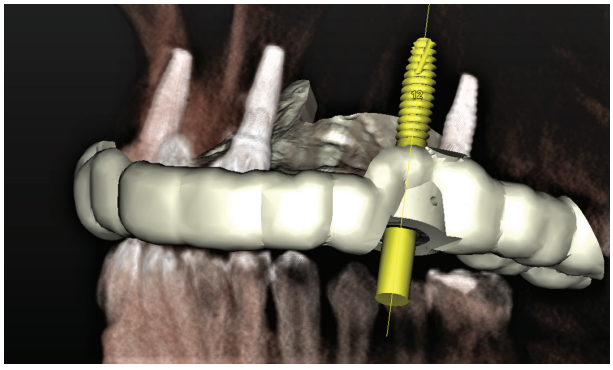


Fig. 24: Surgical guide sent to production in 3D view of existing dentition

Fig. 25: Extraction of vertically fractured tooth #12

Fig. 26: Guided osteotomy performed in extraction socket #12

the guide based on my specifications. I planned to extract #13 and place a 4.6 x 12 mm BioHorizons tapered implant.

Let's fast forward to April 2020 when the patient vertically fractured another premolar. This emergency would require planning for another immediate implant. Since the immediate placement of the second premolar 8 months earlier, the patient had presented to my office on only two other occasions — a follow-up visit after #13 treatment and the visit to diagnose this newly vertically fractured tooth #12. Life sometimes gets in the way and in this patient's case he takes

Fig. 27: Guided BioHorizons 4.2 x 15 mm tapered implant placement through surgical guide at stop position 4 preplanned

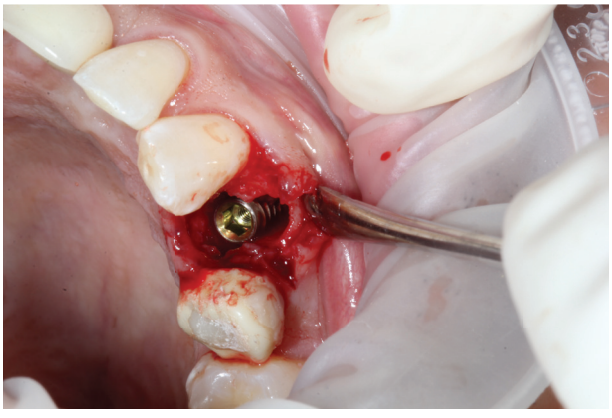


Fig. 28: Implant #12 installed with large gaps and buccal wall in tact immediately before grafting

Fig. 29: Gaps grafted with MinerOss allograft

full responsibility for his issues. An updated CBCT was taken for the next implant and to evaluate the previously placed implant at #13.

Evaluating the #13 Implant

One indication for obtaining a CBCT is to evaluate previously placed implants, so we evaluated the implant that was placed eight months earlier. I was pleased to see that the fixture was well integrated, and the bone graft restored a substantial amount of bone. The cross-sectional image revealed that the bone was maintained and that the patient's parafunction did not cause any overload on the implant as it was intentionally left out of occlusion. This implant had been immediately provisionalized with a PEEK prefabricated temporary abutment (Nobel Biocare) and bis-acryl crown. At insertion, this implant recorded Osstell values of BL76 and MD78 (high stability) (Figs. 21-22).

Planning and Placing a New Immediate Implant

A BioHorizons 4.2 x 15 mm tapered fixture was selected for #12. The COVID-19 shutdown did not allow for treatment until New York City dental practices could reopen in June, two months after the patient's emergency. This tooth was at times moderately symptomatic, so I waited until we could safely treat it within a digitally guided protocol (Figs. 23-24).

I prescribed amoxicillin 500 mg three times a day before the patient's surgical visit. After administering local anesthesia, I gently removed tooth #12 without damaging the bone (Fig. 25). A fully guided implant preparation and placement were performed through the surgical guide. The implant engaged the mesial, distal, and apical bone of the extraction socket but left a wide buccal and palatal gap between the implant and socket walls. Osstell ISQ values were BL69 and MD69. My experience with immediate placements gave me the confidence to move forward with a fixed provisional crown. Gaps were filled in with MinerOss cortico-cancellous bone allograft (BioHorizons) and covered with a Bio-Gide resorbable collagen membrane (Geistlich). A PEEK temporary abutment was prepped then torqued into the fixture at 15 ncm; Teflon was placed to cover the screw access hole and closed with resin. I restored the implant with a Luxatemp cementable crown (DMG America) left out of occlusion in centric and lateral excursions.

Fig. 30: PEEK abutment prepared and inserted into implant #12

Fig. 31: Luxatemp bis-acryl temporary #12 cemented onto PEEK abutment left out of occlusion in centric and excursions

This completed the patient's second immediate implant and restoration over a 10-month period. A series of images depict the fully guided implant surgery for this site (Figs. 26-32).

Conclusions

Immediate implant placement is a demanding procedure that requires predictability and longevity. It demands an atraumatic extraction, implant stabilization in the extraction site, proper 3D positioning, and often times adjunctive bone grafting. I believe that extensive preplanning, operator experience, and bone physiology knowledge contribute to successful outcomes when performing immediate implant tooth replacements as documented in these case reports.

I rely on the use of CBCT and CAD/CAM integration to plan and perform all of my implant surgeries. Osstell RFA

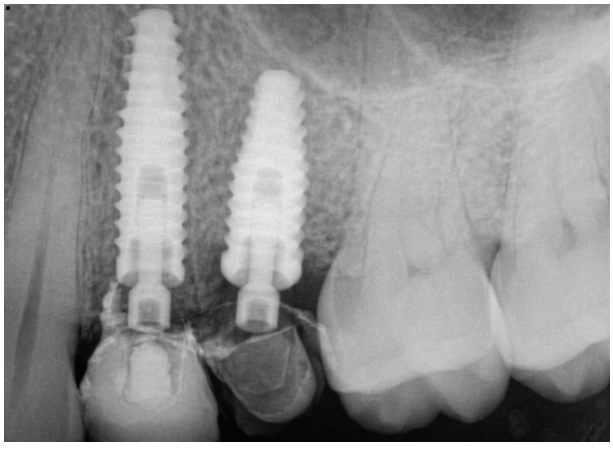


Fig. 32: Post-insertion periapical of restored immediate implant #12 and previously placed immediate fixture #13; note PEEK abutments are completely transparent

also plays a big role in my practice, giving me objective information with a noninvasive methodology and allowing me to make evidence-based clinical decisions. Much of the research and documentation for immediate and early loading of implants was completed over 20 years ago with long-term clinical studies, so this is not new. The technique of contour augmentation was developed by Dan Buser and his team in the 1990s. A large percentage of single-tooth replacements can be predictably treated with immediate implants.

The digital workflow should be embraced by anyone who wishes to improve their success rate. The correct prosthetically driven planning transferred through a surgical guide to the implant site leads to flawless surgery and placement of a stable implant, which can provide patients with fixed tooth replacement. This workflow can eliminate six-month (or longer) waits for grafting and removable interim replacement. On the other hand, knowing when an implant placed with a high-torque value but a low ISQ provides me with actionable information to choose a two-stage approach and avoid potential loss of immediate fixtures. The better we assess our receptor sites, the more successful we can be. We need our implants to progress to secondary stability or osseointegration. Avoiding complications and mitigating risks is our duty.

For questions and additional information, Dr. Ramirez can be reached at info@dranthonyramierz.com.

3M RelyX Universal Resin Cement: The New Resin Cement Star?

Richard Rosenblatt, D.M.D.

Is there a need for yet another dental resin cement?

In my opinion, there is. Having tested a lot of available products, and even now that I'm using three cements from different manufacturers to place indirect restorations, I am convinced there is still room for improvement.

I have no doubt that conventional dental cements, such as 3M RelyX Luting Plus Resin Modified Glass Ionomer Cement, are still the most convenient options available. They are moisture-tolerant, applied and cured in just a few steps, and designed for easy excess removal. However, these cements have low bond strength, which means they depend on a retentive preparation design and are exclusively indicated for materials with a relatively high flexural strength (such as high-strength glass ceramics and zirconia). Whenever mechanical retention is insufficient or a low-strength restorative material is placed, a self-adhesive or adhesive resin cement should be used; the latter provides the highest possible bond strength. So far, unfortunately, using the available products from these categories has presented drawbacks.

Fig. 1: The new product combination is indicated for virtually all dual-cure adhesive and self-adhesive resin cement procedures, including post cementation.

Adhesive Cementation Pain Points

Procedure complexity, excess cement removal, and radiopacity are all pain points dental clinicians have experienced.

Procedure complexity typically involves many components and steps, including etching, priming, and bonding, as well as working field isolation. In an attempt to simplify the original workflow, manufacturers have reduced the number of components (for example, by incorporating restoration primers into the adhesive). This works well in most cases, but when maximum bond strength is required, many clinicians (including me) still prefer to use an extra bottle of silane.

Ideally, excess cement removal is accomplished in a resin cement's gel phase. Most products delivering ultimate bond strength reach this phase in the self-cure mode after a relatively long waiting time (usually 2 to 3 minutes). Light curing, on the other hand, leads to an almost immediate setting reaction. In some cases, less than 1 second of light curing will get the material so hard that clean-up turns into a nightmare.

Many resin cements are difficult to identify on an X-ray because of their radiolucency or insufficient level

The ultimate dental cement should offer the bond strength of an adhesive resin cement without needing adjuncts, simplified excess removal, and high radiopacity.

Fig. 2: 3M's overview of the most important features of 3M Scotchbond Universal Adhesive.

of radiopacity. The radiopacity of the cement should be higher than enamel so that the cement layer and excess material are clearly detectable in the radiograph, which is particularly important in implant dentistry.

The Ideal Resin Cement

The ultimate dental cement should offer the bond strength of an adhesive resin cement without needing adjuncts, simplified excess removal, and high radiopacity. Apparently, many dental practitioners have given manufacturers similar feedback, and one company's research and development specialists have listened closely. I recently learned from 3M that they plan to launch a new resin cement system with many of these desired features (Fig. 1). According to the product developers, 3M RelyX Universal Resin Cement and 3M Scotchbond Universal Plus Adhesive work as a two-component adhesive resin cement system with the option to use the cement with or without the universal adhesive. This is possible due to the self-adhesive property of the dual-cure resin cement.

Ease of Use

I was informed that the new universal resin cement can now be used as either a self-adhesive resin cement or as an adhesive resin cement. Procedural simplification also is enhanced by the optimization of the universal adhesive. According to Dr. Christoph Thalacker, Product Development Lead Specialist for 3M Oral Care, Scotchbond Universal Plus Adhesive contains an optimized silane function. Consequently, combining RelyX Universal Resin Cement with Scotchbond Universal Plus Adhesive achieves higher bond strength to glass ceramic compared to the predecessor adhesive system, 3M RelyX Ultimate Adhesive Resin Cement and 3M Scotchbond Universal Adhesive. In addition, the new universal adhesive contains a dual-cure accelerator that eliminates the need for a separate dual-cure activator when working with dual-cure composite cements and core buildup materials.

Excess Removal

According to the manufacturer, the bond strength of RelyX Universal Resin Cement to tooth structure and restorative materials is high whether it is used in the adhesive or self-adhesive mode and whether it is light- or self-cured. Despite this, excess material is no longer an issue, as explained by Dr. Kai Claussen, Product Development Specialist for 3M Oral Care. Clean-up can be accomplished after a 2- to 3-second tack cure because of the novel self-cure initiator system incorporated into the resin cement, which ensures that less light-cure initiator is needed. The resin cement is transformed into a gel-like consistency after brief light curing and excess cement can be removed easily.

Radiopacity

I also learned that RelyX Universal Resin Cement offers a radiopacity that is higher than that of enamel,

Fig. 3: 3M's overview of the most important features of 3M RelyX Universal Resin Cement.

and Scotchbond Universal Plus Adhesive is the first radiopaque universal adhesive on the market providing dentin-like radiopacity. This results in the desired visibility on an X-ray for enhanced diagnostic control.

Other Beneficial Features

As explained by the developers, the products not only address my personal pain points, but they offer additional benefits, as well. For Scotchbond Universal Plus Adhesive, these include:

- a formulation free of BPA derivatives like BisGMA
- a streamlined vial design
- unit dose delivery for enhanced hygiene management (Fig. 2).

In addition to RelyX Universal Cement's other benefits, it also offers:

- superior self-adhesive dentin bond strength compared to the competition
- excellent adhesive bond strength to dentin, enamel, glass ceramics, and zirconia
- high esthetics with four color-stable, fluorescent shades and available try-in shades
- a more ergonomic, self-sealing syringe with a mixing tip that produces 80% less cement waste per application and 50% less plastic waste (Fig. 3).

Outlook

The information the developers of Scotchbond Universal Plus Adhesive and RelyX Universal Resin Cement shared with me sounds tremendous, and I cannot wait to find out how the products work clinically. I really appreciate how much 3M listens to users. It sounds like the company has addressed a lot of pain points we have had in our everyday adhesive cementation procedures. If the products deliver as promised in the clinical environment, I can replace the two resin cements I currently use with the new combination.

For questions and additional information, Dr. Rosenblatt can be reached at richrosenblatt@gmail.com

Dental Dilemmas: How to Overcome Them with Compromise

Peter Gardell, D.D.S.

The red pill or the blue pill. No whites after Labor Day. White wine goes with fish.

To create order, we must simplify our decision-making trees — but that isn't always easy to do. For example, consider compromise — the essence of a healthy governing body, allowing an individual or group to make thoughtful decisions. After critical factors are noted and discussed, the best aspects are extracted to provide the ultimate solution. I have noticed that, lately, compromise is associated with feeling that one side is the winner and the other side gave in. This is the perspective one expects in a kindergarten setting, not among ethical adults. No one needs to lose.

Restoring dentition is an area we sometimes let fall into a locked decision-making tree. We have a CEREC®, and we need to fix a tooth, therefore we need to use CEREC. This is the correct and most efficient way to restore a tooth and improve esthetics; however, it is not the only way we can accomplish the task at hand.

To achieve consistency, we have to face particular dilemmas: direct or indirect restorations, screw-retained or cement-retained implants. We fall into the this-or-that trap of a simplified decision-making tree.

Simple, Yes…But Better?

One factor that prevents compromise is the potential for color mismatch when you switch from indirect ceramics to direct composites. As a result, we might shy away from doing a screw-retained implant restoration for fear of our patient asking, "Why is there a filling in this tooth?" We want consistency when doing esthetic dentistry, and our patients expect it. The good news is that now we have materials that deliver consistent results whether you choose a direct or indirect approach.

With esthetic limitations removed, we are able to arrive at a "compromise" treatment plan. Do not mistake this as an inferior treatment plan; rather, it is an intelligent treatment plan that takes into consideration all the factors of dental treatment: patient expectations, doctor expectations, material science, and the severity of the damage that needs to be repaired.

The pairing of direct and indirect restorations makes sense for an efficient and profitable quadrant dentistry visit. While the milling chamber and oven are working away, you can treat smaller lesions, avoid a time penalty, and boost production.

Treatment and Material Options

We now have many materials and techniques that complement CEREC. These materials are designed to replace current composite inventory, not add to it. It is always far better to cut down on inventory and know how to use each of the contained components than to have a large inventory with many different instructions. A cluttered inventory closet leads to a cluttered mind and added stress for you and staff.

Adhese Universal (Ivoclar Vivadent) is a high-quality bonding agent that can be used for indirect and direct restorations. The material's high quality does not come

I have noticed that, lately, compromise is associated with feeling that one side is the winner and the other side gave in. But no one needs to lose.

Fig. 1: The Adhese Universal VivaPen (Ivoclar Vivadent) is an intelligent delivery system. It minimizes waste, and its packaging is easy to clean.

One factor that prevents compromise is the potential for color mismatch when you switch from indirect ceramics to direct composites.

at a high cost because of its intelligent delivery system, the VivaPen, which delivers the amount of bonding agent needed for the task without waste. It also delivers in an easy-to-clean hygienic package, which is a highly desirable characteristic (Fig. 1).

Modern composites also have advanced to help us with esthetics and efficiency. Bulk-filled materials have cut the time to place a restoration by 50%. Larger layers are possible, which, when used with 3s PowerCure System (Ivoclar Vivadent), have increased savings by curing each layer in 3 seconds. A few seconds may not seem significant, but over a year, they add up to thousands of dollars in savings!

Tetric Prime (Ivoclar Vivadent) is the latest evolution of the Tetric family of direct resins. In addition to all benefits of Ivoclar's EvoCeram, the material features improved handling and enhanced esthetics due to a chameleon effect. I feel that Tetric Prime's translucent shade (Tetric Prime T) has the biggest impact; it blends seamlessly into the surrounding tooth structure or ceramic. Most direct resins are restored with one of two combinations depending on the preparation depth. Shallow fillings of up to 2 mm can be restored in their entirety with Tetric Prime T, and deeper fillings can be restored with a layer of Tetric PowerFlow (up to 4-mm increments) then capped with Tetric Prime T. Only two layers of material with one that can be cured in 3 seconds add up to a very fast restorative process for most restorations.

Quadrant Dilemmas

Quadrant-based dentistry can lead to a dilemma in a CEREC-based office, especially if adjacent teeth require interproximal preparations such as a DO or MO. Do we use CEREC with a combination of ceramic for full coverage and resilient ceramics for partial coverage? For an office with one mill, that can slow down the visit, and a partial coverage preparation can require a higher level of precision and increase the chance of having to remove more tooth structure to allow for restoration seating.

Restoring with direct resin may raise some complicated questions:

- Do you restore before you prep the tooth for the crown?
- Do you restore after prepping and designing, which will require guessing at the contact?
- Do you have confidence that the direct resin will give a consistent esthetic result with the ceramic you mill?

We may expect these dilemmas to force us into one or another workflow — the blue pill or the red pill. This is a false premise. Finding the right products and rethinking how we approach procedures means we don't have to pick one or the other.

The answer for this quadrant is to compromise the workflow to improve the results and provide conservative treatment. You can select the best option for each unique situation. To achieve consistent esthetics with the quadrant, let's look at how we use our technology to restore implants.

Figs. 2a–2c: This series of photos shows the different layers involved with closing the screw access hole on this implant restoration. Teflon tape is used to cover the screw head. Tetric EvoCeram A3 is used to cover the Teflon tape with a dentin-like color. Tetric Prime T caps off the restoration invisibly.

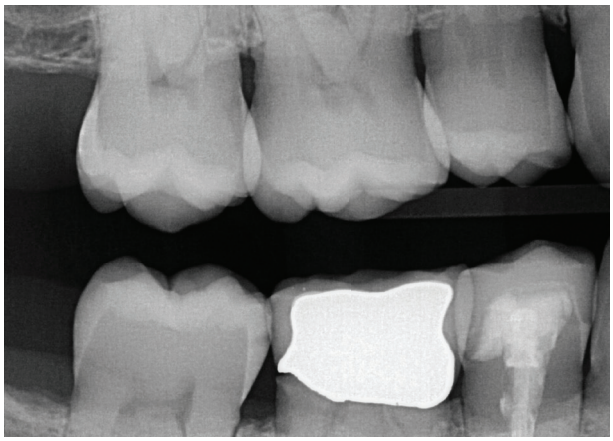


Fig. 3: Bitewing radiograph indicates need for treatment on #30 and #31

Dilemma: Implant Restoration

For restoring implants, the screw-retained crown is my preferred method when the implant position allows. If the position is good, the next area of concern is how to make the restoration "disappear." We don't want patients to say, "Why is there a filling in the tooth you just put in?" Using integration and great restorative materials, we can bring implant dentistry to a level where we can think of ourselves as con artists; we can make the inanimate look alive.

The implant process can become very predictable when using materials that complement one another. IPS e.max meso blocks (Ivoclar Vivadent) provide the beauty we expect from IPS e.max, and Multilink Hybrid Abutment cement (Ivoclar Vivadent) is an opaque material that will block out the required TiBase abutment (Dentsply Sirona) as it securely fixes the ceramic to the titanium implant.

Recently, I changed the materials I use for concealing the screw access hole. The same thought process used when restoring direct resin restorations can be applied to screw-retained implant crowns. Think of the layers being replaced and the life that develops in the restoration. Previously, I would use many layers and tints to reach my goal, but lately I have simplified my workflow while still getting a lifelike result. I use a darker Tetric EvoCeram shade on top of the Teflon tape plug; this becomes my dentin layer. This revision to my workflow has allowed me to eliminate using tints. Tetric Prime, in particular the T shade, has the optical properties that make the screw

Figs. 4a–4b: The opaquer shows through the porcelain-fused-to-metal crown in the preoperative image, hinting that reduction may be an issue. The depth cut reveals plenty of clearance to allow for the ceramic.

access disappear. It transfers the warmth of the darker EvoCeram, while allowing a chameleon effect at the margin. This is accomplished by designing the material, so the resin's refractory index is the same as the filler's refractory index (Fig. 2).

In a minute or two, I can easily model some anatomy into the Tetric Prime before curing. I like Tetric Prime's consistency and how it does not stick to my instruments when shaping and modeling.

Dilemma: Mixing Two Materials

Because color is consistent between Tetric Prime and IPS e.max, the next question is, "How can we restore a quadrant efficiently when these two

Compromise doesn't mean more complicated and less esthetic dentistry at the expense of efficiency. The materials and techniques to overcome this are available to you.

Fig. 5: Image of the stamp used to restore #31 after removal from the mouth; note all the detail captured

Fig. 6: Decay extends past the line angles on the mesial of #31

Fig. 7: Tetric PowerFlow IVA is used to bulk fill the defect remaining after decay removal. This image shows the prep after the IVA PowerFlow has been placed and cured.

materials are mixed?" Honestly, if the adjacent teeth had interproximal decay, I would prep them for inlays or onlays. Intracoronal restorations with CEREC work very well, but sometimes additional tooth structure must be removed to get an indirect restoration to seat. I use the power of CEREC to build precise and predictable contacts and emergence.

Another option would be to do the direct restorations first and then proceed with the CEREC — not a very efficient workflow since the opportunity to leverage time does not exist. For small lesions, it's possible to "guess at the contact" and restore the proximal decay as the block is being milled or crystalized, adjusting it before delivery of the IPS e.max crown. While this can be effective, what if the contact turns out to be too light? The office is profitable when things go according to plan; having to redo treatment is always the most expensive outcome.

This dilemma can be solved using the stamp technique for the direct resin restoration. Take a preoperative imprint of the tooth receiving the direct resin and use this stamp to imprint the anatomy in warm composite that is placed into the preparation. This stamp also will generate an exact copy of the interproximal surface of the tooth being restored — an analog Biocopy for a direct resin restoration. Since the proximal surface is exact, the indirect restoration can be completed as the mill and the oven work at creating a beautiful IPS e.max restoration.

Clinical Case

Ed moved away a few years ago and, when he returned to the area, was told he needed a crown redone on the lower left. I did a CEREC restoration on Ed 8 years ago — a case that is still looking great — and he did not want it done any other way. Decay on the mesial also was noted on the radiographs (Fig. 3).

Full coverage on #30 and an MO on #31 is the ideal situation when using the warm Tetric Prime and stamp technique. I removed the old porcelain-fused-to-metal (PFM) crown; its preop appearance led me to suspect the occlusal was thin. My normal routine when removing an old restoration where reduction is unknown is to establish depth cuts. You cannot take anything for granted; as a good friend always says when he teaches, "Trust but verify." The reduction was adequate, but it was an ugly PFM (Fig. 4).

With quadrant dentistry, isolation helps to increase efficiency for the whole appointment. COVID-19 has highlighted the public health concern of transmission and how isolation can protect you and your staff during patient treatment. Isolation aids efficiency by keeping the treatment field clean and prevents encroachment of cheeks and lips. The OptraDam (Ivoclar Vivadent) is

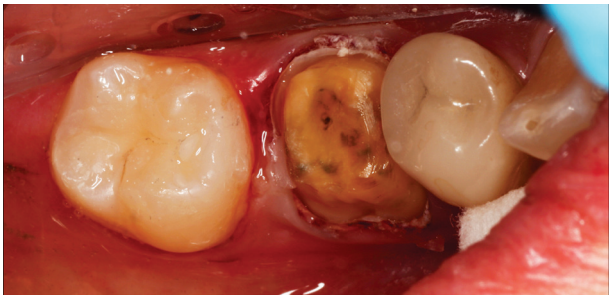


Fig. 8: Note the smooth finish of the restoration.

Fig. 9: Teflon tape was placed over the freshly placed composite filling on #31 before bonding in the IPS e.max crown on #30.

Fig. 10: Completed restorations

a one-piece rubber dam system that uses an integrated frame for easy handling. In this case, I used the Isolite system (Zyris).

After I removed the decay, isolated the tooth, and refined the prep, I scanned the case to fabricate the CEREC crown. As the machine was cleaning up the images, doing model axis, and drawing the margin, I placed a clear polyvinyl siloxane bite material (EXACLEAR, GC America) in the stamp tray and placed it in the patient's mouth to record the interproximal surface of the tooth to be prepped for the MO (Fig. 5).

The compromised tooth structure extended to just beyond the line angles (Fig. 6). A partial coverage restoration would require an increase in the amount of tooth structure removed to get drawn. It also would be difficult to guess the emergence if I chose to do it freehand. The stamp records all this information and allows me to recreate the proximal surface exactly as it was preoperatively.

As the IPS e.max crown was being processed, I excavated the decay and finished the preparation. The question now is: What materials should I use to complete the task? Very little occlusal preparation was required, but interproximally the decay had to be chased, resulting in an area that was a little deep. The playing field dictated that Tetric PowerFlow IVA (Ivoclar Vivadent) should be used to fill the defect after the tooth was selectively etched and Adhese Universal was applied and cured. Adhese Universal delivers high initial bond strength and can be used with various etching philosophies — total-etch, selective-etch, or self-etch. The VivaPen is an intelligent delivery system that helps minimize waste and lowers the cost per use.

Adhese Universal and Tetric PowerFlow are both part of the 3s PowerCure system; each are cured for 3 seconds with the Bluephase PowerCure light (Ivoclar Vivadent) (Fig. 7).

Next, I applied the finishing layer of composite. Tetric Prime T is quickly turning into my most widely used material for direct restorations. As mentioned previously, it has a chameleon effect so it blends in with most of my patients' shades. Enamel is semitransparent and gets its warmth from the dentin; Tetric Prime T can be thought of as an enamel replacement in this regard. To help with reproducing the preoperative anatomy, I warmed the composite to decrease its viscosity so it would flow better when the stamp was placed on the tooth.

Warming brings other benefits to the composite. According to Daronch and colleagues, warming composite to 60° C increases the monomer conversion rate from 31.6% to 67.8%, making the final restoration stronger and more stable. Tauböck and colleagues reported that the shrinkage force generated within the material as it is cured significantly decreases in both bulk-filled and conventional composites. This helps minimize the breakdown of the margin when curing (the dreaded white line), and because microleakage is less likely, it extends the life of the restoration. Gopikrishna found that the decrease in viscosity that occurs when

composite is heated allows the material to adapt better to the preparation and decreases the gap surface area, extending the material's life.

I applied warm Tetric Prime into the preparation and quickly modeled with an OptraSculpt (Ivoclar Vivadent). I then placed the stamp and applied pressure to seat it fully. The bite material I used is clear so I can cure the composite through the tray with the Bluephase PowerCure for 10 seconds. When the stamp was removed, I cured for another 10 seconds to ensure enough energy had been applied to the composite to guarantee a full cure. I easily and cleanly removed flash with a 12b scalpel blade to minimize chances of bleeding in the area and to maintain hemostasis when the crown was delivered (Fig. 8).

With the preoperative interproximal surface reproduced, the new crown will have a perfect contact without having to guess. I was confident that the delivery would go as smoothly as if I did only the crown in the visit.

I selected the IPS e.max HT shade to match the restoration on tooth #29 that was completed 8 years ago. Adequate minimal thickness of the new crown was available, so I enhanced the anatomy by hand and glazed and characterized the crown.

Using a product line with a wide range offers many benefits. It helps reduce my team's education burden because they don't have to constantly shift mental gears when moving from procedure to procedure. For a quadrant restoration that includes direct and indirect restorations, the bonding system must work with both to increase efficiency; Adhese Universal fits that criteria.

After the crown completed the crystallizing cycle, I allowed it to cool and prepared for delivery. IPS e.max can be cemented or bonded in; for this case, I bonded the restoration in, so the intaglio was prepared with Monobond Etch & Prime (Ivoclar Vivadent). I selectively etched the tooth and remaining enamel, applied Adhese Universal to the tooth surface, and then air thinned and cured.

I placed Teflon tape over the mesial of #31 because the bonding agent and cement would likely bond to the freshly placed composite (Fig. 9). Teflon tape removes the possible battle to break the tenacious bond created by Adhese Universal and Variolink SE (Ivoclar Vivadent), making for easier cement clean-up. Color adjustment was not required to match #29, so I used the transparent shade of the five shades available to deliver the crown. The PreCure mode in the Bluephase PowerCure light brought the Variolink Universal to an easy-to-clean gel phase when I applied 950 mW/cm2 for 2 seconds to both the buccal and lingual surfaces of the crown. The cement peeled away cleanly.

Compromise Offers Benefits

Compromise does not mean one wins over the other; it is a healthy process where benefits can be found and agreed upon. Quadrant dentistry can benefit from compromise when you find the best material for the playing field the patient has delivered to you. Compromise doesn't mean more complicated and less esthetic dentistry at the expense of efficiency. The materials and techniques to overcome this are available to you (Fig. 10).

You're not forced to pick the red pill or the blue pill.

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Using VITA SUPRINITY PC to Create an Esthetic, Same-Day Anterior Restoration

Daniel Vasquez, D.D.S.

Abstract

The following restorative case features a 56-year-old woman who presented with a broken maxillary central incisor. She had ceramic crowns on both central incisors with moderate discoloration. As a result, she was never happy with her smile. The determination was made to do a full, same-day restoration of the maxillary anteriors. The challenge was to find a suitable restorative material that was strong enough to last and also would look esthetically pleasing. In this case, VITA SUPRINITY PC (VITA Zahnfabrik) was chosen. The goal was to create 10 durable maxillary restorations with a natural appearance and pleasing esthetics in one appointment.

Case Study

A 56-year-old female patient came to the office for an emergency appointment and presented with a broken maxillary central incisor (Figs. 1–2). She had ceramic crowns on both maxillary central incisors, and one had broken off. In addition to the broken tooth, she had moderate discoloration and had never been happy with her smile. After conducting a clinical evaluation and taking X-rays and photographs, the decision was made to restore the maxillary anteriors in a same-day appointment. VITA SUPRINITY PC (VITA Zahnfabrik) was selected for its strength and esthetics to create the 10 maxillary restorations.

Material

VITA SUPRINITY PC ceramic, a zirconia-reinforced lithium silicate, offers excellent polishing capabilities and easy manual finishing after milling, providing natural translucency, fluorescence, and opalescence. The material's simplified processing and high-edge stability when milled provides a precision fit, and it can be crystallized without auxiliary firing paste.

Preparation

After the patient agreed to the proposed treatment plan, we collected the necessary data for the CEREC® Smile Design Process. We created digital images to visually outline the treatment steps for the patient using

Figs. 1–2: A 56-year-old female patient came in for an emergency appointment, presenting with a broken maxillary central incisor.

Fig. 3: Digital images were created using Smile Designer Pro.

Fig. 4: Impressions were taken with CEREC Primescan and then used to create a digital wax-up.

Fig. 5: An emotional mock-up was created and placed in the patient's mouth.

Fig. 6: The preparations' sharp edges were smoothed and polished.

the online Smile Designer Pro application (Fig. 3). Initial impressions were taken with CEREC Primescan, which is fast and efficient and produces exceptional images, and then used the scans to create a digital wax-up (Fig. 4). We produced a silicone key, filled it with temporary material, and transferred it to the patient's mouth. At this point, the patient was able to see herself with the proposed restoration. We call this stage the emotional mock-up, as many patients become quite emotional (Fig. 5). The patient loved the way she looked and was ready to move forward with the treatment plan.

Fig. 7: We took impressions using CEREC Primescan, followed by a full-arch scan.

Fig. 8: CEREC Smile Design was used to import an image of the patient's face and digital scan models.

Treatment

After preparation, it is always recommended to smooth all the sharp edges and polish. I use a Brownie Polisher (Shofu Dental) to leave nice, round polished preps for a better fit and to avoid overmilling the restoration (Fig. 6).

To begin the treatment plan, we opened the CEREC Software 5.1.1 to the Administration section and added the material selected (VITA SUPRINITY PC). We took digital impressions using CEREC Primescan followed by a full-arch scan (Fig. 7).

I used the CEREC Smile Design software application to import an image of the patient's face and the models from the digital scan. With this new application, I aligned the teeth directly into the patient's facial image and finalized the restoration design using the patient's face and smile (Fig. 8). The application includes design tools to allow for small changes and touch-up actions, such as moving the position of the teeth or modifying their size. It also has an option for showing the patient different views of the proposals and design before

Figs. 9–11: Design tools were used to make small changes, perform touch-up actions, and show the patient different views.

milling. The patient was involved in the same-day process from start to finish (Figs. 9-11).

Milling

The translucency and opalescence of VITA SUPRINITY PC is beautiful and closely mimics a natural tooth (Fig. 12). The VITA SUPRINITY PC HT block in 1M1 was selected, and we used CEREC Primemill in the Super-Fast setting to mill the restorations. On average, a single restoration takes about 6 minutes to mill.

The restorations were fitted directly onto the patient after milling to ensure the contacts worked for a passive fit in the precrystallization stage. The restorations were placed in the VITA SMART.FIRE furnace (VITA Zahnfabrik) for the final crystallization, followed by characterization, glazing, and polishing.

Fig. 12: VITA SUPRINITY PC was selected as the restoration material.

Fig. 13: The restorations were characterized with VITA AKZENT Plus stains and VITA AKZENT Plus Glaze LT spray.

VITA SUPRINITY PC offers excellent polishing and finishing and natural translucency, fluorescence, and opalescence.

Characterization

To characterize the restorations, I selected VITA AKZENT Plus stains (VITA Zahnfabrik) in paste form,

Fig. 14: The restorations were bonded with a thin layer of PANAVIA V5 cement.

Fig. 15: The restoration treatment was completed, exhibiting a natural translucency, opalescence, and fluorescence.

using orange to add chroma in the cervical area, gray-blue on the incisal translucency, and white to accentuate the line angles. The restorations were placed in the VITA SMART.FIRE for stain fixation, followed by an application of VITA AKZENT Plus Glaze LT spray for a high-gloss finish (Fig. 13).

Bonding

We used a full rubber dam before delivery so we had a nice, clean area for bonding. We treated the restorations with VITA Ceramics Etch 5% Hydrofluoric Acid (VITA Zahnfabrik) for 60 seconds, then thoroughly rinsed and air dried. I applied CLEARFIL CERAMIC PRIMER PLUS (Kuraray) for 30 seconds as a silane coupling agent and then air dried before applying cement. A thin layer of PANAVIA V5 cement (Kuraray) in a transparent shade was distributed with a syringe into the intaglios of the restorations (Fig. 14). The restoration treatment was completed, exhibiting a natural translucency, opalescence, and fluorescence (Fig. 15).

Conclusion

The patient originally came in for an emergency appointment to repair a broken maxillary central incisor. After reviewing the treatment options, the patient decided to proceed with a full anterior restoration, which we achieved in a same-day appointment. In addition to restoring the patient's anterior teeth, we also achieved harmony with her teeth and produced an opalescent restoration that looks very natural. The combination of strength and esthetics was achieved using VITA SUPRINITY PC ceramics. The patient is no longer embarrassed to smile and is pleased with the overall esthetics of her final restorations (Fig. 16).

Fig. 16: Pleased with the overall esthetics of her final restorations, the patient is no longer embarrassed to smile.

For questions and additional information, Dr. Vasquez can be reached at danielvasquezdds@gmail.com.

A 60-Minute Crown Appointment? How Is That Even Possible?

Meena Barsoum, D.M.D.

My entire CEREC® journey has been built on efficiency, optimization, and creating outstanding clinical results.

Over the years, technology has evolved, enabling us to complete our procedures much faster. I often think back to my early CEREC days with Bluecam and a compact milling machine. Lithium disilicate crowns took 35 minutes to mill! With the advent of CEREC Speedfire and 15-minute zirconia sintering, efficiency took on new heights. And today, with CEREC Primemill, I can manufacture a zirconia crown in 5 minutes or less! This is truly a tremendous time to be in dentistry.

As I continue to think about how I can improve and achieve "60-minute crown appointments," I keep looking for ways to shave a few minutes here and there. We typically schedule 90 minutes for a single unit and usually finish in about 80 minutes or so. With CEREC Primemill, I easily save 10 to 15 minutes of milling time, which puts me at about 65 to 70 minutes total. That means I would still need to eliminate 5 to 10 minutes, so I looked to the anesthesia portion of the visit.

Running a busy practice demands my constant attention, especially because I see and perform exams on multiple restorative patients every day. Typically, I deliver anesthesia to a patient, perform a few hygiene exams, and perhaps anesthetize another patient while it's taking effect. This takes usually 10 minutes or so, and then I return to my original patient and start the procedure. While this process works, it is still inefficient. I could perform those hygiene exams while my crown is milling or sintering, for example, so it does not have to be during anesthesia. I decided this time was the missing link to achieving a seeming elusive 60-minute workflow. So, I began looking into buffered anesthetic.

Many options with different delivery modes are available. I was looking for something simple and cost effective. I did not want my team to be burdened with mixing individual carpules or our practice to bear the brunt of excessive costs. I also wanted something that would help me deliver a painless injection. Many patients comment that the endodontist we refer them to uses a vibrating injection instrument that makes it painless for them. I tried using those devices, and they simply did not work well in my hands. That's when I came upon Anutra local anesthetic delivery system.

Anutra is an all-in-one solution that buffers lidocaine on demand. The dispenser houses a cartridge that mixes the correct ratio of sodium bicarbonate and lidocaine,

As I continue to think about how I can improve and achieve "60-minute crown appointments," I keep looking for ways to shave a few minutes here and there.

delivering it into a novel syringe system. The syringes are disposable and have a tactile "click" for each milliliter of anesthetic delivered to the patient. This allows me to draw up the equivalent of three carpules of lidocaine into one syringe and inject all sites without having to reload a new carpule. Patients have reported no pain and no burning sensations like those frequently experienced with traditional preservative anesthetic. The buffering brings the pH to a more neutral value that is more in line with soft tissue and interstitial fluid.

The biggest advantage of Anutra for me is the ultrafast onset. Now, instead of injecting the patient and then leaving for 10 minutes, I stay with the patient for a minute or two while it takes effect. In the CEREC workflow, we scan the opposing jaw, buccal bite, and most of the prep arch while we wait for anesthesia to kick in.

Another thing to consider, especially during the pandemic, is going from patient to patient and having to don personal protective equipment (PPE) each time. It is time consuming and expensive. With this new workflow, where I stay with the same restorative patient for the entire time, I am not burdened with having to remove gowns, masks, and caps between each patient. I remain with the patient after I anesthetize, prepare the tooth, and then leave to see other patients and design the restoration from my private office.

I can finally say we have achieved the 60-minute CEREC appointment. The key has been super-fast milling with CEREC Primemill and rapid onset anesthetic with the Anutra system. I am able to deliver anesthetic without leaving the patient's side. This helps build rapport and saves PPE as well as the extra time required to prep new equipment between patients. I can confidently say that Anutra has become an important aspect of my restorative practice. Patients are responding favorably, and my team enjoys the simplicity of the system.

For questions and additional information, Dr. Barsoum can be reached at mbarsoum@cdocs.com.

New Happenings

Sameer Puri, D.D.S.

Times of adversity provide opportunities for growth and change. And 2020 was certainly a year of adversity for all of us, the likes of which we will likely (hopefully) never see again. The COVID-19 pandemic took a toll on every dental practice in the country and certainly CDOCS and the CDOCS family were not spared. As stated, however, the pandemic gave us an opportunity to look deep down and resolve who we are as individuals, as a company, and, more importantly, how we can grow from this experience.

CDOCS in 2020 experienced a campus shutdown, displacement of our workforce, and questions as to what the future holds not only for the company but the dental industry and the world in general. As we slowly emerged from the carnage that has befallen us, one thing has become abundantly clear. The CDOCS of 2021 will not look like the CDOCS of 2020. In the end, that is going to be a good thing for everyone.

One of the changes that will happen in 2021 is that this is the last print version of the CDOCS magazine that we will do. It has been a great run. We started this magazine in 2008, and we have enjoyed putting each and every issue together for our audience and readers — and I've personally enjoyed each and every article and blog I've written.

While this may be the last print version, that certainly does not mean that it's the last issue ever period. The shutdown has shown us that we do not need a physical location to hold a workshop; we have successfully delivered virtual versions of our workshops. This also means that the expense, logistics, and effort that goes into printing and mailing a physical magazine does not need to occur. Those resources can be placed into creating a digital experience that will provide a more interactive medium for our audience and a better overall product.

Planned in lieu of the print version of the magazine are interactive articles linked to videos, discussions, and blogs that allow participants to go deep into the education and content and emerge with a better understanding of the topic at hand.

And in lieu of printing and mailing a physical magazine issue quarterly, we have planned monthly digests with relevant articles and content that allow CDOCS to communicate more readily and easily with our members and audience.

The magazine isn't the only thing we are taking digital in 2021. We plan a massive digital effort to deliver education in a manner unlike anything you have seen in dentistry. Just as creating videos about the CEREC system revolutionized CDOCS in 2006, so will the new educational offerings. And not only will they revolutionize our company, they will impact the dental educational industry as a whole.

Being the ever-eternal optimist, I say that if you can't take something positive from turbulent times and come out stronger, you are just not trying. I can assure you the entire CDOCS team is working hard to ensure that not only do the workshops we offer — and that you have grown to love — continue, but they will be supplemented by a digital education. The magazine is just a small part of the overall plan from CDOCS. There is lots more coming.

As I write my final blog for print in the Q4 issue of 2020, I want to express gratitude for my CDOCS team, which has worked tirelessly to turn us into a world class organization and to all our members, attendees, and partners who have put their educational faith in CDOCS and allowed us to share knowledge and information. From the bottom of my heart, thanks for the great print run. Let's get the digital party started!

For questions and additional information, Dr. Puri can be reached at spuri@cdocs.com.

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