THE DIGITAL DENTISTRY REVOLUTION
Mark Fleming, DDS & Darren Greenhalgh, DDS

CEREC & IMPLANTS: PART I
Tarun Agarwal, DDS

GALILEOS, THE QUINTESSENCE OF MODERN DENTISTRY
Neal Patel, DDS

MAKING WAVES IN SO-CAL
UCLA's Dr. Edward McLaren: Reshaping the clinician-technician relationship
Putting the technology pieces together...

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innovations in technology are happening all around us. Incredible progress is evident in nearly all areas of our lives. A handheld device can act as a phone, a GPS, a place to retrieve e-mail, surf the Web, download and listen to music, watch videos, etc. This is but one example of countless exciting technological advances.

What about technology and the dental practice? Once again, there are many new technologies that impact one’s practice. When a practice is considering a new technology, there should be a clear idea on how it will impact the practice, enhancing efficiency and effectiveness.

In our interview this issue, Dr. Edward McLaren elaborates on how digital technology can positively change a dental practice, focusing on the value of the CEREC® Bluecam in achieving greater practice efficiency. He shares his viewpoint on how CAD/CAM technology can be the savior, not the demise, of the U.S. lab industry. Be sure to read his thoughts on the mix of man, machines and materials.

Another exciting area in dentistry today is the synergistic interaction between the two technologies: Sirona’s CEREC Bluecam and GALILEOS 3D X-ray imaging Cone Beam Computed Tomography (CBCT). Drs. Neal Patel and Tarun Agarwal discuss in their articles how the placement and restorations of implants can be performed predictably and efficiently through the marriage of these two technologies.

Because of our mission to help CEREC users get the most from their experience with this technology, we have included articles showing anterior restorations and a bridge done using digital impressions and CEREC Connect. Dr. Sameer Puri shows how to think outside the box and restore class two preparations using CEREC. Dr. Michael Skramstad addresses the “mysterious” area of parameters.

As always, visit the CERECDoctors.com website to stay abreast of what is happening in the CEREC world. Be sure to mark your calendars for the second annual CEREC Owners Symposium on October 29-30 in Scottsdale, Arizona. There is an all-star lineup of expert speakers who will be present. Do not miss this great CEREC event.

Here at CERECDoctors.com The Magazine, our goal is to provide you with the latest techniques, tools and technology to help you perfect your skills and make the most of your CEREC experience. We hope you enjoy this issue.
WE MAY NEED MORE MICROPHONES.

WITH FIFTEEN EXPERT SPEAKERS AT THIS YEAR’S EVENT, THE PODIUM IS GOING TO BE A LITTLE CROWDED.

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SCHEDULED SPEAKERS

DR. SAMEER PURI • DR. ARMEN MIRZAYAN • DR. BRIAN LeSAGE • IMTIAZ MANJI
DR. TARUN AGARWAL • DR. MARK COLONNA • EDWARD CORRALES • RODDY MACLEOD
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This has been an exciting year for CEREC® users. In January, the CEREC Bluecam® was introduced to rave reviews. Not only did this innovation make everyday CEREC use much easier with its crisp, precise, and accurate images, but it also opened up new doors for us as “digital” dentists. It allows us to communicate with our lab technicians more effectively via CEREC Connect. We now have the ability to accurately image the full arch to complete more extensive cases with no impressions using Stereolithography model fabricating technology. In this case report, I will describe using this process to complete a 3-unit bridge from 4=6.

A 78-year-old female presented to my office with tooth No. 5 missing (Figures 1 and 2). She wanted to have a better smile for her granddaughter’s upcoming wedding. Tooth No. 4 had a root canal and porcelain fused to metal, and No. 6 had a small distal amalgam. She was given the option for an implant or fixed bridge. We chose the bridge due to time constraints and the fact that she had some medical concerns.

After preparing the teeth for full coverage abutments (Figure 3), I imaged the teeth with the Bluecam. We took full arch scans to help the lab build both form and function into the bridge. The upper full arch prep model was constructed using 16 images, the lower opposing model with 16 images, and the “partial bite” with 7 images (Figure 4). The partial bite is used to articulate the upper and lower models together.

It is not necessary to take a full arch scan for the partial bite, just one or two teeth to the mesial and distal of the bite registration will suffice. This will give the software enough information for the algorithms to put the models together.

Because I had already imaged the preparations into the CEREC AC, I chose to design and mill my provisional restoration. When doing multiple teeth, I personally find this to be a faster, more efficient use of my time. The MXCL can mill a 3-unit provisional in about 15 minutes. Also, the extremely accurate margins allow the tissue to heal immaculately. Figures 5 and 6 (page 8) show my provisional design and Figures 7 and 8 show the provisional temporarily cemented in the mouth. The shade was a bit dark, but acceptable to this patient.

Before sending the case to the lab via the web portal, the software allows you to verify the models and the articulation (Figures 9-12, page 9). If you wish, it also allows you to draw your margins. If you (CONTINUED ON PAGE 8)
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prefer the lab technician marginate, you can do that as well. Once completed, you simply hit the “connect” icon on your software, fill out the prescription form, upload any necessary clinical photos, and send it to the lab. It is a simple process that takes just a few minutes.

The final porcelain-zirconia bridge was returned from the lab along with the full arch SLA model work (Figures 15-18). The final restoration was seated in the mouth (Figure 19). The digital process makes this insertion appointment predictable and easy, with virtually no adjustments.

CEREC technology has come full circle. It not only is a wonderful tool for in-office restorations, but also an incredible way to digitally communicate with your lab. By eliminating the potential problems impressions can create and introducing digitally produced SLA models, both the dentist and the lab can feel great about the accuracy of their work and the quality of their restorations. ☜
PREDICTABLE CAD/CAM IMPLANTS

CEREC and Implants: Part I

TARUN AGARWAL, DDS

As CEREC® owners, you’re at the forefront of technology in dentistry. More importantly, you’re on the leading edge of providing your patients with the best that dentistry has to offer.

Just as dentistry experienced the “esthetic revolution” in the late 1990’s, dentistry is getting ready to experience the “implant revolution” in the coming years. As CEREC Doctors, you are going to have the opportunity to once again be on the leading edge.

I am going to share with you current techniques to further maximize your investment and improve your patient care utilizing CEREC for implant dentistry. I will also be giving you a sneak peak into some breakthrough technology involving CEREC and Sirona’s GALILEOS technology. In next quarter’s issue of CERECDoctors.com the Magazine I will go into specific details and showcase the new 3-D digital workflow for implant treatment.

THE TECHNIQUE

If you have already restored implants, you have probably experienced the shock of looking at your laboratory bill. In fact, I actually lost money on my first few implant restoration cases!

With the introduction of IPS e.Max CAD (aka “Blue Block”), CEREC finally has a material that is indicated by the manufacturer for use as an implant crown. This means that you can now officially use CEREC for many of your implant restorations.

As is the case with many things in dentistry, there are various ways to complete an implant restoration with your CEREC. What I would like to do is outline, in detail, the method I have found to be the most predictable and useful for many different situations.

For the simplest of cases you can torque the abutment onto the implant and make your restoration directly in the mouth. This would require near ideal implant position, little to no need for abutment modification, and perfect soft tissue control.

My preference is to work indirectly and have significant control over the final restoration. The indirect method allows me to modify the abutment without risking danger of heating the implant and having to grind titanium in the oral cavity. Additionally, the indirect method allows me to have greater control over soft tissue contours if necessary. Here’s a pictorial illustration of the implant restoration.

(CONTINUED ON PAGE 12)
From left to right, top to bottom:

» Fig. 1: An implant level impression abutment is placed on the implant to be restored.
» Fig. 2: An antagonist with bite registration is taken off the tooth to be restored.
» Fig. 3: A heavy-light PVS impression is taken of the implant level abutment.
» Fig. 4: The implant level abutment is carefully placed back into the impression.
» Fig. 5: The analog is added onto the impression and assistant pours the model using typical office stone.
» Fig. 6: A stock abutment is placed onto the analog and evaluated for any necessary modifications.
» Fig. 7: Once any modifications are completed the analog and model is powdered with optispray and optical impressions are taken with CEREC.
» Fig. 8: The crown is designed and milled; margins and contacts verified on model.
» Fig. 9: Close up picture shows IPS e.Max CAD milled restoration on abutment.
» Fig. 10: Using object fix the blue block is placed on pin and single fire/stain/glaze/crystallization is completed.
» Fig. 11: Final stain & glazed e.Max CAD block is verified on model.
» Fig. 12: Closeup picture of e.Max CAD final restoration after crystallization.
» Fig. 13: The abutment is torqued onto the implant and the restoration is seated using an RMGI cement.
» Fig. 14: Final radiograph showing intimate fit of restoration on abutment.
By using CEREC for fabricating my implant restorations, I have opened a new arena to maximize my investment in CEREC, given my patients fewer visits, decreased time to final restoration, enhanced my practice enjoyment, and increased my practice profitability.

SNEAK PEAK

Now the news that we have all been waiting for …

For the past several months I have been one of the few dentists in the world to beta test the upcoming CEREC-GALILEOS integration. The endpoint of this “fusion” of 3D data still has not been completely realized. In fact, it can open so many doors it may completely revolutionize the way we look at and perform implant dentistry.

The Sirona GALILEOS is a CBCT X-ray that allows us to take 3D radiographic images of our patients. This type of data and imagery is especially useful for implant planning.

Two of the most common issues facing implant-restorative dentistry are the difficulty in restoring implants that are placed with little regard to the final restorative position and the time consuming and confusing process of making an implant temporary. The fusion of CEREC and GALILEOS will eliminate this!

You will take CEREC Bluecam images of the quadrant for implant treatment and design your final crown. This data will then be “fused” to the CBCT GALILEOS data (Figures 15-16). With complete visualization of the restoration (CEREC data) and bone (GALILEOS data) in three dimensions, you will be able to plan the placement of your implant based on final crown positioning (Figure 17). From here, you can order an implant placement guide and have the data necessary to fabricate your temporary and final restoration.

I hope you are as excited as I am about the possibilities. In the coming issues I will be sure to bring you the most pertinent and practical applications of this technology directly to you, my fellow CEREC Doctors.

For a more in-depth look at GALILEOS, see Dr. Neal Patel’s article on page 14.

Be sure to pick up the Q4 issue of CEREC Doctors.com the Magazine for Part II of Dr. Agarwal’s CEREC and Implants article series.
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the “ideal” treatment plan for a given clinical finding such as a questionable tooth (due to bone loss or failing RCT) and are unable to do so simply because we do not have enough information. We should all agree that any given clinical circumstance will have several different solutions depending on the skill, mindset, and capability of the clinician.

But what if clinicians had access to a crystal ball, giving us a glimpse into the most “ideal” treatment choice for any given clinical presentation? What if I told you that the crystal ball that we all dream of is finally here?

**DENTISTRY IN 3D**

Allow me to introduce modern dentistry’s prophet, the Sirona GALILEOS (Figure 1). The inspiration behind Sirona’s new X-ray technology was Galileo Galilei, the scientist whose studies on medicine, mathematics, and astronomy brought the world into the third dimension. Like Galileo, the Sirona GALILEOS gives dental diagnostics a third dimension, bringing us closer to reaching the true pinnacle of diagnostic and therapeutic potential.

There are few things that have truly revolutionized dentistry. One such technology is 3D X-ray imaging called Cone Beam Computed Tomography. Of the practitioners who have embraced such technology, only a few have mastered CBCT and continue to promote its vast benefits, while the majority have plundered in its raw complexity. The majority, by no fault of their own, simply do not use the technology to its full potential because they are not supplied with all the tools, training, and software necessary to maximize its
potential. Fortunately, they don’t realize this since they have not experienced the GALILEOS platform.

Sirona’s unveiling of the GALILEOS has opened a new chapter in the lives of many clinicians, both novice and experienced users, including myself. My decision to introduce CBCT imaging into my practice in early 2008 was to satisfy my inherent desire to push the envelope and to indulge my innate flaw (like many other dentists) of needing to know everything. The GALILEOS truly allows me to visualize the most accurate anatomic information to treatment plan procedures and achieve optimal oral health, wellness and rejuvenation for all my patients.

The GALILEOS is the primary diagnostic tool and is the cornerstone of my practice since it is useful in all facets of dentistry: Implantology, Endo, TMJ, Pedo/Ortho, Perio, Oral Surgery, Pathology, and Restorative Dentistry. Regardless of the treatment modality, the GALILEOS helps to identify, diagnose, treatment plan, and fulfill therapy and prevention. It has opened my eyes to a different level of dentistry.

Prior to opening my private practice, I was fortunate to serve as a CBCT consultant and have experience with the majority of the other CBCT available in the market. Shopping for CBCT is like shopping for a digital camera at your local electronic store. All digital cameras (in our case CBCT) take a picture. Some take better pictures than others, while others come packaged with all the bells and whistles, and only a few do both. The GALILEOS is taking over the market with good reason. In my experience, the GALILEOS is on a completely different playing field, sophisticated design of the hardware and dynamic software have allowed me to instantly reach my primary goal — high case acceptance rate and satisfied patients.

With the GALILEOS as my primary diagnostic tool, patients are more inclined to pursue recommended therapy and treatment simply because they understand 3D. As clinicians, we need to remember that the 2D X-ray images that we are trained on are completely foreign to many of our patients. Why should we expect patients to see and understand diagnostic information in the very image it took us the greater portion of four years of dental school to learn how to read? Perhaps this is why many of us struggle to surpass 70 percent case acceptance rate. If I told you that the GALILEOS has allowed me to achieve a case acceptance rate beyond 90 percent, would I have your attention?

If your patients are impressed with CEREC CAD/CAM, wait until you see the expression on their faces when they see their skull revolving in all its three-dimensional glory (Figure 2).

Being a CEREC dentist, Laser Dentist, iTero Dentist, etc., I can comfortably say that no other technology captures the patient’s attention like GALILEOS.

As the doctor dives into the three-dimensional journey using Sirona siCAT’s patented examination software (Figure 3, next page), so too does the patient. I have yet
Fig. 3: CEREC GALILEOS integration.
Fig. 4: Sirona GALILEOS indications.
to witness a patient interested in understanding absolutely everything within their 2D X-rays, whereas the GALILEOS captures the attention and interest of all my patients, each and every time. All of a sudden I have patients showing up to my practice who are actually interested in obtaining optimal dentistry and achieving complete oral health. Is the GALILEOS a marketing magnet for amazing patients, or did the GALILEOS trigger something special in the minds of my existing patients? Regardless, I am enjoying every moment!

My interest in integrating CBCT was to satisfy the need to build implantology within my practice. By now, we are all aware that CBCT imaging is implant driven. Little did I know that the GALILEOS was indicated in all facets of dentistry (Figure 4). The GALILEOS is marked by superior image clarity and dynamic software that allows users to quickly and efficiently study images. Most CBCT units have cumbersome software that limits clinicians in their ability to diagnose comprehensively, in part because of lack of functionality and efficiency. Unfortunately, in the United States, clinicians do not have the luxury of spending hours on end with each patient. We have seconds, minutes if we are lucky, to evaluate our patients, diagnose, treatment plan, and hopefully gain case acceptance. Many have failed to integrate CBCT imaging successfully into practice simply because the software and hardware of their respective CBCT unit do not allow them to. Sirona and siCAT, on the other hand, have identified the need to develop software that is as effective as it is efficient from a clinical standpoint.

The unique features are endless, so
I’ll elaborate on those I feel are the most revolutionary.

First, Sirona is not just about excellent image quality — Sirona is about providing a solution that offers practitioners an arsenal of tools. The user-friendly software tailored for dental problem-solving will win you over through its intuitive integration of diagnostic, computer-aided therapy planning, and precise intraoperative implementation tools.

Excellent image quality permits diagnosis of the finest details in three dimensions, with the lowest possible radiation dose among the CBCT units available. When using the GALILEOS, its superior image processing and display capabilities leave no doubt about the diagnosis.

The software’s implant planning functionality — such as marking the nerve canal in the mandible and selecting realistically displayed implants from the clinician’s manufacturer of choice (an entire library of implants — Figure 5, preceding page — is included with the GALILEOS) — enable precise positioning within minutes after obtaining the scan. Patients are presented with their treatment plan in the same appointment and do not need to come for secondary treatment conferences as is the case when using the other CBCT units.

Furthermore, with GALILEOS surgical guide technology (Figure 6), all virtual plans can be precisely implemented for the patient, using tools that are already on-hand. These surgical guides allow for advanced prosthetics that can even be fabricated prior to surgical placement of implants.

Finally, as a beta tester for GALILEOS, the biggest buzz revolves around Sirona’s release of their new GALILEOS Software Update, Sirona Implant, allowing integration between prosthetic and surgical planning. The new software tool combines CAD/CAM CEREC and CBCT GALILEOS data (Figures 7-11). The integration allows for surgical and prosthetic planning to be performed...
in a single visit. This seamless process results in higher quality and increased efficacy for clinical workflow.

The use of GALILEOS CBCT imaging for precise surgical planning and placement is tested and proven. Unfortunately, even with the help of this latest X-ray technology, careful surgical planning does not always translate to ideal prosthetic restorations. Far too often, ideal surgical placement leads to restorative compromises and higher costs for the restorative clinician and for the patient.

The new Sirona Implant software tool allows surgical and prosthetic planning to be performed simultaneously, thereby increasing optimal results (Figures 12-13). The user is able to view the CEREC design proposal directly within the context of the GALILEOS image. Essentially, the new integration software allows one to design an ideal crown on an exact virtual bony model of the patient (Figure 12). This has become possible due to the integration of the surface data (CEREC) with the x-ray data (GALILEOS) (Figure 10).

**INTEGRATION IMPLICATIONS**

The combination of two cutting-edge technologies — CBCT and CAD/CAM — is trailblazing the way to comprehensive implantology. In other words, the user can focus on the desired prosthetic outcome and at the same time make allowance for specific surgical factors.

The revolutionary integration feature also has immense periodontal implications. Until now, CBCT was limited to hard tissue images and lacked ability to capture periodontal tissue. For the first time in CBCT imaging, the periodontal tissues can be evaluated for location and thickness in 3D as it relates to hard tissue (thanks to CEREC surface data). Imagine being able to visualize ideal implant placement as it relates to the restorative outcome, keeping soft tissue in perspective during the entire process. With this extra information at his/her fingertips, the user can accurately predict the final outcome and discuss possible alternatives with the patient before starting any procedure.

The planning data then provides a basis for creating competitively priced surgical guides via siCAT, a Sirona subsidiary in Bonn, Germany. Thanks to Sirona Implant Software, CBCT workflow is now more efficient than ever before. Not only do GALILEOS users stand to benefit from Sirona Implant, but CEREC users will also reap the benefits of this new technology as well. The software will be available to CEREC dentists who are referring patients to GALILEOS users. Remember, this will be the platform to the next phase: CEREC custom zirconium abutment fabrication and perhaps, someday, milled surgical guides (Figures 14-17).

I invite everyone to join me in the GALILEOS Revolution! ✨
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This quarter, our distinguished interview series continues with a unique dentist, Dr. Ed McLaren, who heads up the UCLA Center for Esthetic Dentistry, a post-graduate training program for both dentists and dental technicians. Dr. McLaren has the distinctive opportunity to be on both sides of the chair, and his experience is vast. One of the most sought after speakers in the world, he lectures on materials as well as esthetic techniques in addition to his duties of running his highly successful program at UCLA.

Dr. McLaren has vast experience with not only digital impressions, but also chairside CAD/CAM. In this interview, he shares how the digital world is affecting the world of dentists as well as dental technicians. Please enjoy.

Q: You are a Prosthodontist and a certified master dental technician. Can you give some background to our readers on how you chose your path in dentistry?

A: Originally I wanted to be an orthodontist. When I was in college, I worked in the summers with young people coaching and doing recreation programs. I got to know several of their fathers, some of whom were orthodontists. They had a really good lifestyle and got to work with young people. I thought that was great. But when I got into dental school and went through my ortho rotation, it just wasn’t very challenging for me. The Prosthodontist rotation, however, was challenging and fun, so I gravitated toward that. I started doing ceramics in my residency program and loved that. In 1989, I started going to Europe every couple of months to study with some of the most famous master ceramists. I have been doing my own ceramics since then.

Q: You run the esthetic residency for dentists and technicians at UCLA. Can you give some background on how you chose your path in dentistry?

A: I have been lecturing and facilitating courses since 1992. In 1999, UCLA approached me and asked if I would take over the Center for Esthetic Dentistry. I agreed, under two conditions. The first was that I would start a full-fledged residency program in esthetic dentistry for graduate dentists, and the second was that I would launch a master ceramist program for technicians. Both of which I did. They are both full-time graduate residency programs; one is for dentists and the other is for technicians.

The main goal was to create master dental ceramists, as there is no place in the United States to get this kind of training. Our ongoing goals are to train dentists and ceramists in contemporary esthetic and restorative technologies at a mastership level. Ideally, all graduates will be proficient in all forms of imaging and CAD/CAM technology for both the dentist and the lab.

Q: What is the future of digital impressions in dentistry?

A: I believe in 10 years, at least 90 percent of dental practices will use digital impression technology.”

— DR. ED McLAREN

“I believe in 10 years, at least 90 percent of dental practices will use digital impression technology.”

— DR. ED McLAREN
to become the standard, just like it took time for the car to replace the horse and buggy. I believe in 10 years, at least 90 percent of dental practices will use digital impression technology.

**Q:** Do you feel it’s important for clinicians to incorporate digital impressions into their practice?

**A:** This is not a matter of if but when. Practices that are trying to create perceptions of being on the cutting edge should strongly consider doing so sooner than later. There will come a time in the not too distant future that many of our lab partners will only accept digital impressions.

**Q:** What is your experience with the CEREC® Bluecam?

**A:** In a word, phenomenal. The difference between this and the previous technology is night and day. I went from being lukewarm about the previous digital technology to absolutely wanting to have CEREC Bluecam.

**Q:** What are the advantages of the CEREC Bluecam?

**A:** Speed, accuracy and ease of use.

**Q:** For someone such as yourself who is involved in both the laboratory and clinical side of dentistry, how does digital dentistry fit into your work flow?

**A:** I see this as the most incredible opportunity in this whole mix of man, machines and materials. Lab personnel who have been concerned about losing business to off-shoring can use this technology to combat that. I believe there is and will be a large market for digitally trained technicians who can SCAN, DESIGN, MILL, AND CUSTOM FINISH by either staining and glazing or additions of small amounts of porcelain. I call this the Digital Dental Team.
There are many cases (usually multi-unit cases) that would benefit from having a trained ceramist make some custom finishes to an 8-unit veneer case, for example. With the right team and training, this can be accomplished as same day dentistry. Sam, if you remember, when I lectured at last year’s annual CEREC Symposium about this concept, I received multiple queries and emails requesting information about this. So to finalize I think it is just as important, if not even more imperative, for the lab industry to incorporate this technology.

“People are beyond busy today; we like things fast. ... The reality is that patients want things NOW, especially for basic restorative dentistry.” — DR. ED McLaren

Q: CAD/CAM was once thought by some to endanger the clinical & laboratory relationship. How do you see CAD/CAM and digital dentistry bringing dentists and labs closer together?

A: I think properly applied CAD/CAM technology will be the savior of the US lab industry. The jobs will change from waxes to digital designers, sculptors and enamelizers. It will link dentists and technicians in a positive way that was not possible before, all of which will directly benefit our patients. Dentists will be able to communicate in real time digital information – technicians can give feedback on preparation and esthetic design. None of this is possible without the use of digital impressioning and CAD/CAM technology.

Q: How can a clinician justify the cost of a chairside imaging and milling system such as the CEREC Bluecam?

A: There is a very simple answer to this. People are beyond busy today; we like things fast. Even I have had same-day CAD/CAM done on my posterior teeth. The reality is that patients want things NOW, especially for basic restorative dentistry. Marketed effectively, CAD/CAM will make you money. If you can generate new business of a minimum of 10 restorations a month, it is a break even. Everything above that is profit (less variable expenses). Digital dentistry is ideal for young dentists who are trying to grow their practices, as well as for more established dentists who want to bring in an associate and create business.

Q: How can a laboratory justify the cost of a CAD/CAM system such as the CEREC inLab?

A: Honestly, I think from a business perspective this can be more important for the laboratory than for the dentist. As I stated earlier, labs are losing business at an alarming rate - some to chairside dentistry, but most to off-shoring. This I see as an “ESSENTIAL” business model for the future for the labs to incorporate. There are going to be thousands of dentists with digital impression devices. I would certainly want to be in that digital loop.

Q: How do you feel labs and clinicians can work together best using the CEREC system?

A: Direct-to-lab digital impressioning. Also, the ability to do digital smile designs. I believe the labs should have the capability to do same-day lab services for their close by accounts.

Q: What advantages are there for clinicians to use a chairside milling system vs. sending the cases to a lab?

A: The short turn-around time.

Q: What are the advantages of lab fabricated restorations vs. restorations milled chairside?

A: I believe the lab should have the technology. For example, the lab can do custom finishes (i.e., small amounts of porcelain addition and custom staining and glazing) for anterior esthetics. As a clinician, I want the best of both worlds; machine fabrication with the final touch of an artist.

Q: In your esthetic practice, what roles do digital imaging and chairside milling play?

A: As Dan Aykroyd says in The Blues Brothers, “We are on a mission from God.” Our mission and our goals are:

- All impressions are digital;
- All restorations are CAD/CAM;
- All basic restorations are done chairside, and
- Anterior restorations are a combination of CAD/CAM and the ceramist’s artistic touch.

We are on this path, and by the end of 2010 we will be graduating chairside and laboratory digital experts.

Q: Where do you see the future of digital dentistry in 10 years?

A: I believe 90 percent of indirect dentistry will be done with digital dentistry in 10 years.

Q: What has impressed you most about the Bluecam?

A: The unbelievable ease of use and speed over the previous system. The images (scans) we have been getting are exceptional

Q: What features would you like to see incorporated into the CEREC Bluecam?

A: A cappuccino machine. But seriously, I would like to scan jaw registrations just by the patient biting together then pointing the camera and imaging.
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A CASE STUDY

The CEREC Single Central: Lab Assisted Approach

ROBERT L. RIOSECO, DMD

The patient history: A 19-year-old female presents as a new patient from the local university. She reports that two days prior, she had been struck in the mouth with a Frisbee. The Frisbee had fractured the Right Central incisor nearly in half (Figure 1), thus exposing the underlying pulp (Figures 2-4).

The pulp had been exposed for over two days and was deemed unviable, due to the long-term exposure (Figure 5).

TREATMENT

Root Canal therapy was performed on the vital pulp. The apex was fully developed, and the tooth was asymptomatic with no visible root fracture or displacement, so the pulp therapy was completed in the first visit. A composite core was made, and the tooth was prepared for a crown. The patient was quizzed as to the original position of the tooth, and it was discovered that the right central had originally been located significantly buccal of the left central and had overlapped the right lateral. A mock-up on the existing tooth confirmed this and it was indicated to the patient that if we were to fabricate a crown that fit in between the adjacent teeth, the new crown would prove to be significantly narrower than the adjacent central. This was illustrated with a mock-up and with calipers. It was then decided that we would attempt to make a new right central that would still overlap the lateral, but not as drastically, and we would try to make

» Figs. 1-4: Patient sustains blunt trauma to No. 8 with flying disc.
» Fig. 5: Carious exposure prior to endodontic treatment.

» Fig. 14: Patient was very pleased with the final results.
palatalize #8, we needed to prep away much of the facial of the tooth to leave enough room for the perceived movement and the necessary ceramic.

**CEREC IMPLEMENTATION**

We began with a simple Database version of the crown for #8. Several versions of the crown were made with CEREC, each time enhancing the overlapped portion of the crown over the lateral and tweaking it until we had an acceptable shape and size. The adjacent central has an extremely unusual distobuccal curvature and a sort of swollen look in the distal, and would be difficult to mimic with the software. Using the MXCL milling unit, each successive version was able to mill in about 5 minutes. The crowns were quickly polished and tried in for fit and regularity of shape. By the third version, we had a crown that was dimensionally correct (Figures 6-7).

The provisional crown was cemented in place with Provilink, (Figures 8-9) and the patient was seen a few days later for ZOOM in-office whitening, after her lip swelling from the accident was resolved. We waited another week for the whitening to normalize. She was very happy with this trial run for the crown and on a follow-up visit, additional photos were taken for the laboratory with shade tabs, and in varied lighting.

**LABORATORY PROCEDURE**

The CEREC file and all of the photographs of the case were then uploaded to Jurim Laboratories, using standard FTP software obtainable as a free download at http://filezilla-project.org/. Within a few minutes the lab had enough information to go ahead and mill a new crown for characterization, staining and glazing. The same Empress Multi B1 block was used to fabricate the lab crown. This central had a significant level of texturization, highlights and a depth of character that I felt would be easier to achieve with the assistance of an experienced lab technician (Figures 10-11). Within two days, a crown had been fabricated and was ready for delivery.

**DELIVERY**

The crown was etched with 35% phosphoric acid. The tooth was cleaned thoroughly with flour of pumice and Tublicid, rinsed dry and the crown was cemented with clear Rely-x Unicem.
transparent. Indirect, flash-free lighting (Figure 12) and gray scale analysis (Figure 13) of the two centrals was used to confirm texture and value matching of the two centrals. The patient was very pleased with the outcome of the case. (Figure 14, page 26)

The CEREC protocol certainly has its place in the modern dental office. As more dentists choose to employ this technology in their practices, techniques will continue to evolve that allow us to achieve higher levels of clinical excellence for our patients. It is imperative that we continue to value the expertise of our friends and colleagues, the laboratory technicians. In difficult esthetic cases, where patient age, the existence of virgin adjacent teeth, and certain financial constraints force us to treat the single central incisor with one perfectly matched crown, it is useful to know that the lab is still there to make our lives easier and to help us provide the best care for our patients.

Where we are now sure that the accuracy of the digital impression and the strength and esthetic properties of multi-shaded blocks can surpass the quality of hand-stacked or pressed ceramics, we can continue to use the expertise and artistic flare of an experienced technician to aid us in providing the highest standard of care for these cases. Technologies such as FTP file transfer and the extremely easy to use CEREC Connect protocol allow us to communicate a perfect digital file for rapid turnaround and high quality results.

I would like to thank Adrian Jurim, MDT and Kelly Jurim of Jurim Dental Studios for their assistance on this case. Special thanks also go to Drs. Sameer Puri and Armen Mirzayan and Scottsdale Center for Dentistry for their expertise and dedication in teaching digital dentistry to clinicians from around the world.

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of the most common questions asked about the CEREC® system is “What do the parameters do and how do they affect my restoration?”

That seems like a simple question and one which everyone should have a basic understanding of. However, persistent confusion remains throughout the CEREC kingdom on parameters. In this article, I will give you a summary of all the parameters currently used in the latest version of the software (V3.60) and how they affect your CEREC proposal and final product.

Before we begin the individual discussion of each parameter, let’s first look at the reasons we have parameters. What purpose do they serve? We can break this down to three basic reasons: To make allowances for each dentist’s personal preference, to make allowances for the milling unit, and to make allowances for the material.

Furthermore, the parameters can be broken down to two basic categories: ones that affect the outer dimensions of the restoration (proximal contact strength, occlusal contact strength, occlusal offset, margin thickness, veneer thickness, and minimal thickness) and those that affect the inner dimensions of the restorations (adhesive gap and spacer).

And finally, the parameters can also be broken down into those that affect the restoration proposal (proximal contact strength, occlusal contact strength, veneer thickness, and minimal thickness) and those parameters that affect the actual milling of the restoration (occlusal offset, margin thickness, adhesive gap, and spacer).

Now that we have a general understanding of what the parameters do, let’s look at the parameters individually to determine more specifically how they affect your restoration proposal and milling. We will be looking at how the parameters are organized in the newest version of the software, V3.60 (Figure 1).

The CEREC software determines the initial proximal contact strength of restoration proposals. This parameter works on both database crowns and inlays/onlays with a minimum value of -200 and a maximum value of +200. If the user feels as if the software is consistently proposing contacts that are too strong or too weak, they can adjust this in the parameter menu. As you increase the proximal contact strength, the CEREC software will attempt to create a stronger contact between the restoration and the tooth. However, if the user feels that the contact is too strong, they can decrease the proximal contact strength to create a weaker contact.
**Occlusal Offset**

Occlusal offset is a milling parameter in which ceramic will be added or removed from the occlusal surface (z-offset). You can adjust this parameter in increments of 25 microns from -500 to +500 and it will work on inlays/onlays crowns and veneers. If you find that your restorations are consistently high or low, you can compensate with this parameter (Figure 4).

Some important tips regarding the Occlusal Offset parameter:

- This will only affect the milling process and the effect will not be visible on the mill preview.
- If you image veneers from the straight-on facial, be careful not to have an occlusal offset that is too negative, as it will decrease the thickness of your porcelain.
- Extreme value changes in this parameter can cause proximal contact changes.

**Margin Thickness**

Margin thickness can be used to increase the thickness of the margin in 25 micron increments from 0 to +200. It can be used on inlays/onlays, crowns, and veneers and has an effect on both the milling preview and the resultant mill (Figures 5-6). This parameter will often be used to bulk out the margin to prevent chipping thin areas on milling and if users like to polish the margin a lot. Also, this feature can compensate for a negative occlusal offset at the cavosurface margins of inlays and onlays.

proximal contact strength, more material will be added to the contact (Figure 2).

Note: If the neighboring tooth is more than 1mm away, no contact will be formed. (This is often seen if both teeth are prepped.)

**Occlusal Contact Strength**

This parameter can get a little bit confusing due to its association with the Virtual Grinding function. Basically, this parameter controls the occlusal contact strength of database inlays/onlays and crowns with the antagonist tooth. This works in conjunction with the virtual grinding setting, which can be activated in the “antagonist” dialog box (Figure 3). This parameter can be adjusted from -200 to +200 and the virtual grinding setting can adjust the level of these contact points in increments of 25 microns from -200 to +200.
**Veneer Thickness**

This parameter allows you to set the initial thickness of your veneer proposal when using database or replication (Figure 7). It has a minimal setting of 0 microns, a maximum setting of 2000 microns, and can be adjusted in increments of 100. Often times people will increase this parameter if they plan on doing a lot of characterization, staining and glazing.

**Adhesive Gap**

This is one of the most misunderstood parameters in the CEREC system. Adhesive gap is simply the narrowing of the spacer at the preparation margin; specifically, the last 400 microns before the margin (Figure 8). The adhesive gap affects only inlays and onlays, has a minimum value of 0, a maximum value of 150, affects both the mill preview and resultant mill, and can be adjusted in increments of 10 microns.

**Spacer**

The spacer creates room for the adhesive resin cement. It has a minimum value of -100 and a maximum value of +100 microns. It has an effect on both the mill preview and the resultant mill of inlays/onlays, crowns and veneers. Figure 9 will show the same restoration with 3 different spacer settings. As you can see, when the spacer is set at 0, there is still a gap. This is because the CEREC system actually has 100 microns of internal spacer built into every restoration. So to have an actual “0” spacer situation, you would have to set the spacer to -100 microns. A spacer setting of +100 actually creates spacer of 200.

An important question to clarify is: What is the difference between Spacer and Adhesive Gap (Figure 10)?

- Adhesive gap only affects inlays and onlays, while spacer affects everything.
- Spacer is active on all surfaces that are covered by bonding.
- The adhesive gap is the narrowing of the spacer at the preparation margin, to a depth of 400 microns.

**Minimal Thickness**

Minimal Thickness is a new parameter with the Version 3.60 CEREC software. It functions to place a “virtual coping” around the preparation at a thickness provided by this setting. It has a minimum value of 300 microns, a maximum value of 2000 microns, and can be adjusted in increments of 100 microns.

Where this parameter is meant to be used is in determining the thickness of your restoration. In the past, you had to wait until the milling preview to determine which areas were thin (by the “red” markings on the restoration). With the new minimum thickness feature, you will be able to see the thin areas while you are in the actual design stage. If an area of your restoration
encroaches on the minimum thickness coping, you will see a blue color come through (Figure 11). Also, in Figure 12, you can see that you can turn this feature on and off in the display options.

Note: there is one small issue with this parameter that everyone should be aware of. It does affect the initial proposal in database crowns. In the list of things the software goes through when determining the position and z-value height of a crown proposal (adjacent teeth, antagonist position, crown settling, cusp settling, etc.), the minimum thickness is last in this process. Therefore, if the crown is under-reduced for example, the software will propose a restoration that is high. You can see how this parameter affects the initial proposal of a crown when set at values of 2000 (Figure 13) and a value of 800 (Figure 14). A little tip would be to set this parameter at a lower number before your database crown proposal. After the proposal, you can reset the minimum thickness to a proper thickness coping to help you with your design.

Hopefully, this quick review will help you understand the individual parameters and allow you to apply them in an appropriate way. Parameters, while sometimes confusing, can greatly enhance your CEREC experience.
Other than my CEREC®, one of the best investments that I have made in my dental career was getting fitted for loupes. I was fortunate enough to be given guidance by experienced practitioners back in dental school on the benefits of magnification. These doctors encouraged me to get fitted for a set of 2.3x loupes.

I cannot imagine what practicing dentistry would be like without the aid of magnification. For the past 12 years I have steadily increased the magnification from a 2.5x to a 4.3x all the way up to a 6.0x set of loupes. With each increase in magnification, I began to see things on teeth that I had never seen before and quietly wondered what had I been missing in the past years at the lower magnifications.

Despite my dutiful use of loupes and my attempts at proper posture, I was constantly flirting with the occasional but ever increasing sore back. I eventually found myself on faculty at Scottsdale Center for Dentistry teaching the CEREC courses where I experienced for the first time, the dental microscope.

Scottsdale Center is equipped with numerous Zeiss Operating Microscopes in the teaching laboratory (Figure 1). After using the scope at Scottsdale Center on some typodont teeth, I knew that the next logical step was to add the scope to my dental arsenal of tools.

Being a relative newbie using the scope, I can’t tell you what an amazing difference it has already made in my cases. If you have been debating getting a scope yourself, I’d like to offer some reasons that will hopefully convince you to consider making the leap. Your patients — and your back — will thank you.

**ERGONOMICS**

If you have practiced for any length of time, chances are you’ve experienced back problems as I have. No matter what height you are, the bending, the leaning, and the stretching to get a good view of that second molar take its toll over the years. This is an especially significant problem if you are a taller individual. In my case, I’m 6’4” and bending over to look intraorally was a daily occurrence,
even with loupes. This repeated assault on the back has taken its toll and while I exercise and try to stay fit, there is no doubt that my back is weaker and has had its fair share of issues.

Ever since I started practicing with my scope, however, my back issues have greatly diminished and I expect them to continue to get better with repeated use of the scope (Figure 2). By sitting tall and still and using the scope to look intraorally, pain in the back is minimized if not completely eliminated. Some of you have never had good posture, so sitting properly for the first time will be strange to say the least but trust me when I say that saving your back is a priority if you expect to practice for any length of time.

**IMPROVED CARE**

I mentioned earlier that with each increase in magnification, I wondered what I had missed earlier when treating teeth. Frankly, I felt a bit embarrassed that I had not upgraded sooner after seeing the improvement in visualization of the oral cavity.

> “I cannot imagine what practicing dentistry would be like without the aid of magnification.”
> — DR. SAMEER PURI

With the scope and the ability to go to 20x and more, I can unequivocally say that I have not practiced better dentistry or given my patients better care ever in my career. There have been cases where had it not been for the scope, distinguishing an old composite buildup and the margin of the tooth would have been next to impossible. Diagnosing cracks in teeth that were causing sensitivity, being able to see that elusive MB2 canal in upper molars, and being able to take that margin exactly where you want are all possible and made easier with the use of the scope. (Figures 3a & Figure 3b)

(Continued on page 36)
INCREASED PRODUCTION

Let’s face it, if you don’t see it, you can’t treat it. Cracks in teeth that you can magnify, document and show your patients can be treated. Root canals that you previously felt uncomfortable treating because you couldn’t visualize the canals can now be treated with specialist precision. This is a sampling of items that can be performed with the aid of the operating microscope (Figure 4).

WOW FACTOR

I cannot describe the wow factor accurately other than to say if you thought patients are impressed that you use a CEREC, they will be just as impressed knowing that you have invested in equipment that allows you to better treat them. Many of you realized this wow factor when you first started using your CEREC. The wow factor is the same with the scope. In our office we have had patients referred to us by patients treated under a scope who realized the benefits. There hasn’t been a single patient who has not

» Fig. 4: Close up view of endodontic access allows the operator to make sure all canals are treated.

Images 3a, 3b and 4 courtesy of Dr. Glen Van As

» Fig. 5: The Zeiss Pro Ergo is an ideal fit for any dental office.
commented on our “high-tech office” after sitting and being treated by an operating scope.

Now all is not roses, there are a few negatives that offices need to be prepared to deal with, namely increased procedure time and integration. If you use a CEREC, no doubt you have experienced integration issues and longer appointment times initially when you first started using the CEREC.

With the scope, I can say my learning curve has been minimal. Now I had a bit of a head start in that. With our training courses at Scottsdale Center we have access to dozens of Zeiss scopes in the training lab as do all course attendees. Using the scope at the Center allowed me to get comfortable with it, and not be fearful of using it in the operatory in my office. The best advice I can give you is to just pick up the scope and use it whenever possible. Use it for every procedure, whether you feel you need it or not.

I would encourage you to contact your local Zeiss representative and get a demonstration of the operating scope in your office. You will find that the results are career changing. Of course you are welcome to visit Scottsdale Center and test drive the various microscopes on-site or during one of the CEREC Advanced Courses.

“There hasn’t been a single patient who has not commented on our “high-tech office” after sitting and being treated by an operating scope.”
Q&A WITH DR. BRIAN THORNTON

Prep, Powder, Picture Perfect in Poulsbo, Washington

S

ometimes, things just fit. The dental team at Poulsbo Dental Center in Poulsbo, Washington is one such example. Dr. Brian Thornton, his wife Dr. Jennifer Thornton and father-in-law Dr. Eldon Larson share a restorative practice along Liberty Bay on the western shore of Puget Sound.

It’s a solid fit based on family ties and a patient-centric, technically advanced practice approach. As the dentists and practice have grown, CAD/CAM dentistry has become another central piece to the doctors’ ability to provide the best dentistry and patient care.

Here, Dr. Brian Thornton talks about the impact of integrating CEREC® technology into the practice.

Q: How long have you been in practice?
A: Both Jennifer and I are University of Washington School of Dentistry graduates. She finished in 2002, and I graduated in 2003. My father-in-law, Dr. Eldon Larson, is also part of the doctor team, and graduated from University of Washington in 1973. So, I’m noticing a pattern here...

Q: What is the size of your practice?
A: I’d say the practice is about “right-sized” at the moment, and growing. It’s a free standing, self-owned building in a great location. We practice in Poulsbo, Washington, which historically has been a small seaside fishing village with a strong Norwegian heritage. Poulsbo’s marinas fill with tourist boating traffic from Seattle and other Puget Sound ports during the summer. The quaint downtown is full of decked-out shops, bakeries, and restaurants, making it the Northwest’s “Little Norway.” We do enjoy living and working here in the Pacific Northwest.

Q: How many operators do you have?
A: We’ve just completed a pretty sizable remodel here at the office, growing from four treatment rooms to seven, and adding some much needed lab and consultation spaces, as well.

Q: What type of dentistry do you specialize in?
A: With a father, daughter, and son-in-law doctor team, it would be easy to simply answer that we provide family dentistry ... but I’d say that general restorative dentistry is our focus.

Q: When did you first become aware of CEREC technology?
A: I’m not sure exactly when I became aware of CEREC technology. I do remember in my first or second year of dental school receiving an envelope (CONTINUED ON PAGE 40)

> Poulsbo Dental Center, where Drs. Eldon Larson and Brian and Jennifer Thornton practice general restorative dentistry
Top left: The comfortable waiting room at Poulsbo Dental Center.
Above: The CEREC MCXL milling unit, centrally located between operatories in the Thorntons’ practice.
Left: Drs. Brian and Jennifer Thornton pose proudly with their CERECs.

“We’ve had a long track record of embracing technology in the office, while keeping grounded in conservative treatment principles. … Having read enough articles espousing the ‘high tech/high touch’ office, I’d say that we’d definitely fall into that category.”
— DR. BRIAN THORNTON
from home with a cut out *Popular Science* article (courtesy of my engineer father) describing this cool tooth-making machine. Meanwhile, unbeknownst to me, my future father-in-law (Dr. Eldon Larson) was also taking note of CAD/CAM, and beginning to watch it closely. He was doing his own research in addition to being encouraged by a Canadian dental colleague and fellow fishing enthusiast from Vancouver. With my marriage to fellow dental school student Jenny, the stage was set for a CEREC embracing practice to be born.

An existing well-established practice and practitioner were reinvigorated, and two newly graduated dentists were given the greatest gift one can give to a career start — and CEREC technology was at the center of both.

**Q:** Why did you choose CEREC as your CAD/CAM technology?

**A:** We started with CEREC in the summer of 2004 after putting a great amount of thought and research into our decision. It was far from being an impulse decision. In fact, Dr. Larson even travelled to Bensheim, Germany, to the Sirona headquarters for a close-up experience that likely cemented our thoughts that CEREC was the right choice for us. Implementing chairside CAD/CAM was a great match, and we picked up our second CEREC system about a year later.

**Q:** How does this technology fit into your office philosophy?

**A:** How does CEREC fit our practice? Well, maybe we should say that we ended up fitting our practice to CEREC.

Our remodel along with a film to digital change in radiography made it possible for us to demolish a centralized darkroom to make room for a CEREC milling center. Now, with one acquisition unit on the west side ops, another on the east side ops, and our milling units in the middle, we’re set.

Philosophically, we found chairside CAD/CAM to be a great fit. We’ve had a long track record of embracing technology in the office, while keeping grounded in conservative treatment principles.

We’ve been long-time users of laser cavity detection, computer-assisted anesthetic, digital and intra-oral cameras, and over the patient monitors for education and entertainment. In addition, all rooms feature dual screen monitors that utilize integrated practice management software. Having read enough articles espousing the “high tech/high touch” office, I’d say that we’d definitely fall into that category.

**Q:** How has CEREC impacted your practice?

**A:** The impact on our office has been really sizable in a lot of ways. CEREC technology was the mechanism that brought all-ceramic indirect restorations to our practice. Aside from the few lab fabricated Procera anteriors, or the very occasional veneer restorations at the time, CEREC became our way of bringing all ceramics into the mainstream of our treatment options.

Looking back, it was kind of like jumping into the deep end of the pool, but it worked out great. We took to the software well, spent our training time wisely, and have continued to learn and refine our techniques. In fact, to help others in our area with implementing chairside CAD/CAM, we formed and moderate a CEREC study club devoted to the western Puget Sound area.

**Q:** What is your favorite CEREC procedure?

**A:** I especially enjoy any of the “combo” restorations. By that, I mean anytime you hybridize two concepts, often in a way that would lead a non-CEREC owner to say “What in the world is that?” For example, the “Crownlay” (blending the onlay and crown prep), the “Creneer” (blending veneer and crown), the “Saddle,” or the one-cusp replacing “Pork chop.” The possibilities are endless.

**Q:** What is your most unique CEREC procedure?

**A:** I’ve mentioned a few already with the last question, but it’s nice to
have a tool that lets me bring solutions to dental situations that non-CEREC dentists have trouble with or can’t even offer. A milled solution for an endodontically treated molar in a young patient. A quickly scanned and copied lab restoration for a shade change in an urgent situation. And of course, the crown retrofit to partial denture has been a solution demonstrated by several others before quite effectively.

I’d like to point out that all CEREC procedures are unique. That’s the whole concept. A custom restoration for a custom need. They may fall into generalized categories as already discussed, but the freedom and the ability to prep and restore teeth conservatively or aggressively as appropriate, in a personalized one-appointment setting is what makes all of this really worth doing.

Q: If someone were to take your CEREC away today, you would ...
A: ... Have to use our other one!

But seriously, I would really feel like I took a step backward if it were gone. Plus, I think I might start to lose credibility producing the CEREC-themed CAD/toons! series featured in this magazine. I could keep it going, but impression material really isn’t that funny.

Q: Anything else you’d like to add?
A: As many are noticing, our industry is poised to move toward digital impressions in a big way in the time to come. For us CEREC users, its “been there, done that,” but for many it will be a big change. Shortly following, I’m expecting many to realize that they’ve got everything except the output, and quickly grasp the opportunities and advantages that chairside milling offers.

All this makes me, and hopefully you, feel great. After all, isn’t it nice to be two steps ahead of the pack? 

Drs. Brian and Jennifer Thornton also produce artwork in addition to their dentistry. Much of their artwork is on display in their office, but can also be viewed at www.ThorntonFineArt.com. Dr. Brian Thornton produces the CEREC related cartoon panels seen in this magazine (page 42 of this issue) as well.

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Multi-talented Washington-based restorative dentist Dr. Brian Thornton is also an accomplished painter and the creator of CAD/toons!, a cartoon series featuring clever CAD/CAM characters and situations familiar to any CEREC doctor. A digital dentistry enthusiast and CEREC user for more than five years, Dr. Thornton pairs his imagination and CAD/CAM knowledge to produce these popular panels. Please enjoy this glimpse into the artistic side of Dr. Thornton.

**Q:** How long have you been drawing the CAD/toons! panels?

**A:** My first online publishing of a CAD/toons! panel was near the end of 2006. It marked the beginning of my “more than browsing only” relationship with the online dental forum, Dentaltown. This visual medium works great as a way for me to share a personal, although lighthearted, perspective on the CEREC experience.

**Q:** What was the motivation to produce the series?

**A:** If you were to ask my father, he’d say that early on in my school experience he suggested political cartooning or architecture as possible career options. I don’t think he was very serious about the suggestions at the time, but here I am – drawing, coloring, and publishing single panel cartoons in an internationally distributed magazine – and using a CAD/CAM machine on a daily basis.

It should be mentioned that the mainline of my artistic endeavors do live in the realm of more traditional medium artwork. I’ve been more involved with fine art techniques than drawing or cartooning, with most works in pastel or acrylic (acrylic paints, not the dental material ...). That does make the cartooning a side adventure for me, and we’ll see where it goes as time progresses. An online portfolio of artwork, as well as a few Chinese watercolor paintings by my wife Dr. Jennifer Thornton can be seen at www.ThorntonFineArt.com.

**Q:** What is the medium for their distribution — are they published? Do you email them to friends, family and other CEREC docs? Are they on display in your practice?
A: The CAD/toons! series has mostly been seen via the online message forum of Dentaltown, as well as in CERECDoctors.com the Magazine. Those two avenues have the widest audience at the moment. My wife and I moderate a local area CEREC study club, so the cartoons do work their way into presentations, newsletters, and mailings.

Do I have any on display at the dental office? That’s an interesting question. They are, after all, based on a very narrow spectrum of dental humor - that dealing with CEREC technology. I think it would be difficult at best for non-CEREC owners to find the humor in them, let alone the average patient. Our pastel and acrylic paintings are a featured focus at our practice, along with some nature photography, but the CAD/toons! right now only live in the lab. They keep me company while I’m applying a stain or glaze technique to an onlay or crown.

Q: Have you considered diversifying with your cartooning?
A: I’ve thought about seeing if I’d like to expand the audience by broadening the humor to a wider segment of dentistry, but I have mixed feelings about it. I could probably crank out a cartoon or two about ortho or perio, but the old advice about “draw/write what you know” holds true. I do need to “follow the funny.” For me that’s with CEREC, and many CEREC owners likely understand the passion and intensity invested in this technology, which to me makes the humor seem so timely and relevant.

Q: Where can people go to see more of the CAD/toons! series?
A: I’m hoping to continue to have some of my freshest panels published online at web.mac.com/uwblt/CerecDoctors. I’ll continue sharing in online forums, and we’ll see what other opportunities arise. I have some archived in a few locations, including in the “Information for Dentists” section of our practice webpage PoulsboDentalCenter.com. Lastly, with the great print-to-order resources available these days, I could arrange for individual prints, books, or even coffee mugs if someone desired. How does that sound? A mug for the office breakroom with a CEREC cartoon on it ... I might be able to use it while I have a crown milling.

To read more on Dr. Brian Thornton and CEREC dentistry, please see the article on page 38 of this magazine.
Happenings in the CAD/CAM World

Class II Restorations with CEREC

SAMEER PURI, DDS

If you have ever attended one of my lectures or one of the advanced training CEREC® courses at Scottsdale Center for Dentistry, you have no doubt heard my enthusiasm for CAD/CAM dentistry. Properly executed, CAD/CAM dentistry can be performed for a large number of dental procedures.

In fact, in this issue of CERECDoctors.com, you have read about the complex implant cases that are now possible with the CEREC Bluecam and the GALILEOS Cone Beam system. In past issues, we have had numerous articles on classic restorations such as onlays and crowns, single units and quadrants, anterior and posterior, all performed with the CEREC technology.

Despite the vast array of indications for the CEREC Bluecam, one such indication that is often overlooked by clinicians is one of the simplest and most common of procedures in our dental arsenal – the class II restoration.

If you have been in practice for any length of time, you have sat with a patient and at least once arduously tried to place the sectional matrix band with the rings to get proper isolation and proper contour; not the most productive of procedures. Often it can take longer to put the matrix on than it does to actually restore the tooth. If I had a nickel for every curled up matrix band that wouldn’t fit and had to be thrown away, I’d be one wealthy dentist.

Instead of performing a frustrating procedure such as the placement of composite, I would offer an alternative: The Direct CEREC Composite. While it’s not really direct in the true sense of the word, for those small- to medium-sized class II restorations you can use your CEREC to fabricate the restoration and mill it with the composite block from 3M.

We do this almost daily in our practice and instead of charging an inlay fee which can be cost prohibitive to the patient and not often covered by insurance, our office charges the direct composite fee to the patient.

Why do I advocate doing class II restorations with the CEREC instead of direct composite? The following reasons outline my thinking on this:

**Doing a class II with CEREC is faster.** Yes, I said faster. No sectional matrixes to put on, no layering of composite, no possible open contact which means you have to cut out the box again, no having to replace the wedge and put in the new composite. Simply prep, image, design and mill. This can be done in about 4 minutes with the Bluecam and MCXL; often less time than it takes to get your isolation and place your resin.

**Doing a class II composite gives you a better restoration.** Composite, when properly placed, is a fantastic restoration, no doubt about it. It is, however, technique sensitive. You have to layer it to prevent shrinkage, you must ensure that the matrix is properly placed for a proper contact and you have to take care in polishing and curing so as not to grind away your occlusion, contact or margins.

With the CEREC, the composite is preshrunk. The only shrinkage occurs at the margins, which means only microns of shrinkage instead of mm of shrinkage. This results in a longer lasting, more wear resistant restoration.

**Using CEREC for your “fillings” is one of the best forms of marketing for your practice.** When was the last time...
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one of your patients sat up in the chair after a filling and said “Wow, that was so cool!”? Well, in our practice, that happens day after day. Patients are impressed that we used a computer to fabricate their filling, and oh, by the way, the cost is the same.

**Using CEREC for your “fillings” is fun.** One of my favorite procedures with the CEREC is well, to use the CEREC. Performing fillings is yet another opportunity to use my machine, provide a good service at a reasonable fee, and enjoy my profession.

Some things to consider: Using a CEREC for fillings is more expensive to the office by a few dollars. We eliminate the cost of the composite, the matrix and time, but we do incur the cost of the composite block which can add anywhere from $5-15 to the overhead of the procedure for the practice.

One can either raise their fee by a proportionate amount to offset this increase and pass it on to the patient, or chalk it up to providing a superior restoration and incorporate the increased cost into the marketing budget for the patient wow factor.

Today only 3M provides composite blocks to practices. Their block is made from their Z100 composite and is filled with zirconia particles. It’s a solid restoration and a solid millable material for the CEREC.

It is my hope, however, that 3M or others will provide some additional choices in this category. Multilayered composite blocks will help us to increase the esthetics, and blocks made from a stronger dentin shade and a more esthetic microfilled enamel layer give the blocks more versatility for use in the practice.

If you are not already doing so, I would encourage you to incorporate this procedure into your armamentarium. It’s quick, it’s easy, it’s fun, and when properly done it can be a productive procedure for any dental office.

To learn more about using your CEREC for resins, visit www.cerecdoctors.com. Hundreds of videos expand on this as well as on the multitude of other procedures that are possible with CEREC technology.
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