

A Revolutionary Breakthrough

The latest innovation in CEREC
Mark Fleming, DDS and
Darren Greenhalgh, DDS

My CEREC Experience

One of dentistry's leading clinicians,
Dr. Gary DeWood tells all in this
exclusive interview

Bluecam and CEREC AC

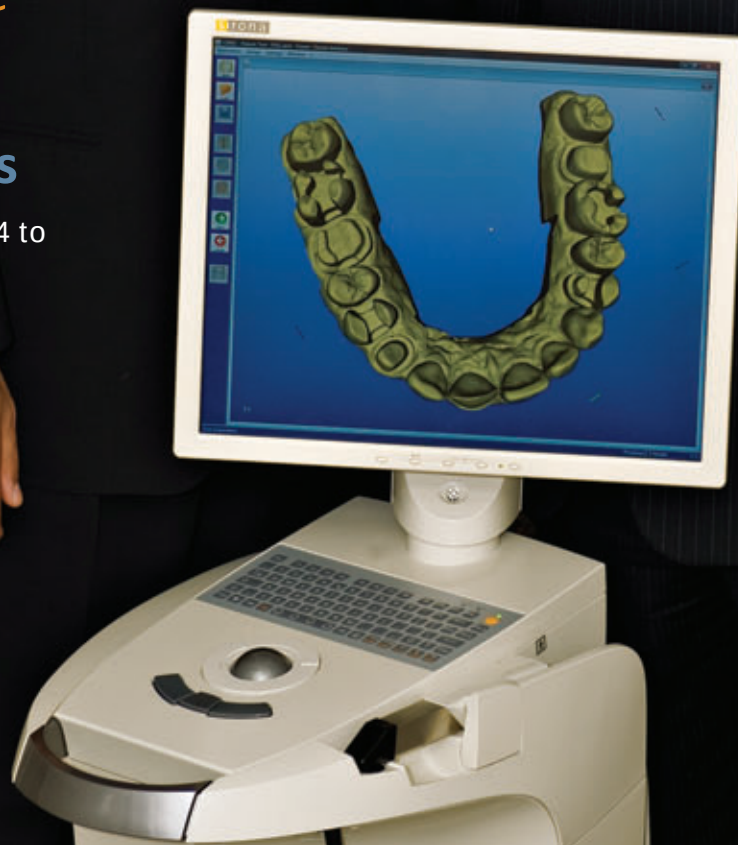
Discover all new possibilities as
Dr. Michael Skramstad explains what
this new technology can do for you.

CEREC 3.4 The New Software Review

Dr. Sameer Puri

Minimal Thickness

Dr. Darren Greenhalgh
explains the advantages of 3.4 to
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CONTRIBUTORS

Co-Founders Cerecdoctors.com

Sameer Puri, DDS
Armen Mirzayan, MA, DDS

Co-Editors

Mark Fleming, DDS
Darren Greenhalgh, DDS

Writer/Editor

Rocio Abascal

Contributors

Dr. Seth Gibree
Dr. Gerhard Werling
Dr. Michael Skramstad
Dr. James Austin
Dr. Gary DeWood

Photos provided by

Scottsdale Center for Dentistry
CERECdoctors.com
Sirona
Patterson Dental

For sales and membership
information contact:

Membership Coordinator

Elizabeth Davison
liz@cerecdoctors.com
818.998.7474
or visit CERECdoctors.com

Design

Brent Baker

{ CEREC:

A Revolutionary Breakthrough

Mark Fleming, DDS and Darren Greenhalgh, DDS



The first two issues of CERECdoctors.com The Magazine, talked about dreams realized and success brought on by CEREC. In this issue, you will learn about extremely exciting technology and the effects it has on those who have chosen and will choose to be part of the CEREC experience.

Technology has been described as an innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. Advances in technology can be found in all areas of our lives and a quick look around our homes and offices reveals this. Innovations that our parents could have only dreamed of are those that we constantly take for granted.

It is definitely an exciting time to be in dentistry as technological growth has not left us far behind. Because technology is advancing at such a rapid pace, inroads to the field of dentistry are undeniable. In dental practices, these innovations have accelerated treatment and its acceptance; dental treatment is now easier faster and more precise. As a result, patient satisfaction has proportionally increased.

Technology should answer a need in ones practice or open a new clinical area. Ideally, technology should pay for itself through an increase in practice efficiency and a decrease in office expense. In this issue's interview with Dr. Gary DeWood, he mentions that when an office is looking at technology there should be a clear view on how it will positively change the practice or improve efficiency in the practice.

In our last issue, we talked about breakthrough practice and success. Success is not static; it involves establishing a goal or target and responding to daily fluctuations to achieve that goal. The same can be said for technology. Yesterday's technology may not be sufficient to move your practice forward and achieve the excellence and success you desire.

Over the years, Sirona has developed exciting and practical innovations. Clearly not resting on that success, they spend \$50 million a year in research and development so that improvements can be made to existing equipment. CEREC is state-of-the-art technology that impacts a dental practice in a positive manner.

As Imtiaz Manji has pointed out before, CEREC is not just a technology add-on, it is a game changer; and now, the game has changed again. As seen in this issue, Sirona has developed a breakthrough in CEREC technology. They proudly introduce the version 3.4 software and the revolutionary hardware, CEREC Bluecam.

The Bluecam upgrade is intended to make your CEREC experience easier and faster. This technology allows the fabrication of high quality, esthetic ceramic restorations, and the ability to pay for itself, now more than ever.

The articles that follow in this issue are possible because so many of those connected with CERECdoctors.com have been testing the latest version of the software. More importantly, three of the CERECdoctors.com faculty members are a select few that have been granted permission by Sirona, to test drive the new Bluecam.

We have created CERECdoctors.com The Magazine to help CEREC users gain the most from their CEREC. We are proud and honored to continue to provide you with the latest techniques, tools and technology to help you perfect your skills and make the most of your CEREC experience. Enjoy!

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Pushing the Envelope with CEREC Bluecam

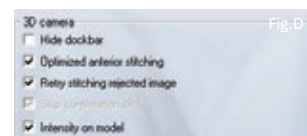
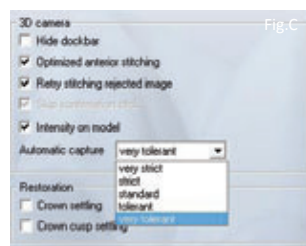
Armen Mirzayan, MA, DDS

Along with a handful of fellow CERECdoctors.com faculty members, I had the privilege of test-driving the latest generation of CEREC technology. Considering the “abuse” that testers of the new technology endure, the faculty was a bit skeptical about going through the process all over again. Countless hours have been spent agonizing over previous updates while trying to implement and provide feedback on the improvements made. We experienced great frustration in using the CEREC 3 system. It was an exercise of futility as 2D images tried to render a 3D restoration, ultimately leading to the system’s low utilization by many clinicians.

The subsequent introduction of the fourth generation CEREC was promising as this was the first time the software rendered in a 3-dimensional format. However, the combination of commands in German, an absent “users” manual and unprovoked software crashes quickly tempered any enthusiasm. Still, the promise was so inspiring that it was worth the journey to persevere and integrate the system into our practice.

In a relatively short period of time, this single upgrade was ultimately responsible for the exponential growth of chairside CAD/CAM. As an early adopter of the technology, it was exciting to see other practitioners move into the CAD/CAM world. Our speculation over this movement was quickly validated when adjunct materials and supplemental technologies surfaced to support the market place. Entire industries sprang to support the ever growing base of CEREC users.

The latest generation of the technology, the CEREC AC with Bluecam (Fig. A), has far greater promise than anything previously seen in CAD/CAM. It only took 15 minutes of test driving the machine to reach a conclusion and all hesitations about going through another product testing were quickly alleviated.



As soon as the CEREC AC was turned on, the imaging capabilities were quickly realized and the rapid-fire action of the camera and its precision in capturing data were readily apparent. The precision of the new camera comes from the wavelength that the blue LED light (Fig. B) operates with, allowing for accuracy that is unparalleled by traditional laser or infrared scanning. The camera intuitively ignores poor data and only captures relevant information processing the preparations.

In the past, multiple preparations and images were difficult to master. In fact, having collectively trained thousands of CEREC users to break large and complex cases into smaller, more manageable ones over the years because of limitations in the previous hardware, that may no longer be necessary with the improved precision and accuracy of the camera.

The first volunteer used for testing the camera, was a patient in orthodontic treatment. As soon as she was seated in the chair and the Isolite was placed, the upper left maxilla was lightly dusted with Sirona’s Optispray opaquing medium. This new medium is optimized for use with the new Bluecam.

The Bluecam was activated and the live camera was inserted into her mouth. As soon as the camera is stabilized, it starts to auto-capture optical impressions. The camera comes with varying tolerance settings that allow the practitioner to choose the appropriate sensitivity thresholds when taking images. The spectrum ranges from very tolerant to very strict (Fig. C). At their discretion the operator can choose a very tolerant setting to capture images in the mouth while a more strict setting can be used to capture a mock up or wax up on a model.

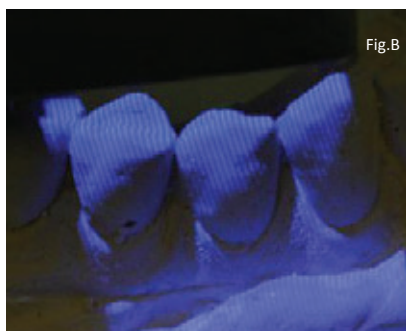




Fig A



Fig.1



Fig 2

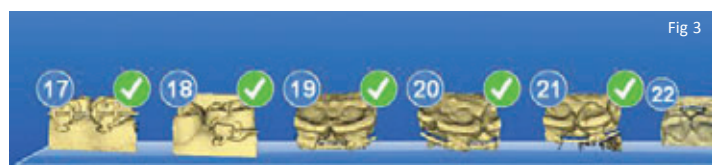


Fig 3



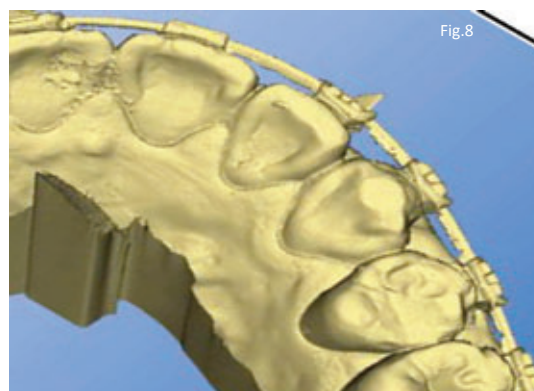
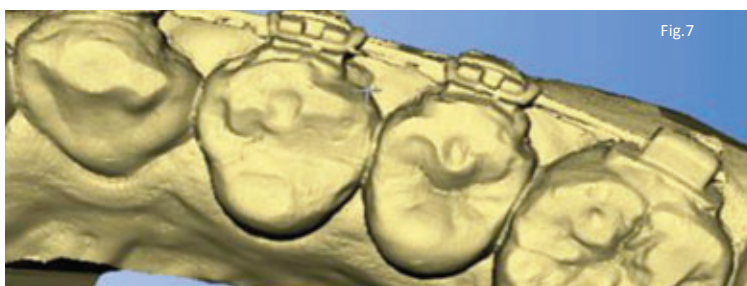
Fig.4

As the camera moved toward the midline, the camera kept building a large model of the quadrant. Then the camera was rolled to the facial, capturing the brackets and rubber bands with great detail (Fig. 1-4). Within minutes, the upper right maxilla was incorporated and the software had built the entire arch. This feat was accomplished at about the same rate as the setting time of most polyvinyl impression materials.

The ease of use and the accuracy of the camera are unsurpassed. Intricate detail is rendered and, most importantly, undercuts were managed differently than those in the past (Fig. 5-8). When desired, a simple roll of the camera can easily capture undercuts.

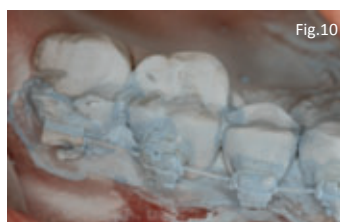
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Pushing the Envelope with CEREC Bluecam

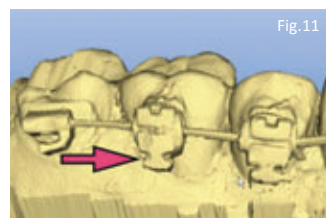


The new software easily accomplishes crossing the mid-line to capture anterior models. A feature called Optimized Anterior Stitching (Fig. D) allows the user to cross over the central incisors by reversing the camera position, while the software manages to build the congruent model in an uninterrupted manner.

To test and verify the accuracy of capturing the undercuts, another patient's upper left quadrant was isolated (Fig. 9) and dusted with Optispray (Fig. 10). The area was scanned quickly with the Bluecam and an accurate model was rendered (Fig. 11). The same quadrant was scanned with numerous attempts utilizing the traditional CEREC infrared camera but it was virtually impossible to catalog undercuts located under the brackets (Fig. 12). While the traditional hardware and software can only speculate with data present in undercuts, the Bluecam simply scans them. For both new and advanced users, the Bluecam provides a much easier operation and higher level of accuracy.



Between the unique software enhancement and the functionality of the Bluecam, Sirona has once again awakened our appetites with the possibilities that will surface over the next generation of CAD/CAM machines. Coupled with CEREC-Connect, which will



have the ability to either mill or print models of our work for lab technicians, it is very easy to speculate that the decade old process of capturing traditional impressions faces extinction for many practitioners. It would be much more efficient and economical for dentists to scan pre-operative conditions and manipulate them digitally to suit their needs.

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Dr. Gary DeWood

My CEREC Experience

Dr. Gary DeWood shares his views
on the role of CEREC in dentistry today

Sameer Puri, DDS

It is with great pleasure that we interview Dr. Gary DeWood for this issue of CERECdoctors.com, The Magazine. Dr. DeWood is a former clinical director at the Pankey Institute and has recently joined the Spear Institute as Vice President of Clinical Education. He had the opportunity to try the new CEREC Bluecam and because his background is restoring highly complex rehabilitation cases, we thought it would be interesting to get his views on CEREC CAD/CAM.

and Director of Marketing and Publications at the Pankey Institute. In May of 2008, I relocated to Seattle, WA.

Dr. Puri: Can you give us a brief history of your dental experience as well as your experience with CEREC?

Dr. DeWood: I have been in dentistry for 33 years, 23 of which I spent in a general practice in Pemberville, OH, about 40 miles southeast of Toledo. A small rural community with a population of 1200, Pemberville was the ideal place to raise a family and build a practice. Education has always been very important to me; in fact, I received my undergraduate degree in education as it was my first career choice. Cheryl, who is my partner in dentistry and in life, worked continuously with me to pursue active learning throughout our dental careers. We both earned Master of Science degrees from the University of Toledo College of Medicine where we both served as assistant professors. We attended courses of study with Peter Dawson, the Pankey Institute, Creating Restorative Excellence, the Pride Institute, the Seattle Institute and the Las Vegas Institute among several other venues and study clubs. In 2002, Cheryl left our practice to seek specialty training in orthodontics and pursue a PhD. Today she serves as the Program Director of the graduate orthodontics program at The University of Tennessee in Memphis. I intended to follow her there after the sale of our practice, but landed in Miami instead. Cheryl and I had served as visiting faculty at the Pankey Institute since 1992, and when the chairman learned that I no longer had a practice, he invited me to join as full-time resident faculty; I've been a full-time educator ever since. Splitting time between Memphis and Miami, I received an appointment as Associate Professor at the University of Tennessee in 2005 and have served as Clinical Director, Director of Business Systems

I investigated and decided to try CEREC 1 when it was introduced. Cheryl and I have always tried to be as cutting edge as possible. We incorporated digital radiography in 1994 and never looked back. My experience with CEREC 1 convinced me it was a "bleeding edge" technology without an application in excellent dentistry. It soured me so that I was a vocal opponent of CAD/CAM for several years...that has changed. As Peter Dawson often said, "If you quote me, date me".

Dr. Puri: You recently left the Pankey Institute to join Dr. Frank Spear. What led to that decision?

Dr. DeWood: Since 2002, Cheryl and I had lived a two "home" existence and in early 2007 we decided that would change. Throughout 2007 I attended select courses at LVI making several trips to Las Vegas. On one particular occasion, Frank was arriving in Las Vegas for a seminar while I finished an LVI course, so we met for dinner on a Wednesday evening. Having known Frank since 1988, we've enjoyed a friendly relationship which has taken us through difficult and joyful times together. I mentioned that Cheryl and I were considering moving from Florida and Tennessee; he asked me to consider joining him in Seattle. I did.

Dr. Puri: Currently you have moved your residence to Seattle. How are you and your family adapting to a completely different part of the country from where you were?

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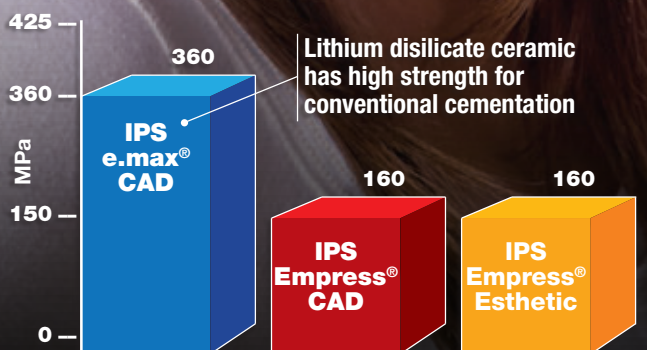
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My CEREC Experience

Dr. DeWood: That's a hard one for two reasons. First, Cheryl is committed to the graduate orthodontics program at Tennessee through May 2009, so we continue to have two "homes", Memphis and Seattle. Secondly, the Spear Institute's working arrangement with the Scottsdale Center in Arizona means that Spear Institute courses are held there on a regular basis. So, at this moment in time I'm adapting to living out of three "homes" rather than two. Having said that, both Seattle and Scottsdale are places we love, so there won't be much adapting once we get settled.

Dr. Puri: Tell me why it is important for someone to learn comprehensive dentistry, which you practice and teach with Dr. Frank Spear, when 95% of dentists perform single tooth dentistry?

Dr. DeWood: Let's separate the question into its two parts and address them individually.

The first question is: Why is it important for someone to learn comprehensive diagnostic dentistry? The answer to this one is simple, because you are a doctor. If you think you learned it all in school you don't deserve to be called one.

The second question is more difficult to answer. Why is it important for someone to learn comprehensive therapeutic dentistry? For the 95% of doctors who have made the conscious decision that they can and will only treat single teeth, it is NOT important. If your dental career goal is to serve humankind by making yourself available to people who are completely dependent on government or private aid agencies for survival, such as those in many public health service practices and free clinics, it will be frustrating and even counter-productive to become skilled in therapies you will never be able to apply. The purpose of these practices is to eliminate the most disease over the largest number

of patients within the resources allocated. Because neither the doctor nor patient have fiscal decisions to make regarding the dentistry, disease elimination becomes the goal rather than health restoration. Additionally, truly comprehensive therapeutic dental care is unavailable and inappropriate. I'm willing to bet this group represents a very small portion of that 95%. The real question becomes, why have the remainder of dentists in that 95% who do single tooth dentistry, chosen to offer their patients less than what they could regarding their dentistry?

In my opinion, some dentists do this believing their patients don't want comprehensive care. They fear that learning about it will create a responsibility for them to develop patient understanding before any treatment can be offered. Already feeling the crunch of time and production, there seems to be no way to reconcile the time with the patient needed to create that understanding. Some do it because they have accepted financial boundaries through participation with third parties that limit what they can ask in payment, thereby limiting their ability to offer comprehensive care and operate a financially successful business. Because I believe that dentists put the best interests of patients above their own, I must believe that the dentists who choose not to learn and offer comprehensive therapeutic dentistry feel that patients don't need it. If these individuals have chosen single tooth dentistry for themselves and their family members, it's impossible for them to value what they do differently so they are applying their own values to the patients they serve. However, if they would choose something different for themselves or their loved ones, it is vital that they learn comprehensive therapeutic dentistry so the decision about whether or not it is something they want for themselves, can be returned to the patient.

Dr. Puri: Recently you went through your own CEREC training with the new Bluecam. How would you describe your experience with the new CEREC camera?

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Dr. DeWood: I loved it! It practically thinks for itself and I had fun working with it. During our training, we had the opportunity to treat a live patient and replace a fractured laboratory restoration. The process of imaging and designing the CEREC restoration was quick, easy and fun. My experience with the new Bluecam was much different than my experience with the CEREC 1 technology which I had purchased and returned many years ago.

Dr. Puri: Describe your learning curve with the new system compared to your experience in the past?

Dr. DeWood: It was quick and intuitive. My experience with CEREC 1 was considerably less rewarding, it was confusing and frustrating. The results were less than stellar. The 5th generation of CEREC is light years ahead. You don't really need any computer experience and after taking the images, the software guides you seamlessly through the step. It's almost as if it creates the restoration for you. This is not what I experienced in the past.

Dr. Puri: Was the powdering process difficult?

Dr. DeWood: Not at all. I was introduced to several products that are simple to use and absolutely NOT messy to deal with.

Dr. Puri: Many people have not seen a CEREC up close in numerous years. What changes can someone expect to see compared to old systems?

Dr. DeWood: Let's see, cell phones versus the telegraph or calculators versus an abacus come to mind. There is NO comparison! The technology has come such a long way that it's difficult to put them in the same species.

Dr. Puri: You had a chance to actually design and mill restorations, did the restorations you saw come out of the system meet your expectations?

Dr. DeWood: No, my expectations were exceeded. The restoration completed during our training fit beautifully on the prep and required virtually no adjustments. The contacts and occlusion were right on. After staining and glazing the milled CEREC crown exhibited a more pleasing esthetic result than the zirconia restoration next to it. I was very impressed with the whole process.

Dr. Puri: As a high end provider whose practice focus is on large comprehensive cases, how do you feel the CEREC will fit into your practice?

Dr. DeWood: I immediately thought of the benefits of milled composite restorations to evaluate vertical dimension changes in full mouth restorative cases. I'm also excited about the possibility of milling restorations in group function when we need to create shared occlusal loads. The best way to do that used to be through a functionally generated path and a twin stage articulator. Now I can't imagine placing direct composite when I can mill a solid block of material and bond it in. As with any tool, I expect to discover new applications.

Dr. Puri: What advice do you have for anyone who is nervous about integrating CAD/CAM into their practice?

Dr. DeWood: Always be nervous about integrating anything new into your practice. Have a clear idea of how it will positively change something or improve efficiency. Once you've determined this has value, complete the ROI calculations and justify the investment. If it makes sense for services or efficiency and the numbers are appropriate, your nervousness will disappear. If any of these determinations don't make sense, don't add the expense. Don't get caught up in the emotional need to "have it" without due diligence about what additions, or improvements it will bring and how the additional revenue will pay for it.

Dr. Puri: One comment with CEREC is that you must be highly trained in proficiency. How is that different than being trained in other aspects of dentistry?

Dr. DeWood: The only difference is the area of training. Many dentists don't feel comfortable with technology, so they see the "training" as a barrier. These same dentists can be very comfortable investing a large sum of money in what they see as "dental" education. There is no difference.

Dr. Puri: Where do you see the future of CEREC and CAD/CAM in general?

Dr. DeWood: I believe that all dental labs will have and utilize CAD/CAM technology. The technology has come too far to ignore and as practitioners become aware of the benefits of CAD/CAM and in-office milling, it will find a place in practices of all types.

Dr. Puri: Is there a feature not currently in the software that you would like to see?

Dr. Puri: You are planning on having your teeth restored with CEREC. Why CEREC?

Dr. DeWood: Can I answer this one later as I become more proficient? It seems pretty complete to me at this point.

Dr. Puri: How do you feel CEREC restorations match up to their laboratory counterparts?

Dr. DeWood: I want to be able to speak to the experience and feel CEREC restorations with the authority of one who has been there from both a doctor and patient perspective. The in-office milled restorations meet all of the requirements of excellent dentistry when properly applied. They definitely pass the WIDIOM rule (Would I Do It On Myself).

Dr. DeWood: If you're asking about milled "in-office" versus "in-lab" restorations, I am not really qualified to compare. I believe that each have a place in the exceptional dental practice. If you're asking about stacked feldspathic porcelain versus CEREC, I'd say that each have an appropriate application. Believing that CEREC removes the need for the laboratory reduces your available tools and lessens your effectiveness as a diagnostician.

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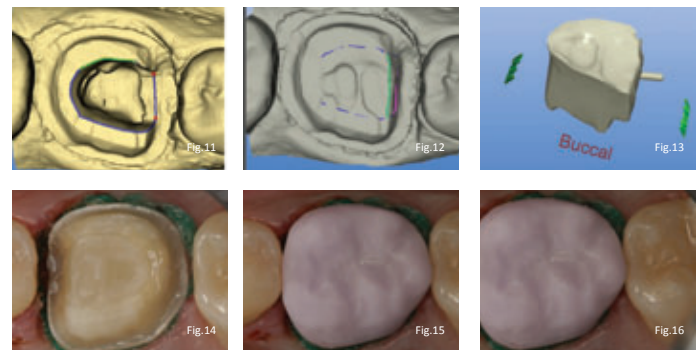
Crown-Down Technique Comes to CEREC

Armen Mirzayan, MA, DDS

There are numerous ways to restore endodontically treated teeth with the CEREC system. A commonly used approach is to combine the core and the crown into a single unit called an Endocrown (Fig. 1). Alternatively, the core build up can initially be fabricated as a separate entity from the crown. A variation of this traditional approach is the Crown-Down Technique where the clinical sequence is reversed to deliver the restorations in a more efficient and timely manner.

The temporary restoration of an endodontically treated tooth can be altered to meet the desired form and function (Fig. 2, 3) while the patient is anesthetized and the field is prepared to be addressed with the correlation technique. If the pre-operative reaming tooth structure is destroyed, the database technique can be utilized.

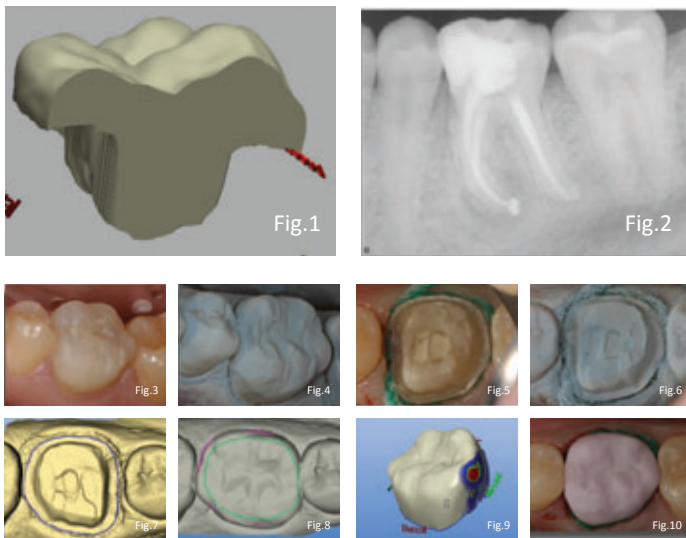
An optical impression of the pre-op situation is taken (Fig. 4) and a full coverage crown preparation is made (Fig.5), allowing proper reduction and adhering to sound biochemical principles for the material. An optical impression of the preparation is taken (Fig. 6) and the crown is designed with the acquisition unit (Fig. 7-9).



While the crown is being fabricated (e.max CAD, shade A2), the chamber is excavated free of temporary material and an optical impression of the definitive preparation is taken. The preparation images from the first case (Fig 6) serve as the pre-operative images for the core build up. The original file is loaded into another window and the design is changed to a new restoration that is to be created in correlation as an inlay/ onlay/ partial crown. The pre-op images are deleted and the prep images are transferred to the occlusion catalog box. New optical images of the prepared chamber are taken (Fig. 10) and the restorations are designed (Fig. 11-13). Then the core material is milled with 3M Z-100 composite material and both units are tried in separately, and then tried in as a single complex to verify seating (Fig. 14-16)

The preparation is then isolated and set for delivery (Fig. 17). The pulp chamber is etched, then primed and bonded with unfilled resin. A dual cure hybrid composite is loaded into the chamber and the indirectly fabricated core is seated flush to the chamber (Fig. 18).

More dual cure resin is placed on the remaining tooth structure and the final crown is delivered (Fig. 19). The excess resin is removed with the floss and following clean-up, the whole complex is completely cured and the treatment is finalized (Fig. 20).



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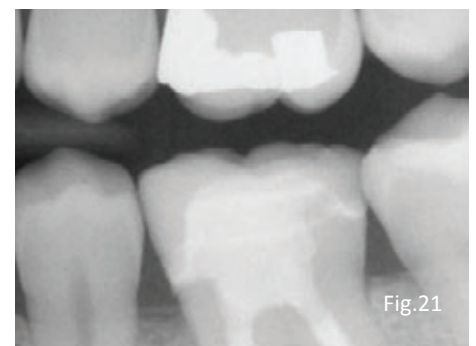
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The final x-ray reveals the intimate approximation of the core material to the remaining tooth structure and the accuracy with which the treatment can be delivered using the Crown-Down Technique. Furthermore, the approach allows the user to leverage design and milling time with the time it takes to clinically excavate the pulp chamber and properly deliver the core material.

To view this clinical case and watch videos, please visit www.cerecdocors.com.



CEREC 3.4: The New Software Review

Sameer Puri, DDS

With the latest release of Sirona's version 3.4 software, many new features have been introduced. While this article provides a brief outline of the new software, full details on the software's release and its function with the new CEREC Bluecam and the classic camera can be viewed through videos on www.cerectoctors.com. The website reviews each new feature in depth, providing you insight on what you can expect from the updated version.

Configuration Dialogue Box

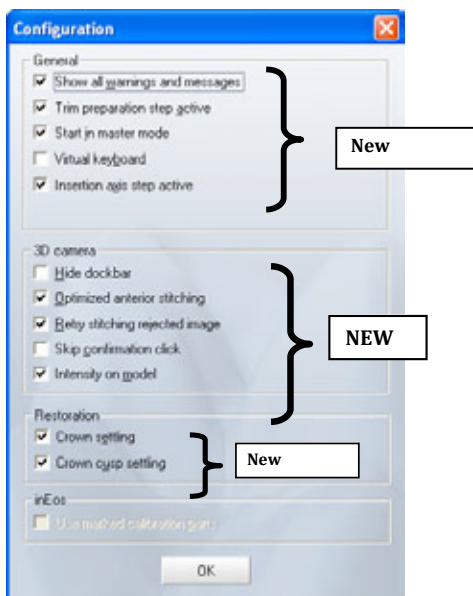
You can find the configuration dialogue box under:

Settings ⇨ Configuration ⇨ Options

The configuration dialogue box has been reorganized and now contains four main parts:

1. General
2. Camera Acquisition
3. Restoration
4. inEos

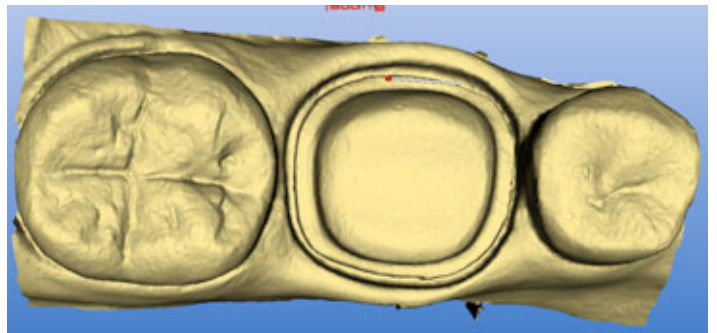
The image below shows the new configuration dialogue box for version 3.4.



Drawing of the Preparation Margin Line on the 3D Model

By selecting the “Intensity on model” setting, you can choose whether you would like to draw the line on the grey model with mapped intensity images or the model used by the preparation line finder. If you deselect the “Intensity on model” setting, you will only be able to draw preparation margins on the 3D model without possibility of switching to the grey model.

The image below indicates that if the “Intensity on model” setting is selected, you will only be able to draw preparation margins on the 3D model. You can still activate or deactivate manual or automatic drawing by pressing on the space bar.



Furthermore, some of the options have been completely taken out of the SW while others are in a new location:

⇨ Virtual grinding:

- is now available in the design step and can be manually activated by clicking on the Antagonist button and pressing Virtual Grinding under the Tools section in the Antagonist dialogue box;

⇨ High resolution model has a new name HIGH RESOLUTION PREPARATION:

- this function has been relocated and can now be found under the

Windows ⇨ Display Options ⇨ High Resolution Preparation;

⇨ Show frozen 3D Image:

- Is completely removed from the SW;

⇨ Camera crosshair:

- Is always activated from this point on. There is no option for deactivating it;

⇨ Show minimal thickness:

- This function can now be found under the:
Windows ⇨ Display Options ⇨ Minimal thickness;

⇨ Automatic crossing the midline;

- This function has been combined with another option that serves for the optimization of the options for the anterior teeth: Optimized Anterior Stitching.

Options in the configuration dialogue box are:

1. Optimized anterior stitching:

- ⇨ Includes automatic crossing the midline function and further optimizes optical impression taking of the anterior teeth (speed).

2. Retry stitching rejected image:

- ⇨ When activated, rejected images will be recalculated with each new optical impression. For example, if optical impression number 2 has been rejected due to the insufficient overlapping area with optical impression number 1, after optical impression number 3 containing sufficient overlapping area with optical impression 1, the software will once again try to include optical impression number 2 in the 3D preview.

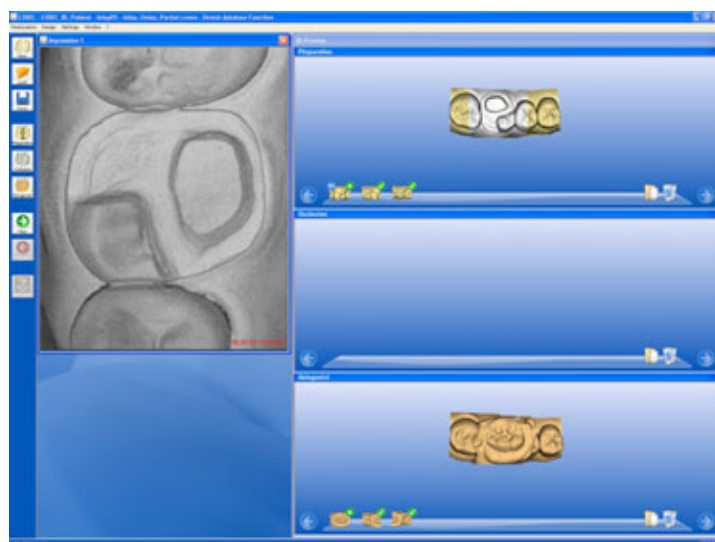
3. Skip confirmation click:

- ⇨ When activated, foot paddle confirmation for the optical impression taken is not needed. The image will be automatically included in the 3D preview.

3D Preview

The image catalogue, “2D catalogue”, is no longer available when using the 3D camera with version 3.4.

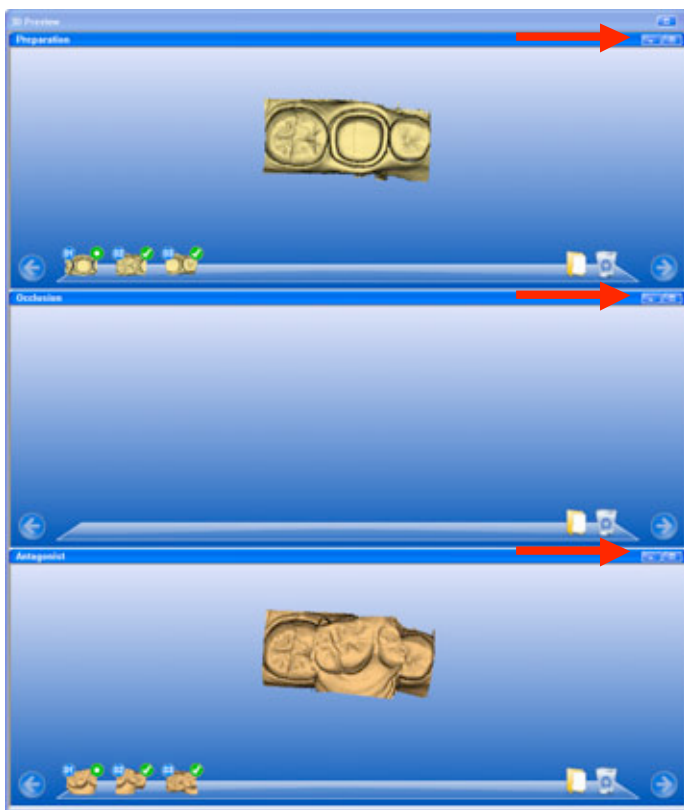
The new 3D preview is displayed below.



Software Review

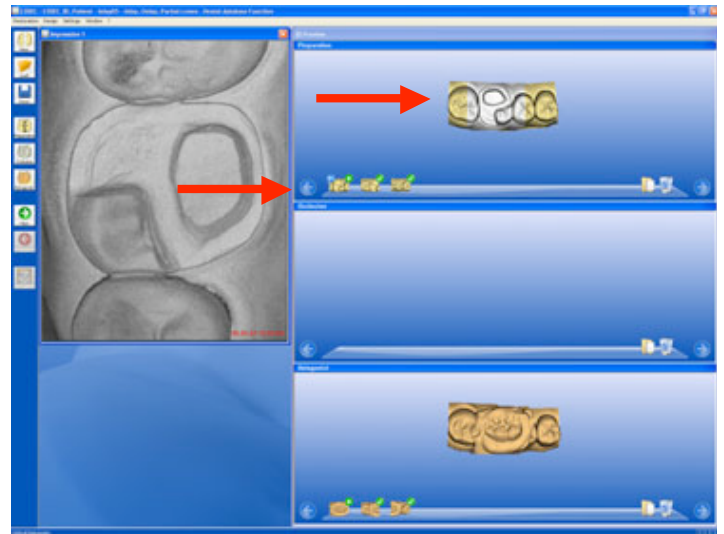
Large 3D Preview

You can minimize , maximize or resize the entire 3D preview as well as the sub windows.



As before, you can begin taking optical impressions of the preparation, occlusion or antagonist accordingly. Optical impressions will be placed in the 3D preview catalogue and shown on the dockbar as a thumbnail, rather than being placed in the image catalogue. If more than five optical impressions are confirmed, the arrows in the corresponding catalogue will be activated for scrolling between the optical impressions.

Refusal of the First Inappropriate Images



Previously, if the first image was inappropriate due to a rubber dam or cotton ball being captured, that image had to be removed from the 3D preview manually to avoid rejection of all subsequent images. With the new software, the first inappropriate images will be refused automatically if a fitting image pair is found later. This makes it possible to work uninterrupted, even if the first images of automatic capture mode are inappropriate. An example of this is illustrated as follows:

- 1st image: rubber dam, inappropriate, green dot, used to build the model
- 2nd image: cotton roll, inappropriate, cannot be registered, red cross
- 3rd image: tooth 2, ok, but cannot be registered, red cross
- 4th image: tooth 3, ok, fits to 3rd image

Please see image below: the first two images are refused automatically (red cross), the 3rd image is the reference image and the 3rd and the 4th images are used to build the model.

Automatic Detection of the Reference Image

This unique software automatically identifies the most adequate image as the reference image from all optical impressions. Therefore, you can begin with the most distal tooth and the reference image will be set correctly. The preparation or antagonist image does not have to be taken first, as it did in previous versions of the software. You can choose the reference image manually by double clicking on the thumbnail.

The 3D preview has all the features of the 2D catalogue: Reference Image

The reference image is indicated with the green circle containing the white dot:



To change your reference image, double click on the desired thumbnail and see the green circle containing the white dot adjust.

Optical Impression Count



Using the mouse pointer, you can easily view count of the optical impression taken. Once you have positioned the mouse pointer over the desired thumbnail, the number will appear in the upper left corner of the thumbnail

indicating count for that specific optical impression. (Please see prior image).

You can view all numbering of the thumbnails by placing the mouse pointer over the arrows, in a similar manner. (Please see image below):



Saved Images for Future Use (White-Area):

The “White Area”, taken from the 2D catalogue, is introduced with the folder located next to the trash bin.

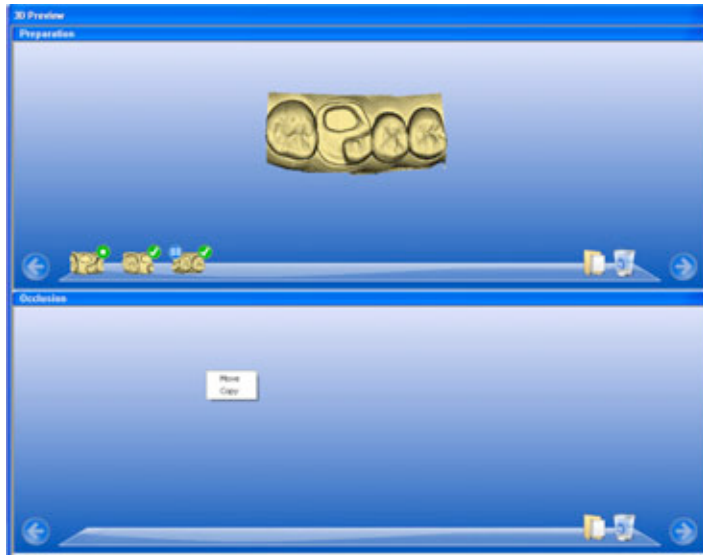
Images that have been previously taken can be saved in this folder and will not be deleted. Images placed in the trash bin are automatically deleted upon the “next” button being selected.



With one click on the folder, current saved images are displayed. Images can be returned to the 3D preview by dragging the image onto the model preview. The 3D preview will recalculate, taking into consideration the image moved from the “White-Area” folder to the 3D preview.

Copy & Paste Function

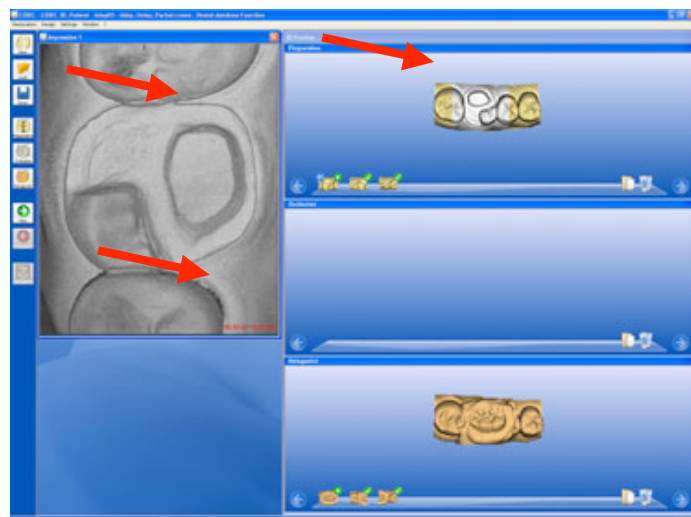
You can copy and paste images from one 3D preview to another. Simply click and hold on the thumbnail you wish to move or copy. After releasing, left mouse click and a dialogue box with the option to move or copy will appear.



Intensity "Black & White" Image with Date and Time Indication

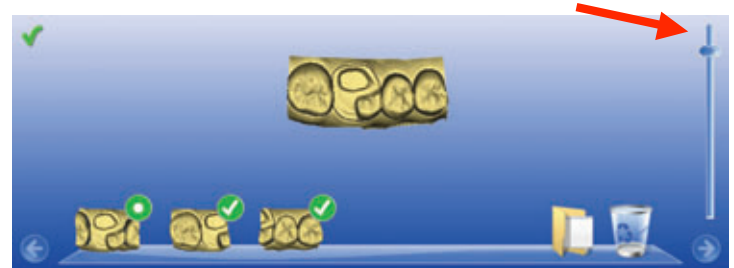
You can view your intensity images by placing your cursor over the desired thumbnail on the dockbar. You will notice the following three features:

1. The intensity image will be displayed.
2. The white area in the 3D preview will indicate the optical impression that has been selected.
3. The date and time the optical impression was taken can be viewed in the lower right corner of the intensity image.



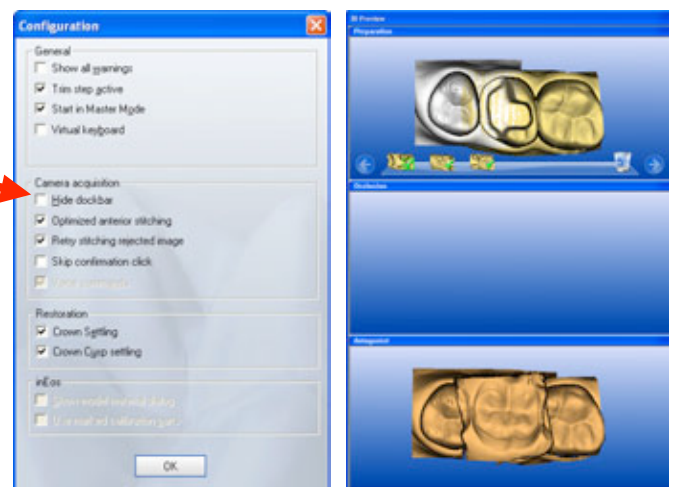
Zoom Function

By moving the cursor pointer to the right side of the 3D preview (i.e. preparation preview), a slider used for making the 3D model preview larger or smaller will appear. Thumbnails will also be smaller or larger.



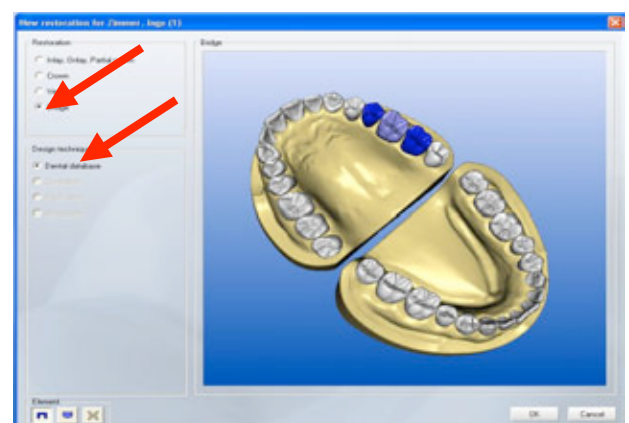
Hide Dockbar

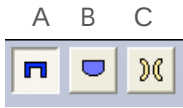
Under the: Settings → Configuration → Options, you will now have the option of hiding the dockbar in the 3D preview:



Chairside Temporary Bridges

In the new restoration dialog box, you can select the dental database design technique for a bridge restoration.



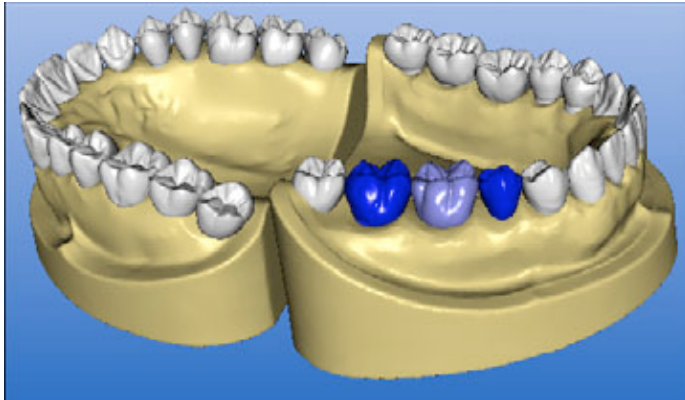


Element

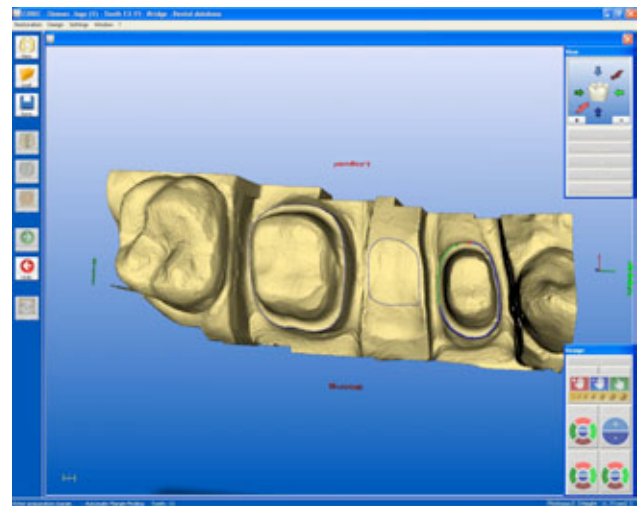
A: Crown, shown in dark blue in the odontogram

B: Pontic, shown in light blue in the odontogram

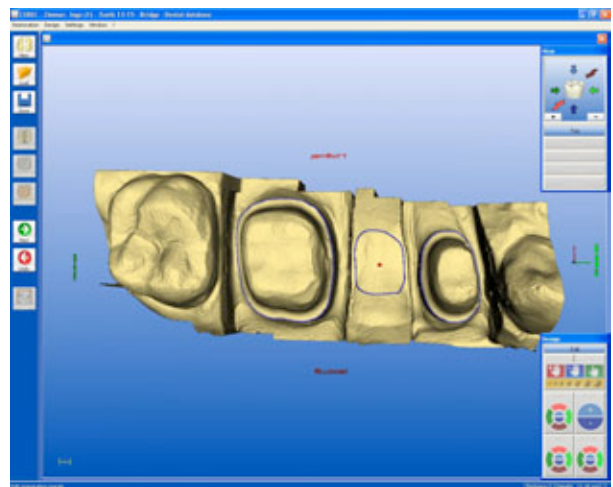
C: Partially edentulous (missing), shown in brown in the odontogram



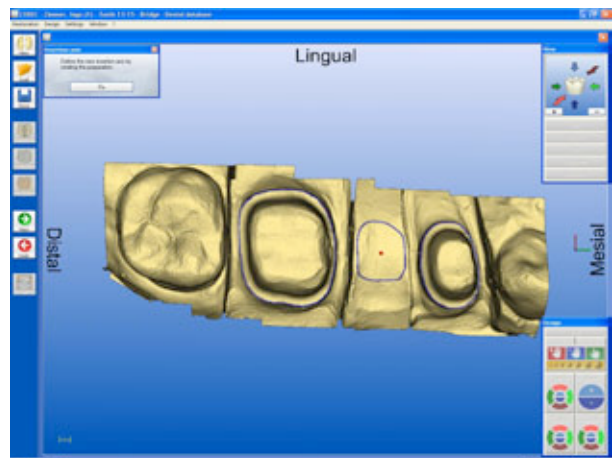
After selecting “OK”, you can begin taking optical impressions:



It is possible to edit all lines once the last line has been entered. A red dot will appear in the base line of the pontic. This dot can be randomly displaced on the model and defines the buccolingual position of the subsequent initial suggestion for the pontic. With base lines for a “shifted heart shape”, this red dot should be slightly shifted in a lingual direction.

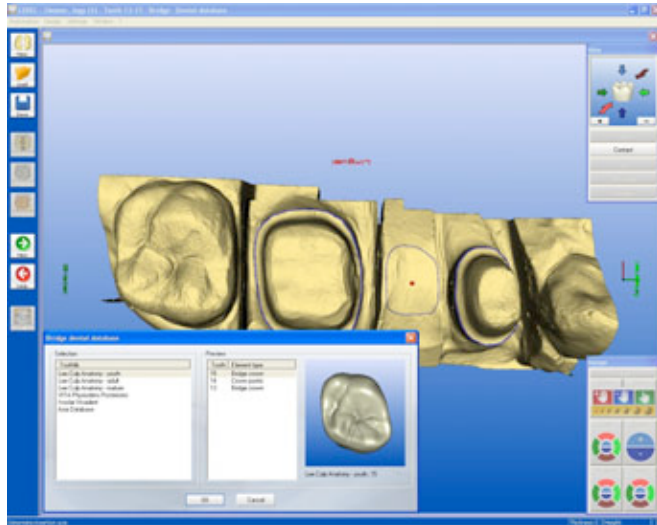


If necessary, you can correct the insertion axis.

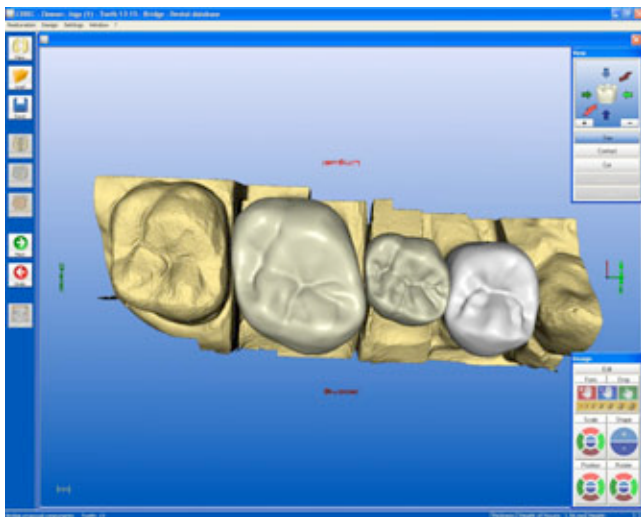


First enter the preparation margin of the first crown starting with distal. Then enter the base line of the pontic. Finally, enter the preparation margin of the second crown.

As with anatomical crowns, you can also choose the dental database for all teeth on the left side. You can select all teeth inside the bridge in the center to determine whether the morphology of all elements match the remaining teeth. You can confirm your choice of dental database by selecting "OK".



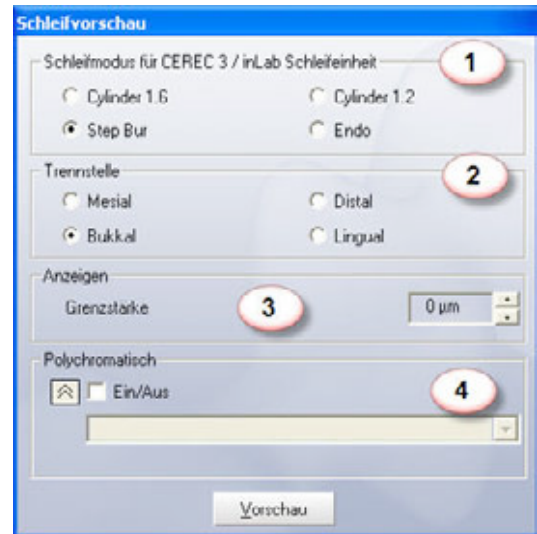
Starting from the distal side, each bridge element will be suggested individually.



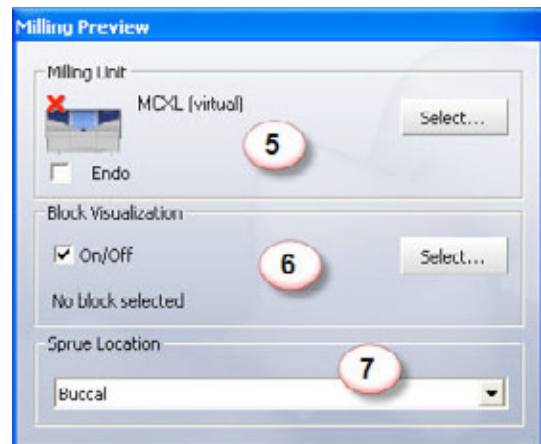
All the tools required to modify the suggestions are readily available. If you have taken optical impressions of an antagonist, the occlusion can also be automatically adapted as for a single anatomical crown. At this time, the crown design does not have to be definite; it can be corrected any time until shortly before the milling preview. For this purpose, a double click on an unselected crown is sufficient to enable its subsequent adaptation.

Milling Preview

V3.0x



V3.4



Milling Unit Selection

Point 1

With V3.0x, it was possible to display a preview of the CEREC 3 milling unit and InLab milling unit when changing the milling modes: Step Bur, Endo, Cylinder 1.6 and Cylinder 1.2.

Point 5

With V3.4 you are now able to:

1. Select the milling unit with which you will mill the restoration: either MC XL, CEREC 3 or InLab.

2. SW will automatically display the milling preview depending on the Instruments you have selected for the particular milling unit.
3. Endo mode will automatically activate for anterior crowns and veneers.
4. You can still activate Endo mode for any type of restoration.

Sprue Location

Point 2

With V3.0x, it was possible to change the Sprue Location by activating Mesial, Distal, Buccal or Lingual buttons.

Point 7

With V3.4 you are now able to:

1. Mill Optimized – a default setting or;
2. Change the Sprue location from the “drop down” menu.

Block Visualization

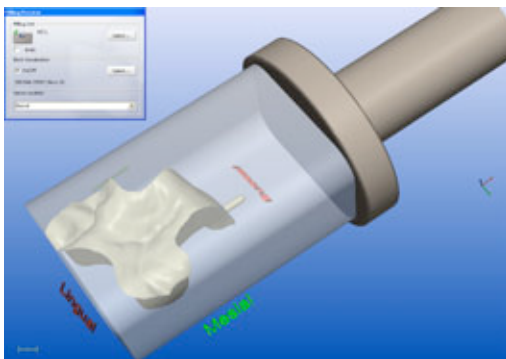
Point 4

With V3.0x it was only possible to display a preview of the restoration in the polychromatic block.

Point 6

With V3.4 you are now able to:

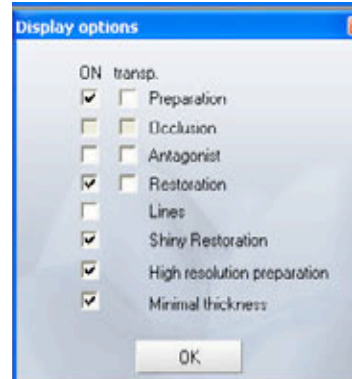
1. Turn the visualization option on and off.
2. Select the block that you will use to mill.
3. Display a preview of the restoration, in the selected block, for ALL blocks available.



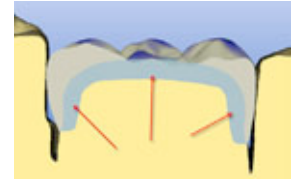
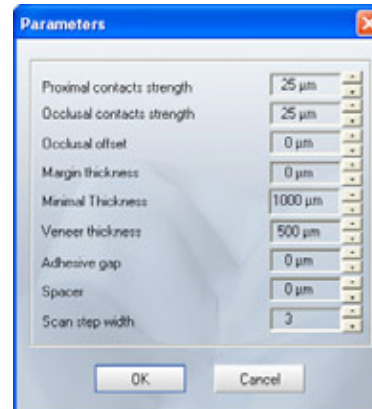
Additionally, you can select whether or not to view the block holder. If you deselect “show block holder”, the restoration will be displayed without the block holder.

Minimal Thickness

Minimal thickness is part of the display options dialog box in v3.4.



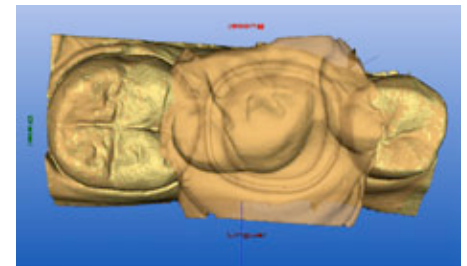
Based on settings in the parameters dialog box, minimal thickness will be displayed; if the selection is deactivated it will not be displayed. This option is available in the design set up as well as the milling preview step.



High Resolution Preparation

Activating or deactivating the “High Resolution Preparation Option”, you can view the 3D preparation in either normal or high resolution.

Trim Antagonist



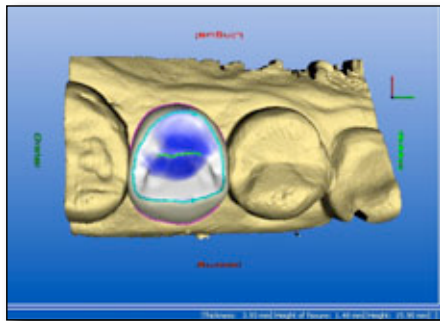
You are unable to see the antagonist during the trim antagonist step. Namely the antagonist surface will be transparent. This makes it easier to determine which area must be trimmed. (See image)

We hope this article has provided you with a general idea of version 3.4 CEREC software. With its many improvements and several new features, we are confident you will be pleased.

Minimal Thickness

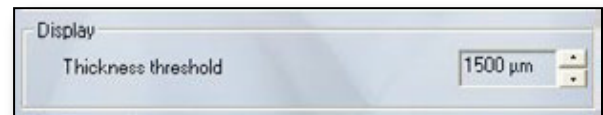
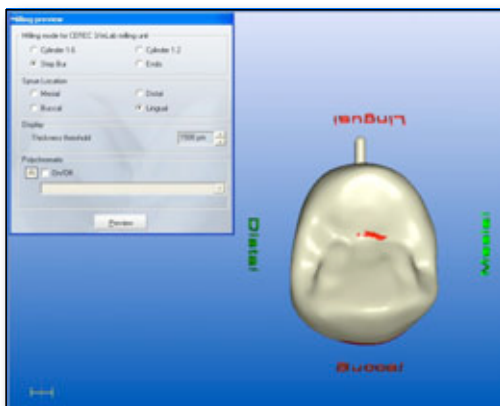
Darren Greenhalgh, DDS

In previous versions of the CEREC software, we had a few opportunities to see and evaluate the thickness of our proposed restorations. The first opportunity to see the thickness of the occlusal table is by utilizing the height of fissure measurement and the thickness measurement to determine if our preparation was adequately reduced and our restoration was at our desired thickness.

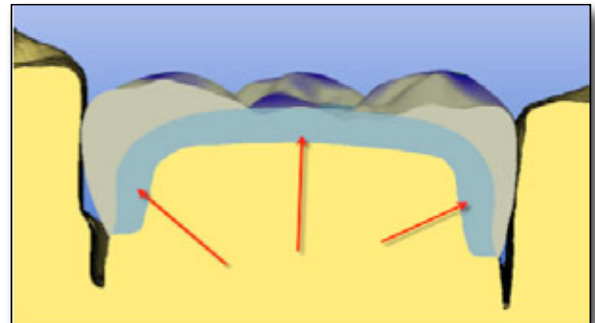


Thickness: 3.93 mm | Height of fissure: 1.48 mm | Height: 15.90 mm

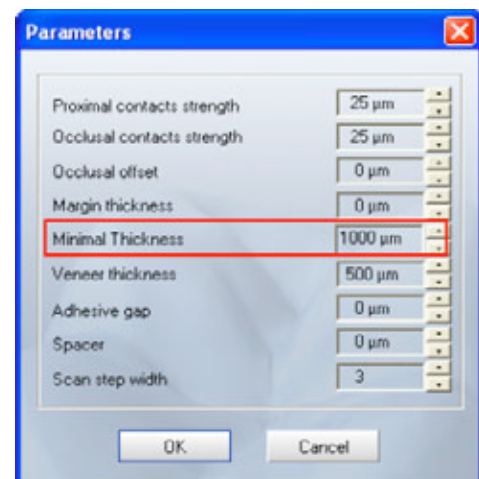
The second opportunity to see and evaluate the thickness of our restoration is by waiting to view the mill preview window and use the minimal thickness threshold to determine whether the occlusal thickness and preparation reduction was adequate.



With new updates to the CEREC software version 3.4, there have been improvements in the way the user can see both the reduction of the prep and/or the thickness of the porcelain. These improvements to the previous methods are referred to as minimal thickness.



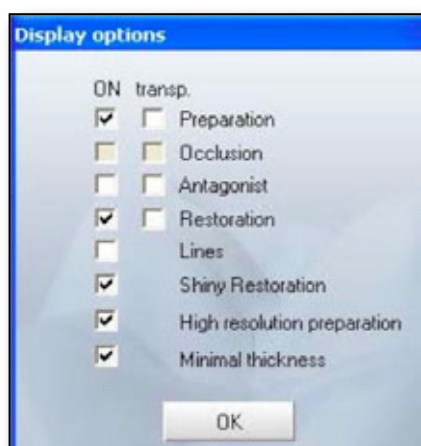
Notice that you will now see a transparent blue bubble around your preparation. This so called bubble is the minimal thickness set by the user in the parameter section of the software.



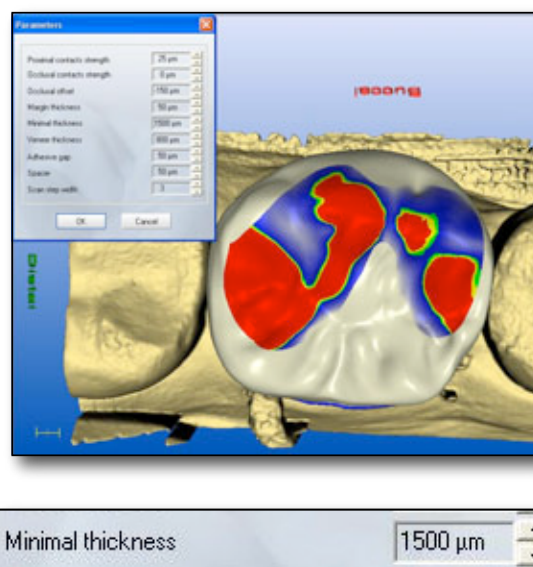


The user can choose settings in the parameters dialog box. Minimal thickness will either be displayed or not displayed, depending on whether the setting is activated or deactivated. The minimal thickness display is available in the milling preview window as well as the design preview window.

The option to activate or deactivate the minimal thickness preview is available in the Display Options dialogue box which has been modified with the updated version 3.4 CEREC software.



The restoration was designed in database using a bite registration. After the bite was trimmed and the margin was placed, the Lee Culp youth database was chosen. The following image illustrates that the restoration was proposed quite high and will need some editing to allow for proper occlusion.



The following improvement to the software is the best improvement by far. This parameter allows you to adjust the thickness of your desired restorations. Once this is done, first the software automatically proposes your restoration to the desired thickness and then it tries to adjust for the bite registration.

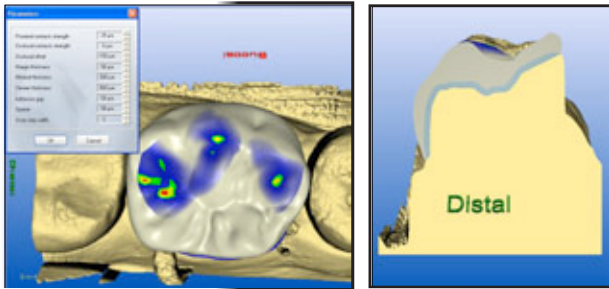
In this case, we can see that the minimal thickness is set at 1.5 mm. One should also notice how high the restoration is proposed. If we look at this proposal in the cross section, we can see that the restoration is proposed based on preset minimal thickness measurements and the bite registration is considered last.

To illustrate this particular software feature, the following summarizes a case presented to our office. A 26 year old male presented with a build-up placed after RCT was accomplished in tooth #19. We prepared the tooth for a crown and by utilizing the new minimal thickness update we can see how the proposals are now generated.

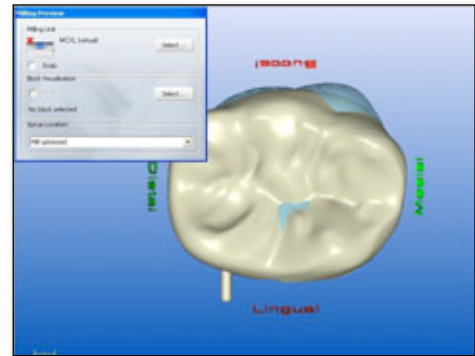
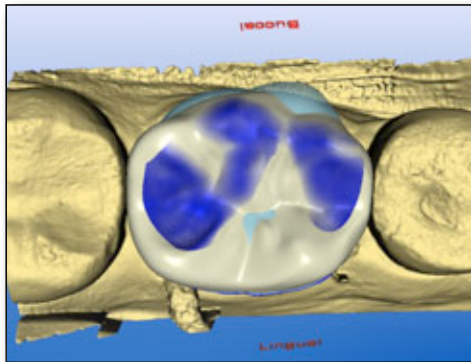


The following images show how different the occlusal table appears when the minimal thickness setting in the parameter dialogue box is changed to 300 microns; the cross section also appears to be different.

Minimal Thickness



With the appropriate use of all the software tools, the crown was designed in conjunction with minimal thickness to achieve the desired occlusal scheme and restoration thickness.



The final restoration was milled using an e.max block from Ivoclar Vivadent. Below are the post operative photos which were taken immediately following the procedure.



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Fabrication of Bridges with Different All-Ceramic Materials

Tailor-Made Esthetics in Prosthetic Restoration

Dr. Gerhard Werling

According to the Arbeitsgemeinschaft für Keramik in der Zahnheilkunde e.V. study group, approximately 250,000 all-ceramic bridges were incorporated in Germany last year. The material framework for most of these involved zirconium oxide (ZrO₂). Because of its high strength, this material is increasingly employed for crowns and bridges in the posterior region. In this context, it does not matter whether the framework is milled out of a green compact or a densely sintered block. Because of the white color of zirconium oxide, shading liquids can be used to impart the coping or framework with a dentin-like color without measurably reducing the strength of the material. As a result, the overall appearance of the restoration is enhanced. Moreover, the higher strength of zirconium oxide, comparable to that of metal substructures, enables the clinician to realize crowns with minimal wall thickness. Consequently a larger amount of natural tooth structure can be conserved. With new and more efficient procedures such as the press-over technique, veneer layers previously built up with wax



Fig. 10 Veneering with Vita VM 9
 Fig. 11 Veneered all-ceramic bridge on a zirconium oxide base
 Fig. 12 Full contour wax-up of the zirconium oxide framework prior to pressing IPS e.max ZirPress using the press-over technique
 Fig. 13 Veneering/customization with IPS e.max Ceram
 Fig. 14 Customized bridge on zirconium oxide base fabricated with the press-over technique
 Fig. 15 Full contour CAD-wax bridge prior to reproducing it with pressable ceramic

can be pressed to a zirconium oxide core using the likes of fluorapatite glass-ceramic ingots.

Due to their high grain density, a grain distribution in different crystallographic directions and high refractive index, oxide ceramics feature an opaque structure. Thus the copings or frameworks need to be veneered with glass-ceramic materials to ensure an esthetic outcome. In general, the clinical results have been very positive. However, chipping is occasionally encountered, presenting a particular drawback. Chipping became a problem specifically in the initial phase; this is when abutment crowns with very thin wall thickness, resulting in a lack of cusp support, were frequently milled. The difference of thickness in layers led to a build-up of tensile stress in the layering ceramic. Meanwhile, it has been shown that cusp-supporting crown copings significantly reduce the risk of veneer fractures.

As far as stability and esthetics are concerned, we have achieved good results with zirconium oxide substructures veneered in the dental laboratory. However, in the majority of cases, costs are comparatively higher. The crucial question regarding new materials or procedures is whether they offer comparable or even higher

Fig. 1 Pre-operative situation
 Fig. 2 Preparation
 Fig. 3 Contrast powder has been applied to the restoration
 Fig. 4 Temporary restoration on screen
 Fig. 5 Temporary restoration made of CAD-Temp
 Fig. 6 Customization of the temporary restoration
 Fig. 7 Temporary restoration cemented in place
 Fig. 8 The temporary restoration is reduced to the dimensions of the framework
 Fig. 9 Try-in of the zirconium oxide framework



esthetics while requiring less time and effort.

In this context, the press-over technique combined with zirconium oxide or full contour pressing of bridges with lithium disilicate glass-ceramics (without an additional veneering step), represent interesting options.

Several different procedures were tested to assess their practical application. Particularly in regards to esthetics, the result was rated by ten individuals including dentists, dental technicians and qualified dental personnel, who used a point-based system. Three, 3-unit anterior bridges were fabricated in the practice laboratory; two bridges using CAD/CAM technology (InLab/Sirona) and one bridge using press technology.

Framework:

1. Zirconium oxide ceramic
2. Zirconium oxide ceramic
3. Lithium disilicate glass ceramic

Veneer:

1. layered with VM9 (Vita)
2. pressed-over with IPS e.max ZirPress (Ivoclar Vivadent)
3. pressed to full contour with IPS e.max Press (Ivoclar Vivadent), slightly cut-back and glaze fired (no full veneer).

As far as optical qualities and flexural strength are concerned, IPS e.max Press lithium disilicate glass-ceramic (Ivoclar Vivadent) currently ranks somewhere between feldspathic and oxide ceramics. Lithium disilicate glass-ceramic ingots are available for the conventional press technique. Due to its high strength of 400 MPa, this material cannot only be employed for anterior and posterior tooth crowns but can also be applied for anterior bridges up to the second premolar.

IPS e.max Press is available in three degrees of translucency: MO (medium opacity) ingots for the production of frameworks which are fully veneered with IPS e.max Ceram veneering material; IPS e.max Press LT (low translucency) ingots which feature a higher translucency and are suitable for the staining and cut-back technique and ingots with a high opacity (HO) which are indicated when metal posts and cores need to be masked.

In this case, the LT ingots used showed an increasing wall thickness and slightly faster increase in their opacity compared to the “classical” feldspathic or lucite glass-ceramics with a gradient translucency.

The lithium disilicate version for CAD/CAM processing is the IPS e.max CAD. This is offered in MO and LT levels of translucency making it suitable for the fabrication of crowns and laminate veneers. To be able to process this ceramic in the CAD/CAM unit within a reasonable period

of time and without causing excessive wear of the burs, IPS e.max CAD blocks are milled in an intermediate non-crystallized “blue” state with a strength of 130 MPa.

After machining, the framework is subjected to a crystallization process for approximately 25 minutes at 840° - 850°C. This causes a conversion of the microstructure, ultimately resulting in a material strength increase to 360 MPa and the formerly bluish material obtaining its previously chosen, final tooth shade. Unlike other CAD/CAM oxide ceramics, IPS e.max CAD shows virtually no shrinkage during the sintering process; this allows the accuracy of the fit of the restoration to be checked in the “blue” state (i.e. immediately after milling).

Case Report

After having prepared the teeth, an optical impression of teeth 11-13 was taken using the CEREC 3D System's intraoral camera. This was followed by the design of the bridge including connectors on-screen. Based on the digital data obtained, a temporary bridge restoration was milled from a resin block (CAD-Temp, Vita). In the case presented, the incisal area was customized with light-curing veneering composite. The advantage of using resin as a temporary material is that there is no polymerization shrinkage, heat or bad odor as it occurs with conventional temporization material. The restoration may even be inserted and removed several times without increasing the risk of fracture. Moreover, these temporary bridges allow the dimensions of the planned restoration to be precisely stimulated in the patient's mouth and be transferred to the permanent bridge at a later stage.



Fig. 16 IPS e.max Press lithium disilicate glass-ceramic bridge after pressing
Fig. 17 IPS e.max Press lithium disilicate glass-ceramic bridge
Fig. 18 Lithium disilicate bridge: 1st try-in
Fig. 19 Lithium disilicate bridge: 2nd try-in
Fig. 20 1st try-in of bridge pressed over with glass-ceramic

Sirona's InLab milling unit was used to mill the framework for the permanent bridge restoration.

The dimensions of the ZrO₂ framework are automatically reduced by the thickness of the enamel layer in order to create room for a veneer with uniform thickness and to ensure optimum support of the cusps. These anatomically reduced framework dimensions enhance

the stability of the veneer and prevent chipping. After sintering, the ZrO₂ framework was tried and functional impressions were taken prior to building the ceramic veneer.

There are two ways of fabricating bridges using the press-over technique. Either the veneer layer is built up with modeling wax or it is designed on the computer screen after the framework has been scanned and subsequently milled out of burn-out resin using CAD/CAM technology. The wax or resin veneer is attached to the ZrO₂ framework and invested for the press process. After the wax/resin has been burnt out, the selected ingot is pressed into the mold and therefore onto the framework in the press furnace (e.g. Programat EP 5000). In this case, we preferred to use the waxing technique as this facilitates the creation of ceramic shoulders. Compared to zirconium oxide, the moldable ceramic used for the press-over technique (IPS e.max ZirPress, Ivoclar Vivadent) offers enhanced translucency and a better marginal fit. Following the press-over technique, a simple cut back was performed and the tooth was built to full contour using IPS e.max Ceram materials. Subsequently, glaze firing was conducted.

The record file used for the fabrication of the CAD-temp bridge was employed to mill the restoration a second time – this time using a burn-out resin block. The bridge was then invested and pressed with an IPS e.max Press ingot using the conventional press technique. Following this, the bridge was finished and a corrective firing and a glaze firing cycle was conducted.

Full-contour CAD-wax bridge prior to IPS e.max Press lithium disilicate reproducing it with pressable ceramic glass-ceramic bridge after pressing IPS e.max Press lithium disilicate glass-ceramic bridge

Results

When the restorations were tried in, no significant differences were observed with regard to marginal integrity and accuracy of fit. The patient stated that he liked the pressed, full-contour lithium disilicate bridge best; which in this case, was the IPS e.max Press. All the bridges showed superior esthetics and could hardly be distinguished from the natural dentition. Our evaluation of their esthetics resulted in the following ranking:

1. A full-contour lithium disilicate bridge (involving a minor cut-back)
 2. ZrO₂ framework, to which glass-ceramic was pressed
 3. ZrO₂ framework conventionally veneered with glass-ceramic
- Lithium disilicate bridge: 1st try-in
Lithium disilicate bridge: 2nd try-in



Fig. 21 2nd try-in of bridge pressed over with glass-ceramic
Fig. 22 1st try-in of veneered bridge
Fig. 23 2nd try-in of veneered bridge

Analysis of the procedures presented showed that with the help of CAD/CAM technology, appealing esthetic results can be quickly achieved and are frequently superior to those produced with metal-ceramic techniques. With a bridge that was milled out of a burn-out resin block and pressed with lithium disilicate, the main advantage was the fact that the data used for the fabrication of the temporary restoration could also be used for the final restoration without having to reduce its dimensions. The slightly thicker connector dimensions compared to those required in the ZrO₂ framework, constituted the only weak point of this procedure.

Another benefit of ZrO₂ is that the material can also be used for long-span bridges. From an esthetic perspective, the version fabricated with the press-on technique was slightly superior. IPS e.max ZirPress veneer layers demonstrate a flexural strength of 110 MPa, which is higher than that of conventionally layered veneers. Consequently, we can proceed on the assumption that pressed-over restorations are more resistant to chipping. Moreover, the press-on technique facilitates the creation of ceramic shoulders which are etchable and enhance the esthetics of the restoration. Ceramic shoulders can be created simply by reducing the zirconium oxide framework in the cervical region and then building up these areas with modeling wax. When using the conventional veneering technique, the creation of ceramic shoulders can be a very challenging and time consuming task since the ceramic tends to shrink during firing. One of the disadvantages of the press-over technique is that more time is required for modeling, investing and pressing. Moreover, additional equipment such as a pre-heating furnace and press furnace are required.

The fabrication of the lithium disilicate glass-ceramic bridge was easy to accomplish because the existing data that had previously been used to produce the

temporary restoration could also be used to mill the bridge in a fully anatomical fashion. Subsequently, the all-ceramic bridge was pressed. Finishing involved only little effort and was quickly accomplished. Excellent esthetics were achieved and it was this bridge that was finally selected by the patient following try-in and comparison of the different versions. From our point of view, the only weak point was the slightly larger connector dimensions compared to those of zirconium oxide bridges (16 mm² versus 9 mm²), which are required by the material. They may detrimentally affect the final esthetic outcome.

Advantages and Disadvantages of the Different Techniques and Materials Used

From a practical standpoint, we suggest that larger high-strength lithium disilicate blocks for CAD/CAM processing and corresponding software be made available in the future. These blocks would allow full-contour bridges or veneers to be milled and subsequently bonded to zirconium oxide frameworks.

In conclusion, lithium disilicate and oxide ceramics are suitable dental materials for meeting the various demands placed upon prosthetic restorations. As far as costs are concerned, all-ceramic crowns and bridges that formerly ranked among the premium segment while the various surface characterization and staining techniques available today allow for a broader spectrum.

Therefore, differentiated levels of esthetics are tailored to the needs of the patient making esthetic restorations affordable not only to well-off patients, but also to those with a lower income. These solutions are available to virtually all patients as they are achievable with standard care procedures that do not involve any compromising on the clinical level.

Is full-contour construction possible?

CAD-Temp	Yes
IPS Empress CAD	Yes
Pressed-over zirconium oxide framework	No
Veneered zirconium oxide framework	No

Is full-contour construction reduced?

CAD-Temp	Yes
IPS Empress CAD	Yes
Pressed-over zirconium oxide framework	Yes
Veneered zirconium oxide framework	Yes

Number of units possible

CAD-Temp	1
IPS Empress CAD	1
Pressed-over zirconium oxide framework	1 to 4
Veneered zirconium oxide framework	1 to 4

Processing procedure

CAD-Temp	Simple
IPS Empress CAD	Simple
Pressed-over zirconium oxide framework	Time consuming
Veneered zirconium oxide framework	Time consuming

Is fabrication without model possible?

CAD-Temp	Yes
IPS Empress CAD	Yes
Pressed-over zirconium oxide framework	No
Veneered zirconium oxide framework	No

Cost/benefit ratio

CAD-Temp	Good
IPS Empress CAD	Very good
Pressed-over zirconium oxide framework	Good
Veneered zirconium oxide framework	Acceptable

A large, white, floor-standing dental machine with a computer monitor on top. The monitor displays a 3D digital model of a human dental arch. The machine has a control panel with a trackball and buttons. The background is a solid blue color.

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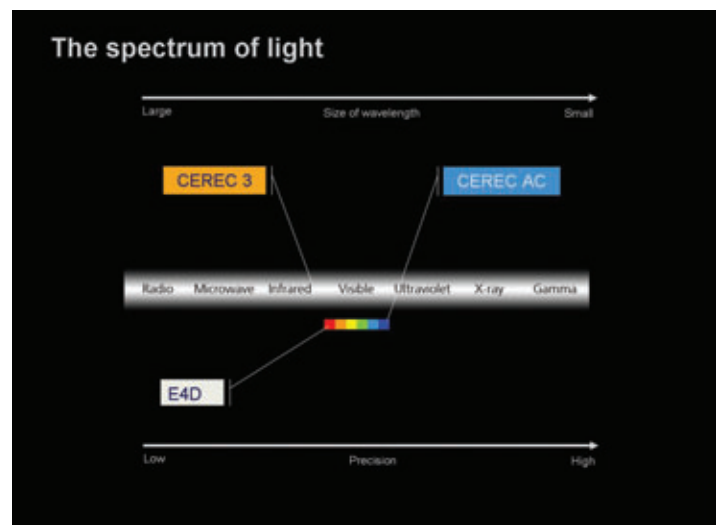
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Bluecam and CEREC AC}

Michael Skramstad, DDS

A few weeks ago, I was walking through a local electronics store and found myself immediately drawn to the TV and movie section. As I stared at the movie playing on a beautiful HD TV, I was mesmerized by the incredible clarity and detail of this particular movie. I kept thinking to myself. "I need to buy one of these Blu-ray disk players...it's so much clearer than my DVD player at home." Having never been able to control my buying compulsion in these stores, I gave in to my "wants" and bought the Blu-ray disk player. Of course for those movie fans out there, it certainly doesn't disappoint and is absolutely incredible.

Now why on earth am I talking about movies and Blu-ray disk players in a CEREC magazine? Well, it's about the technology. How does the Blu-ray disk achieve such better clarity than a DVD? The answer lies with the lasers, particularly the wavelength of those lasers. DVD's rely on red lasers to read and write data and Blu-ray disks use a blue laser. The benefit of the blue spectrum laser is that its wavelength is shorter than a red laser (405 nm vs. 650 nm). This allows a blue laser to focus with greater precision while storing the data in less space. So even though a DVD and a Blu-ray disk are the same physical size, the Blu-ray disk can store more than five times the data. By picking up all this extra data, the Blu-ray player produces a more



detailed, high definition picture.

Fig.1

In January, Sirona Dental Systems introduced the CEREC AC, their new acquisition unit. Part of this acquisition unit is a new camera called the Bluecam. As you might imagine, the CEREC Bluecam operates under similar technology as discussed above.

Particularly the unit uses a blue spectrum LED light to auto acquire images with incredible precision and accuracy. Before we get into specific details about the Bluecam, let's get some perspective and history with



where CEREC was and where it is today.

Figure 1 is an illustration of the spectrum of light. What it shows is as the wavelength gets smaller, the precision increases. For years, CEREC has been in the infrared spectrum of light. The precision of this camera was very good and CEREC users enjoyed excellent fits with very little problems. In 2001, CEREC In Lab introduced a red laser scanner and more recently the E4D back in 2004. This slightly increased precision, but it was done at a cost. Without heavy opaquing, dental tissues absorb this wavelength causing artifacts and imprecise measuring. To get around this, often multiple pictures must be taken to get the increased precision allowed by red laser scanning. This brings us to 2009 and CEREC Bluecam. This camera capture images using the lowest wavelength light in the visible light spectrum, making it the most precise CAD/CAM camera on the market today.

Now, let's discuss two important issues: besides increased precision, how is this camera different from the CEREC



3D infrared camera and what can this do for me as a user? First of all the principles of taking images with the Bluecam are going to stay the same. You still want to have correct pitch, roll, and yaw of the image. However, the major difference in the photography technique

is the auto acquire feature. This means that you no longer have to use your foot to activate the camera and capture images. It is amazing how this works. To activate the camera, you simply single click the left mouse cursor which activates a live camera feed. As you bring the Bluecam to the mouth, the camera will automatically capture the image the moment you stabilize it. This is wonderful for many reasons. Now you can concentrate on aligning the camera perfectly, without worrying about the foot pedal and timing that is associated with that. The auto acquire feature is extremely fast and efficient allowing you to capture multiple teeth in a matter of seconds. Essentially, the Bluecam is making the photography process faster, easier and more precise...the perfect combination. I encourage everyone to watch the live demonstration

videos of this camera in action on www.cerecdoctors.com.

In addition to the Bluecam and many other optimized features, the CEREC AC is equipped with a much larger, high definition monitor with incredible resolution, a voice activated speaker and a built in battery backup that will run the acquisition unit for up to five minutes without being powered by an outlet.

Finally, what can this do for your CEREC

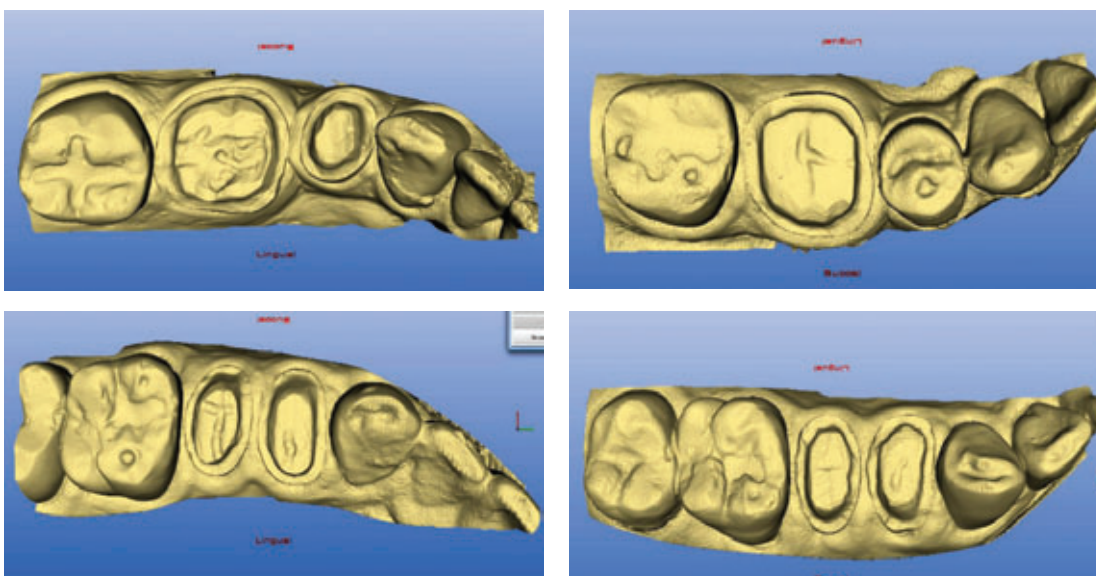


Fig.2-5

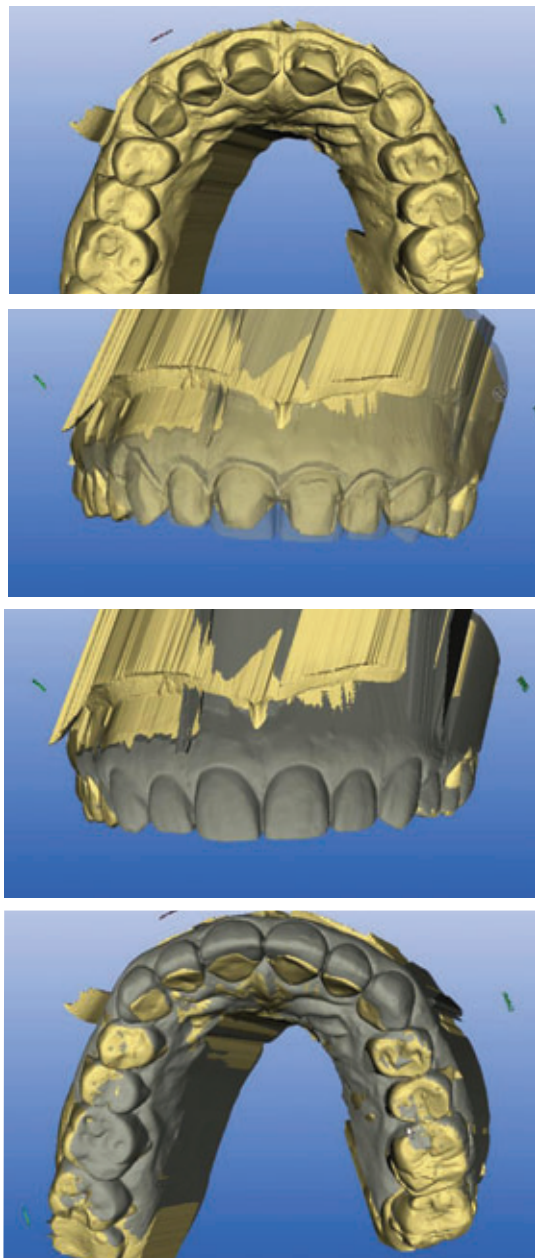
Bluecam and CEREC AC

experience? In short, the CEREC AC and Bluecam will tremendously increase the precision and efficiency of your optical scans. In combination with the new, larger HD monitor, this will help you create virtual models that are more precise, more visually clear and crisp, and easier to work with (Fig. 2-5). Additionally, with the increased focus and precision of the blue LED scanning, you have the ability to scan very large cases from entire quadrants to full arch, with little worry about averaging and inaccurate data. This will open many doors for CEREC users regarding their abilities with the machine. In cooperation with Cerec-Connect, you will have the ability to do almost any kind of restorative case imaginable.

Figures 6-9 show a larger case imaged. This was a six unit veneer case imaged with the Bluecam. Because of the efficiency and precision allowed by this new technology, I was able to image the entire arch, both preps and wax up correlates in about 3 minutes (1min 30 sec each) with 16 pictures each catalog. The Bluecam definitely allows you to image with more speed, ease and precision.

With Sirona's introduction of the CEREC AC and Bluecam, the future is now and the possibilities are endless. Faster, easier, more precise, AND more options. The "now" is exciting.

Fig.6-9



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An interview with Dr. James M. Austin

Q: How long have you been in practice?

A: I graduated from the University of Washington Dental School in 1980 and began my career as an associate of a practice specializing in DSHS patients located in downtown Seattle. As we were virtually the only doctors involved in this segment, my fellow associates and I had the opportunity to gather years of experience in a short period of time. I worked at this clinic for a little over a

“CEREC technology gives me an infinite number of restorative options, resulting in more choices for the patient.”

year while my office was built in Bellevue, a suburb of Seattle. In the fall of 1981, I opened the doors to my practice which was approximately 1,200 square feet with four operators. I didn't have any patients so I began to fully equip two of the operators. I have been practicing on my own since then, 28 years now.

Q: What is the size of your practice?

A: In 2003 our building was remodeled and enlarged. I took partial ownership of my portion of the building and expanded my practice to a 2,200 square foot office. I work approximately four days a week with six staff members and 2,400 active patients.

Q: How many operators do you have?

A: I currently have five fully equipped operators. I operate out of two operators while my hygiene staff uses two others. The last operator is used for emergency treatment, child cleanings and for overflow if we are running late.

Q: In which type of dentistry do you specialize?



A: I operate what I refer to as a family practice. Although I perform all phases of dentistry, most of my time is spent concentrating on restorative dentistry which I enjoy the most. Since I integrated the CEREC technology five years ago, I seem to be doing considerably higher-end procedures in the restorative arena.

Q: Why was the CEREC your CAD/CAM choice?

A: When I made the move to CEREC, it seemed there wasn't another option. I was blown away with the flexibility of technology and I was very impressed with Patterson Dental's support network. This was an easy purchase for me to make. My CEREC has been a very reliable performer. Patterson's reputation for their great support is a reality for me. If I ever have a question or a problem, they are immediately there. This summer I upgraded my CEREC to the newest computer software and the newly designed MC XL milling machine. I loved the finished product with my old milling unit but the fit of the restoration coming from the new MC XL is flat amazing.

"I can go on and on...this is one piece of equipment no practice should be without."

considerably increased over the last five years. I feel like our patients receive better care and my entire staff, from the front office to the operator staff, benefit greatly.

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

A: The technology has actually transformed and crystallized my philosophy. In dental school we are taught to always be conservative when involved with removing tooth structure, but traditional crown and bridge work seemed anything but conservative to me. When I saw that you could restore only the weak part of the tooth and complete the task in one appointment, I knew I had to make the move. CEREC technology gives me an infinite number of restorative options resulting in more choices for the patient. The ability to complete a finished inlay, onlay or crown in about one hour was a real benefit for both my patients and me.

Q: How has CEREC impacted your practice?

A: Prior to integrating the CEREC into my practice, a typical day at the office was filled with too many 30 minute appointments consisting of multiple one, two, and three surface composites, an occasional crown prep, an extraction, an endodontic procedure and of course, re-cementing or remaking the occasional fractured temporary crown. I went home everyday feeling exhausted. Implementing the CEREC technology transformed the way I treatment planned dentistry and our scheduling completely changed as well. Our day is considerably less stressful as most of our appointments are currently of the longer variety. We see fewer patients but our hourly income has

Q: What is your favorite procedure using the CEREC?

A: My favorite CEREC procedure is the emergency patient who has just snapped off one of their cusps. This is especially true if it's a new patient to our practice. The wow factor of having the technology to restore a broken tooth with a finished restoration, that looks and feels just like a natural tooth, in a single one-hour appointment cannot be overstated. The patient routinely goes back to work, pulls back their lip and shows all their co-workers what we just did. You can't buy that kind of advertising!



An interview with Dr. James M. Austin

Q: What is your most unique CEREC procedure?

A: My most unique CEREC procedure involved a nice young lady whose tooth #4 had never been restored after her root canal several years earlier. The caries extended down the root and well below gum level. Except for a bit of the mesial margin ridge, the rest of the tooth was completely gone. My initial reaction was to recommend an extraction and an implant as I considered the tooth was not restorable. The patient really didn't want an extraction and couldn't afford any definitive restorative treatment after the extraction anyway. I was relatively a new CEREC user and was interested in seeing what this technology could do and how it would hold up. I told the patient that I considered this more of an experiment than a treatment but she wanted me to try it anyway. Over the next hour and ten minutes we removed the caries, isolated the margin, took our pictures and designed a full crown including a post which the CEREC machine milled as part of the crown. The crown was bonded into place with Variolink cement and the margins were smoothed down. The patient was very happy to have a tooth again. I continue to monitor this restoration and have found that it has been functioning without problems for over three years.

Q: If someone were to take your CEREC away, what would you do?

A: I have reached a point in my career where I can't even imagine practicing without the CEREC. It is an integral part of how I practice dentistry.

Q: Is there anything else you would like to add?

A: Before I purchased my first CEREC unit, I ran the numbers and figured I could probably do enough restorations to pay for the monthly cost of purchasing the machine over the next five years. At the time, I didn't

really understand how it would transform my practice. Long story short, my machine was completely paid off with the increased revenue the CEREC generated within the first year. At that point, the savings in laboratory fees financed the purchase of a host of other state-of-the-art technologies. None of which I could afford without the cash flow generated by my CEREC machine.

Our patients really appreciate their CEREC restorations. They like getting a restoration completed in one appointment, rather than the two appointments it took in the past. I can go on and on, but let me just finish by saying this is one piece of equipment no practice should be without.

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My CAD/CAM Purchase:

Things to consider when investing in CEREC

Seth Gibree, DMD

Editor's Note: Dr. Seth Gibree who practices in suburban Atlanta, set out to write a point-counterpoint article on reasons NOT to buy the CEREC technology. After researching the CEREC with much consideration, he convinced himself to purchase this exciting technology. He has had a pleasing CEREC experience and shares with us his own thought process which led him to the decision to purchase the machine.

In the dentistry field where technology and competition continuously develop, we are presented with a multitude of purchase decisions and options everyday. This also proves true in the field of CAD/CAM technology. I was suddenly faced with a decision to enter the world of CAD/CAM dentistry or continue on my current path of practice. After residing on the fence for the past three and a half years, I finally chose to purchase a CEREC from Sirona/Patterson in December of 2007. I considered numerous factors prior to the actual purchase such as financial options, time allotment, lab work and materials and ultimately patient feedback and acceptance. I felt like I could no longer sit on the sidelines and allow amazing technology in the field of dentistry continue to pass me by year after year. It was time to jump on the bandwagon.

The financial choices can be overwhelming and difficult, as many of the daily decisions we face as dentists are. The initial purchase price of high end technology and advancements can be difficult to swallow. Dealers' prices on units to enter the CAD/CAM arena range from \$70,000 to \$130,000. The best purchase fit for me was a demo unit from Patterson Dental for just over \$70,000. The federal government offers tax deductions for small businesses under section 179; this made the purchase much easier. In 2007, the allowable deduction limit for

equipment purchases was \$125,000 and as of this year, has doubled to \$250,000. (Check with your accountant for questions on tax burdens, planning and deductions.) With the unstable political arena and a new upcoming administration, I wonder how long these types of tax breaks will be offered to small business owners and companies. There are several lease and purchase options available through different financial institutions and companies to finance your purchase. I chose my local lender, Atlanta Business Bank, for an equipment loan based on a prime rate (+) fixed APR.

For instance, the initial investment is \$100,000 on average. The monthly payment, cost of CEREC supplies, blocks, burs, etc. would need to be weighed against your lab bill, impression materials and an extra operator set-up of disposables. It is also vital to equate the number of units that would transfer from lab processed to CAD/CAM processed in your office. That number can then be used to figure out the line item shift in regards to your lab bill, by multiplying that number by cost per unit lab bill.

My transfer was a no brainer as the numbers added up! Do not purchase on an impulse because of an emotional experience or slick presentation. The numbers have to add up! The fact of the matter is, if you perform a fair amount of lab processed restorations, the machine more than pays for itself (even without the tax deduction). In regards to my collections, my lab percentage has decreased about 50% while my supply percentage has remained at the same level. Patients love the technology and happily refer their friends to our office. It is the best internal marketing tool next to my team!

During consideration, one question I had regarded time management. Time to get over the learning curve (there is one as with any new technology or piece of equipment), time for the patient in the chair and my time involved in the procedure and deciding which items I could delegate. The learning curve was the first factor I considered. I am so thankful for ceredoctors.com. It would take numerous advanced CEREC courses and many years of full practice to learn what is taught on their website via video. You can spend a long weekend in the comfort of your own home, overcoming a great majority of your learning curve. Also, there are numerous beginner, intermediate and advanced courses offered year round at Scottsdale Center for Dentistry. With the help of CERECdoctors.com and Scottsdale Center for Dentistry, the learning curve for my team and I was gone in a few short months. Without their help I would hope to have a mentor, but even then my knowledge would be limited to his or her knowledge. Check out www.cerectoctors.com and Scottsdale Center for Dentistry; Patterson has begun to include the first year membership on cerectoctors.com with the purchase of a unit.

The patient's chair time was the second factor I considered. Initially, the appointment is a bit longer and could slightly limit your chair capacity depending on the size of your facility. During my initial learning curve, a single CEREC unit would take just under two hours. This was longer than my normal single crown appointment. Now we are much faster and my chair time is the same as a normal crown prep. Nowadays, the patient is treated and can leave the office with a permanent

restoration rather than a temporary, in about an hour and 15 minutes. There is no return appointment! At first, it was a transition. Now it's a smooth part of our everyday general family practice, but with higher volume.

Best of all, you have a choice in regards to doctor times and assistant utilization. Most state laws allow you to delegate as much or as little as your heart desires. I have chosen to relinquish what I can to my great assistants. After imaging, your time choices with CEREC are all personal preferences.

I was not too excited about the thought of "lab work" again, I had dental school flashbacks. I was also concerned about marginal integrity and prep design. I did not want to become a dentist that used his CEREC in every situation. I believe there is a time and place for different materials, no matter what technology you possess. I still place gold, PFM, on all porcelain lab manufactured units daily. It is a choice! I chose not to place all porcelain restorations on 2nd molars, except in rare cases. Because of the new e.max blocks and their strength, there is less of a concern than before. You have to be aware of material options, longevity, wear properties, characteristics, patient factors and choices in regards to the type of restoration to be placed.



My CAD/CAM Purchase:

Things to consider when investing in CEREC

I am surprised at how much I enjoy the control of placing a unit that is made in-house with a digital impression. It gives me total control and autonomy, taking out numerous variables such as communication and distortion of materials. Now we can control marginal integrity, spacers, cement thickness as well as prep design and conservation of tooth structure. Now my preps are better because of CEREC. Even though I use magnification (Orascope 4.5) and illumination with a head lamp, it is amazing to see your preparation enlarged 12 times on a computer monitor with a normal setting. Your prep designs will have better flow, continuity and smoothness. Your all around dentistry should become better, mine has improved immensely! Patient feedback and response has been amazing. They love having their restorations completed in one visit without having to worry about a temporary. Even those that want a unit in one visit, but cannot offer it are very accepting of the decision to act in the best interest of their dental health. We can customize shades for the patient with different stains and glazes or polish the porcelain to a high shine. You must have a bonding/adhesive protocol that is sound and based on fact rather than marketing, salespeople and promotions. It is very important that you learn to implement this protocol rather quickly.

I currently use Apex Dental's Surpass, Interface and Anchor for bonding, silane and cement, respectfully. When bonded properly along with good isolation, either with rubber dam or Isolite, all porcelain restorations work. As with any restorative procedure, there can be failures but the long term success on these restorations is

comparable or better than that of lab based units.

My team loves our CEREC and my patients love it too! I have more referrals from our new machine than any other piece of technology I've ever purchased. CEREC is the best purchase I've made to date.

In conclusion, there are many things to consider when deciding if CAD/CAM dentistry is for you. Hopefully I have been able to answer some of your questions by illustrating concerns and thoughts I had prior to entering this part of dentistry. I am excited to see competition for CEREC (Sirona) in this field because ultimately it will create a better end product for the user. There are thousands of CEREC users to glean information, techniques and thoughts from versus a few E4D (Schein) clients. This knowledge base was instrumental and critical in my choosing to purchase the CEREC over the E4D. My patients, my team and I are big fans of our CEREC.

The CEREC is another tool we have added to our armamentarium to provide better service and dentistry for our patients. The purchase of this technology is a win-win situation for both our office and our patients. If this is technology you are interested in, I would contact my local sales representative to start with an in-office demonstration today.

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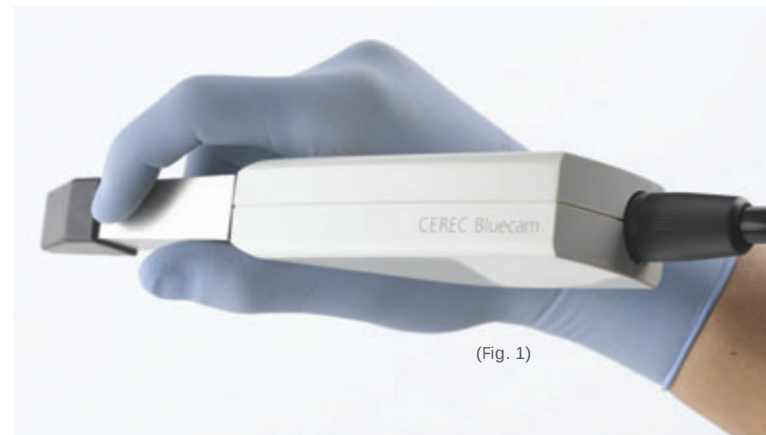
CEREC Bluecam: Christmas Came Early

Sameer Puri, DDS

With the arrival of the New Year and recent holiday season still fresh, Christmas came a bit early for me. I recently received a package and gazed curiously as it had arrived unannounced. I wondered, did my staff get together to buy an early gift for their boss? Did my wife secretly order that 50 inch plasma TV that I've desperately been wanting for my private office so I could catch up on my favorite Entourage reruns while finishing the mounds of paperwork required to run a dental office? Hardly! This box contained something way more interesting.

I've been a Beta Tester for the CEREC software for a number of years now. This has given me the unique opportunity, along with other CERECdoctors.com faculty members, to test and preview the latest versions of the software. Before any software is released to the general public, Beta Testers spend months working with and evaluating the new features of the software. Although we feel a tremendous toll on the practice in helping to find bugs and provide feedback for the software, this enables us to pass on that valuable information to doctors in our CEREC Advanced Courses at Scottsdale Center for Dentistry.

In this case, being a Beta Tester and enduring months of software updates had for once led to something unique...I've had the opportunity to be one of a handful of dentists in the world to test drive the new CEREC Bluecam! (Fig. 1)



(Fig. 1)

While the new system doesn't look much different than the current system, its performance compared to the CEREC "Red Cam" (named for its infrared technology), is like comparing a Mercedes S Class to a Formula One car. Like the S class, one of the premier pieces of automotive engineering, the CEREC Red Cam has reliably provided one-visit dentistry for 23,000 dentists and millions of patients nationwide.

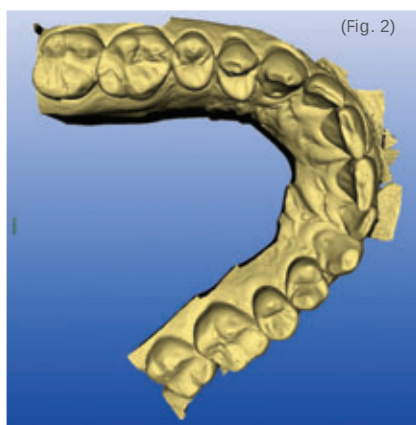
As good as the CEREC Red Cam is, the Bluecam is that much better. As I fiddled with the camera, I noticed that it looked the same, weighed pretty much the same and ran the same software versions. However, while the Red Cam takes one image at a time, the Bluecam gives you the ability to take multiple images quickly and efficiently. The camera simply turns on with the click of

CEREC Bluecam: Christmas Came Early

a mouse and the Bluecam just fires away. Snap, snap, snap...in about ten seconds you can capture an entire design ready quadrant.

As you notice the detail and quality presented in models produced, you will realize the amazing clarity and sharpness with which images are captured. (Figure 2) With the ability to mill your restorations chairside or send them to the lab, this camera is capable of replacing all your impression material, introducing you to a digital world.

The true test of this camera's power can be determined through a new user's response to the new system and how quickly they learn the CEREC process. With cameras in tow, we set out across this great land of ours to work on the Bluecam with a few well known clinicians. Armen went to Salt Lake City to update Drs. Gordon Christensen and Paul Child, both of CRA, while I trekked to the great Northwest to work with Drs. Frank Spear and Gary DeWood. As you may know from the interview in the last issue, Dr. Spear was anxiously awaiting the delivery of his new system.



(Fig. 2)

I can say that the report from the field was overwhelmingly positive and all doctors quickly scanned quadrants with virtually no trouble. Dr. Child, CEO of CRA, was able to scan a full arch on a patient with little to no trouble.

You can learn more about the CEREC Bluecam and the latest software update, version 3.4, on www.cerectoctors.com. Check out the hundreds of videos and the new virtual test drive of the CEREC and learn more about this incredible advancement in CEREC technology.

If you are a CAD/CAM user or you are currently considering becoming a user, this year promises to bring you many exciting innovations with CEREC leading the way. There is no place in the world that has more CEREC related information than www.cerectoctors.com. See you online!



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