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A Special Thank You

Welcome to the inaugural issue of CEREC Doctors the Magazine! We are very excited to provide you with this publication and will be launching a new issue guarterly. Whether you are already involved in using CEREC, or are simply considering it, we have something for you.

We will be presenting articles that will serve to update you on the latest in the CEREC world. You will learn the different techniques and tips and tricks, other doctors are using for their most complex cases. We will also provide you with interviews with top clinicians in the industry explaining how CEREC has impacted their practice.

On that note, we would like to thank all the doctors who contributed their work to make this magazine a reality. Thank you, we are fortunate that you have chosen to contribute and we look forward to your continued support.

To our readers, we assure you we will put forth our best efforts to provide you with a quality resource in dentistry that is sure to inspire and motivate you. We look forward to helping you achieve great success in your practice and we thank you for your support.

We are confident that all readers, CEREC users and those interested in investing in CEREC will benefit greatly as we provide you with the latest and greatest from the CEREC world. Enjoy!

Sincerely,

**CEREC** Doctors



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CEREC CONNECT

THE CEREC DESIGN PROCESS









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### **DREAMS**EDITORIAL Mark J. Fleming, DDS Darren Greenhalgh, DDS

Welcome to the inaugural issue of CEREC Doctors Magazine. This publication has come to fruition by what may seem to be unrelated yet convergent dreams of five dental and management professionals. Dreams have been defined as, "To see in a vision, to imagine as possible." Consider these dreams:

Drs. Rella and Gordon Christensen dreamed of creating an organization that would allow talented, experienced clinicians to test new and promising dental products and disseminate the results throughout the world.

Mr. Imtiaz Manji dreamed of opening a world-class dental learning facility that would change dentistry for the better. That dream was further inspired by his late wife Shahinool who said to him, "Why don't you just do it?"

Drs. Sameer Puri and Armen Mirzayan dreamed of teaching CEREC owners by creating a website with hundreds of online educational videos and an interactive discussion board.

Despite being thought up by different individuals, were these three dreams really unrelated? Hardly. We are partial to a quotation from Dan Millman's book The Way of the Peaceful Warrior, "There are no ordinary moments." After building the Scottsdale Center for Dentistry, Mr. Manji enlisted Dr. Gordon Christensen to be the Dean. Then, Drs. Puri and Mirzayan were chosen to teach advanced CEREC courses at the center. Three divergent dreams came together and are now reality. Although these dreams were fulfilled, that was not enough for this group of creative and innovative professionals. Something was missing.

Until recently, we still believed there was a void. We realized there was no dedicated resource publication for CEREC owners and we felt inspired. It wasn't a question what would happen next.

We want to provide a resource for CEREC users wanting to go beyond the ordinary into the extraordinary, so here it is! Our dream and purpose in publishing CEREC Doctors

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- Magazine is to help CEREC users get the most from their CEREC experience. CEREC is an advanced technology that will provide dedicated CEREC owners the possibility for
- technological excellence. Expertise will bring a sense of increased gratitude and goodwill from satisfied patients, creating a more enjoyable and profitable experience for the dentist.
- It is our mission to publish a dedicated CEREC resource journal containing articles and interviews from successful practitioners and researchers. Our hope is that this journal will enhance the reader's CEREC experience making use of the equipment an easier and more enjoyable process.
- If you are not currently using CEREC technology but are considering the possibility for the future, you can take a virtual test drive and view actual clinical cases presented by CEREC Doctors at their website www.cerecdoctors.com.
- Be sure to mark your calendar for the First Annual CEREC Owner's Symposium to be held October 3 and 4, 2008 at the Scottsdale Center



Darren Greenhalgh, DDS Co-Editor



Mark J. Fleming, DDS Co-Editor

for Dentistry. Additional information about this event can be obtained by logging onto the above website.

We are excited with what we have already achieved and move forward with that same enthusiasm. It is with a strong vision and clarity that we continue in our mission to accomplish our dream of helping you realize the dreams you have for continued excellence in your CEREC experience. CEREC Doctors Magazine is honored to be a part of your journey to achieving extraordinary moments.

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# CEREC DOCTORS MAGAZINE



Inaugural Issue July 2008

**Co-Editors** Mark Fleming, DDS Darren Greenhalgh, DDS

**Co-Founders CerecDoctors.com** Sameer Puri, DDS Armen Mirzayan, MA, DDS

> Creative Director Rocio Abascal

Administrator for CerecDoctors.com Elizabeth Davison liz@cerecdoctors.com, 818.998.7474

> Ad Representative Elizabeth Davison

**Graphic Designer** Nick Christie

**CAD/Toons** Brian Thornton, DDS

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If you have any questions or comments, we want to hear from you. Please e-mail Elizabeth Davison at liz@cerecdoctors.com or visit our website at www.cerecdoctors.com. For inquiries on ad placement, please contact Elizabeth Davison, 818.998.7474.

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# A CANDID CONVERSATION WITH DR. RELLA



It is my distinct pleasure to interview one of the leaders in our field for the inaugural issue of CEREC Doctors Magazine. Dr. Rella Christensen has been involved in dentistry for decades and has undertaken a tremendous amount of research of various dental materials and techniques. We felt it would be very interesting to get her perspective on the CEREC technology, which is now in its 22nd year of service. I had

the opportunity to interview Dr. Christensen and get her candid views on the CEREC and its use in the dental office.

**Dr. Sameer Puri:** Can you please tell the readers your experience with the CEREC system both on a clinical level and on a research level?

**Dr. Rella Christensen:** I have worked with CEREC for almost 17 years. Our work started in 1995 almost 10 years after Dr. Werner Mormann milled his first inlay with the original CEREC technology. During our research, we have worked with many different materials including Dicor MGC (milled glass ceramic), Vita Mark II, Procad, Paradigm and several experimental materials. Originally all the research was done with inlays. Because the limitations of the CEREC technology at that time made it difficult to work with restorations other than inlays, the original research was performed with CEREC owners. The CEREC owners selected the patients, cut the preps, seated the restorations and then sent impressions and other data to us for analysis over several years. We made very high resolution dies by

pouring the impressions in a polyurethane material that was then gold sputtered. SEM work was done on all of them, so we had scanning electron microscope photos as well as clinical photos and high resolution dies. We had a short experience with CEREC 1 and then the rest of the work was done with the CEREC 2, 3, 3D and the InLab. In addition to our in-house work, which includes six separate studies, I have visited offices all over the U.S. and Canada to see how they worked with CEREC technology. Early on, I and another basic science colleague attended the CEREC training course at the University of North Carolina. I also had the privilege of spending a week in Zurich, Switzerland observing the CEREC work of Dr. Werner Mormann while they trained one of our on-site dentists to use the CEREC.

**Dr. Sameer Puri:** How do you feel the current CEREC technology fits into a dental office?

**Dr. Rella Christensen:** It fits quite well into dental offices where the time and effort have been given to learn to use it well and incorporate its unique patterns of delivery. I believe that eventually most restorative practices will have a device like this to deliver same day ceramic restorations. We feel that Sirona has made some wonderful strides with regards to hardware and software, especially with the software. The software is a lot easier to use and in my opinion much faster than earlier versions. There is less hand work of the finished restorations required by the dentist and staff. The earliest restorations required quite a bit of hand work following the milling to define the occlusal anatomy, establish the contacts and establish the occlusion. They have made some great strides with the newer technology to minimize these modifications.

**Dr. Sameer Puri:** The CEREC technology has a fairly expensive price tag, relatively speaking. Do you feel that this is a good investment for the dental office?

Dr. Rella Christensen: Yes, but only if the dentist is dedicated and determined to master the techniques. They need to set aside the time and want to make the technology work for them. They need to be willing to train their staff and organize their systems in the office to adjust to an in-office construction of the restoration which takes time. Offices with that dedication and determination have done very well with CEREC. Offices where we found CEREC to be the most successful are those with a dedicated staff member who starts while the doctor is with another patient. The staff member takes over the milling, initial try-in and finishing. Then the doctor completes the procedure with the cementation and final adjustment of the restoration. I have found that in a busy established office, the doctor will try to do the whole procedure and it does not work out as well.

### "They need to set aside the time and want to make the technology work for them."

**Dr. Sameer Puri:** What improvements do you feel should be made to the CEREC technology?

**Dr. Rella Christensen:** I would like to see the abolishment of powder and would love to see a smaller hand piece camera. With improvements in digital impressions, I wonder if there can be a direct feed to the CEREC with

newer digital impression technology. (I informed Dr. Christensen that Sirona is in fact working on this with the CEREC Connect program where CEREC dentists can email digital scans of their preps to laboratories for fabrication of final restorations other than all-ceramic, to which Dr. Rella replied...) The digital impression is



the key to the form and fit of the restoration. If it's not done carefully, the final product suffers and you get a restoration that you may not be pleased with.

**Dr. Sameer Puri:** How do you feel milled restorations from CEREC compare to other dental restorations such as gold, composite, amalgam and PFM restorations?

Dr. Rella Christensen: One of the intents of our research was to find out the answer to this guestion. We have found that the best milled restorative materials are equal to, or slightly better than, the best laboratory fabricated materials of the same type. By "of the same type," I mean all-resin or all-ceramic inlays or crowns similar to an Empress where the whole restoration is made of one material instead of a framework and veneer ceramic. In comparison, CEREC materials are as good as or better than lab fabricated materials. When we first saw CAD/CAM blocks we were intrigued and hopeful that the controlled conditions under which the blocks were manufactured would result in ceramic and resin based materials that would clinically last longer. We have not found that the ceramic and resin block materials last forever, but CEREC materials have held their own well against the other materials used today.

**Dr. Sameer Puri:** The longest study regarding CEREC longevity is around 18 years with an 85% success rate, so what you are saying is that CEREC is a viable restorative technique and material?

**Dr. Rella Christensen:** Yes. CEREC is a viable restorative technique and the materials are also viable. In a research study we look at things a bit more critically than in a

clinical environment. There are a number of reports that show very good longevity, but those reports often accept a number of defects as long as the restorations are still able to serve. In our situation, we tend to record all defects including small chips, large chips and cracks, even though the restoration can still

continue to serve. We have seen CEREC restorations crack through the isthmus, but go on to serve for many years as long as they don't develop caries. However, we like to compute the percent perfect restorations over time, since patients like to think their restorations will remain perfectly A CANDID CONVERSATION WITH DR. RELLA

intact for many years. A good analogy would be a car with a dented fender. It still functions well; it just doesn't look as nice. From this point of view, our clinical studies show CEREC restorations to be comparable to, or slightly better than, their lab fabricated counterparts. Although the CEREC ceramics can break, we have not seen the chipping with CEREC ceramics we have seen on some hand-layered ceramics.

**Dr. Sameer Puri:** How many of the CRA evaluators own the CEREC technology?

**Dr. Rella Christensen:** I really do not know the answer to that question right now. Our first study did not involve CRA evaluators. We secured an owners list from Sirona and asked the owners if we could follow their restorations. There were 25 CEREC owners in the first study. This was just at the transition from the CEREC I to CEREC II. Then we later worked with onsite CRA evaluators who were not owners. These were people we directly supervised. The machine was operated by one of Dr. Werner Mormann's post-doctoral people on loan to us. The fit and longevity of the restorations are very dependent on the techniques. This is why we never sent CEREC machines to inexperienced or untrained dentists. At this current time, we work with only onsite evaluators.

**Dr. Sameer Puri:** CRA evaluators recently declared the CEREC as a "must have, can't live without" piece of dental equipment. What are your feelings on this statement?

Dr. Rella Christensen: I have been all over the US and

"...People love the CEREC. Their patients love the new technology.." Canada with people who are using the CEREC. Those who have given the time to experiment with the technology, learn it, integrate the systems, train staff and make the software and hardware second nature

have done very well with the CEREC. Those people love the CEREC. Their patients love the new technology; they love to see the restoration mill and the fact that there is only one appointment. Even though the one appointment may be a bit longer, they would rather get one day off from work for the dental visit, rather than two days. So it has been a positive thing in many practices. It has been a practice builder and a practice promoter and these doctors don't want to live without the CEREC.

**Dr. Sameer Puri:** Much has been said about the longevity of CEREC and all-ceramic restorations in general. What do you feel are the appropriate uses of the CEREC technology in the dental practice?

**Dr. Rella Christensen:** It is virtually tailor made for a single tooth restoration or a quadrant of restorations which are inlays, onlays or crowns. We found the crowns to be easier since they generally have very nice margins. The inlays can be a bit more challenging depending on the outline form. We do not glaze or characterize the restorations, we polish them. One of our research questions was whether these materials wear the opposing dentition. So, we have never performed glazing or characterizations. I can't really comment on anterior restorations because we haven't worked with them in our lab.

**Dr. Sameer Puri:** So, second molar treatment with the CEREC is not a contraindication in your opinion?

**Dr. Rella Christensen:** We have successfully placed many crowns on second molars. For us, this is a test site. We want to test the restorations in a high stress area. Anything distal to the first premolar is where we have done our research and this work has shown that CEREC in molars is appropriate. I have seen a few beautiful anterior CEREC restorations but we have not milled them ourselves.

**Dr.Sameer Puri:** There are many instances of CEREC owners reporting a lower incidence of post-operative endodontics. How do you feel the CEREC restoration impacts the health of the tooth if any?

**Dr. Rella Christensen:** I would attribute post-operative sensitivity and endodontics to the preparation, not the CEREC materials themselves. Closeness to the pulp and

the handling of the desensitization of the tooth are factors. We always use Gluma Densitizer and Vitrebond as a liner in the deep spots. We use a resin cement. Post-operative sensitivity and endodontics have not been a problem in our work.

**Dr. Sameer Puri:** Currently there is only one company that creates a composite block for the CEREC. What are your feelings on indirect composite restorations done with CEREC versus an all-ceramic CEREC restoration? When would you use each material and why?

**Dr. Rella Christensen:** We have a number of clinical cases using all-resin crowns. There was a time when all-resin materials such as Artglass, Belleglass, and Targis were

### "For 25 years, I have been looking for a material that could be what I call a 'Volks Crown'."

marketed for resin crowns. They were promoted for single unit crowns on molars. Our

study included these materials and we thought that the millable resins would be an extension of that. For 25 years, I have been looking for a material that could be what I call a "Volks Crown". The Volkswagen in Germany was designed to be a car for everyone. The "Volks Crown" would be durable and economical to accommodate patients such as single mothers, young people starting out, low income families, etc. These are people who need crowns but can't generally afford them. This is the niche we saw for CEREC resin crowns. With CAD/CAM crowns we saw something that was quick and easy to make, easy to cement and was a thoroughly economical restoration. CAD/CAM crowns have not been marketed this way, but perhaps in the future we will see a "Volks Crown". If we do, I bet it will be fabricated using CAD/CAM in office to keep costs down.

#### Dr. Sameer Puri: As CEREC becomes more mainstream,

more users are staining and glazing their

"To me it's an absolutely fascinating area... I think that as systems start to multiply in the market and competition in software and innovation increases, most dentists are going to become involved."

restorations. How do you feel a stained and glazed restoration stacks up against a polished CEREC restoration?

**Dr.Rella Christensen:** There are some polishing procedures that finish these restorations to a beautiful luster. I can tell you after recalling these restorations for many years, (our longest research being 16 years) the polished surface is retained well. Patients frankly don't like to see brown lines in the pits and fissures of their teeth. I have had several cases where ceramic restorations had to be sent back to the lab because the patient didn't like the "cavities" in their new restorations. After watching clinical restorations for 16 years, I can tell you the polished surface lasts, so I see no reason to glaze.

**Dr. Sameer Puri:** Where do you see the future of Chairside CAD/CAM and more specifically the CEREC technology in general?

**Dr. Rella Christensen:** To me it's an absolutely fascinating area. I don't know if I can say everyone will be using Chairside CAD/CAM, but I think that as systems start to multiply in the market and competition in software and innovation increases, most dentists are going to become involved. I think things are going to become easier and patients are going to hear about and ask for the one-appointment, ceramic restoration.

**Dr. Sameer Puri:** What recommendations do you have for someone considering purchasing CEREC technology?

**Dr. Rella Christensen:** I think you need to be committed. You need commitment on several levels – commitment to allow the time, commitment to establish new systems, to accommodate patient scheduling and commitment to train the staff. A CEREC is not something you write a check for, plug it in and move out on day one in full production. It takes time and practice so the hardware and software become second nature and your concentration can be on

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the patient and restoration, not the hardware and software. If doctors commit to mastering the technology, CEREC can be a very sound investment for them. In a report in 2006 we looked at some characteristics we thought would make CEREC users successful. We listed things like being unafraid of computers, having a team approach, not trying to do all the steps yourself, delegation of appropriate tasks and having the tenacity to stick with it. There is a definite learning curve. If the things we have just mentioned are mastered, success with CEREC can be a real "shot in the arm" for the dentist, staff, and the practice. Patients love the "new toy" in their dentist's office.

I would like to thank Dr. Christensen for taking the time to do this interview and I look forward to her presentation at the First Annual CEREC Owner's Symposium at the Scottsdale Center for Dentistry to be held on October 3-4, 2008.

We are proud to bring you exclusive interviews with the leaders of dentistry in every issue of CEREC Doctors Magazine. Learn more as they discuss their impressions and experiences with the CEREC technology. We hope you enjoyed this interview.

To learn more about incorporating CEREC into your practice, please visit www.cerecdoctors.com and click on the potential owners tab.





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### Dennis J. Fasbinder, DDS, ABGD **Clinical Professor of Dentistry** Director, Advanced Education in General Dentistry University of Michigan School of Dentistry

# THE BLUE REVOLUTION CHAIR-SIDE HIGH-STRENGTH CROWNS

### **Background on the Author:**

Dr. Fasbinder is currently the Director of the Advanced Education in General Dentistry Program and a Clinical Professor at the University of Michigan, School of Dentistry. He also maintains a part-time private practice in Ann Arbor, Michigan.

Dr. Fasbinder is certified by the International Society of Computerized Dentistry as a CEREC educator. He is also a founding member of 21st Century Practice Solutions, comprised of some of the nation's top experts in CAD/ CAM and technological applications for dentistry.

Dr. Fasbinder has been doing laboratory and applied, clinical research with CEREC and other ceramic systems since 1993. He has lectured throughout North America, Europe, Africa, and Australia on ceramic dentistry and CAD/CAM technology.

Restorative material options for the CEREC 3D system have increased significantly over the past several years. Ceramic blocks have evolved from a single shade to polychromatic blocks with varying degrees of translucency. The ceramic blocks available for chair-side restorations must be adhesively bonded to the tooth to achieve maximum strength and ensure longevity of the restoration. However, there is one exception, and that is the e.max CAD LT material (Ivoclar Vivadent), commonly referred to as the "blue block".

The e.max CAD block is a lithium disilicate glass-ceramic material that was introduced as part of the e.max ceramic line as a high strength, coping material for single crowns. It is available in the "MO" (medium opacity) block form

for copings and is veneered with the e.max Ceram porcelain. It has since evolved into an "LT" (low translucency) block form with nine A-D shades and 4 bleach shades. Although it is indicated for copings, recently, e.max CAD has also been used for full contour restorations.

The e.max CAD glass-ceramic has a flexural strength of ~360 MPa, which is approximately 2 1/2 times greater than other ceramic blocks available for the CEREC system for chair-side restorations. To create a block that can be easily milled, the e.max CAD block is manufactured in an intermediate crystalline phase, or "soft" state, which has a flexural strength of ~130 MPa. The purple to blue color of the block is due to the composition and structure of the pre-crystallized glassceramic. (Figure #1) CEREC 3D version 2.8 or later must

be installed for the e.max CAD LT material to be an optional material in the mill preview screen. There is a specific milling program for the material as it cannot be



**FIGURE 1** 

milled using the "fast mill" option. The standard milling chamber requires about 20 - 22 minutes of milling time for a conventional molar crown design. The MCXL milling chamber requires about 15 - 17 minutes of milling time.

Once the e.max CAD block has been milled, the restoration must undergo a firing sequence under vacuum in a porcelain oven to complete the crystallization process and achieve the maximum physical properties. The 25minute crystallization process occurs at 8400 C (15440 F)

and converts the blue shade of the pre-crystallized block to the selected block shade. It causes increased growth of the lithium disilicate crystals and increases the density of the material. The firing process does not cause clinically relevant volumetric shrinkage of the material.

(Figure #2) Illustrates a clinical case in which the patient elected crown restorations for teeth #3 and #4. Tooth #3 presented with a fractured composite restoration, and tooth #4 presented with a fractured lingual cusp with a failing amalgam restoration. Crown preparation guidelines

for e.max CAD

crowns are similar

to those for other

CEREC crowns. This

includes an axial

reduction of at least

1.0 mm with cuspal

reduction of 2.0

mm and an occlusal

fissure reduction

of no less than 1.5

mm. The preferred

margin designs are

a shoulder with a

rounded internal

angle or a chamfer

margin. Note in

this case that in

removing the prior

restorations, some



**FIGURE 2-1** 



**FIGURE 2-2** 

additional reduction was required and the defects were incorporated into the preparation design rather than blocking them out. (Figure #3)

The crown preparations were powdered and captured to the Acquisition unit in the usual manner. The CEREC 3D version 3.03 software was used to design and mill the crowns. Although the e.max CAD material is fabricated in a pre-crystallized state to make it easier to mill, it requires additional milling time as the "fast mill" option cannot be selected. After the crowns are recovered from the milling chamber, the sprue is removed to facilitate placement. All

contour modifications should be completed in the blue



FIGURE 3

(softer) state, as it is significantly easier to adjust compared to the final crystallized state. Adjustments should be made with light pressure, using microfine diamonds (40 micron or less) with water spray or

diamond impregnated rubber polishers. A rubber polisher finish is sufficient, as the crown will be glazed during the crystallization process.

Although adjusting the occlusion is a risky endeavor with uncemented CEREC restorations, the e.max CAD milled crowns have sufficient strength so they may be trial seated with a silicone material (GC Fit Checker/GC America) and the occlusion refined. With a little care, the final occlusion can be established prior to the crystallization process, significantly minimizing or preventing the need for postfiring adjustment of the occlusion.

After completing the trial seating, clean the crown thoroughly prior to the firing sequence. This can be accomplished with a steam cleaner or an ultrasonic bath. Since the crystallization firing sequence approaches the melting temperature of the crown, all margins should be supported to prevent potential movement of the material. IPS Object Fix (Ivoclar Vivadent) is a putty-like material that can be placed in the crown to support the margins. (Figure # 4) Take care to avoid extruding the material onto the external



FIGURE 4

surface of the crown as this will prevent the glaze from reaching the surface of the restoration. A silicon nitride support pin can be inserted into the Object Fix material to fabricate a hand-

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held die for ease in stain and glaze application. The nitride pin is placed on the nitride tray before insertion into the porcelain oven.

The crystallization process can be combined with a stain and glaze application for maximum efficiency in processing the crown. One might think it would be difficult to create the desired final shade by applying stains and glaze to a blue crown. However, with minimal practice and experience, the desired final shade is easily achieved. Alternatively, the full contour crown can be cut-back so additional porcelain shade modifiers or veneering porcelain could be placed to customize the final restoration.

Crystallization and glazing are accomplished in a single firing sequence. The glaze is available as a paste. It should be diluted with the e.max Ceram Glazing and Staining Liquid to create an easily flowable consistency. An overly thick

layer of the glaze paste can lead to pitted surfaces on the final restoration (Figure #5). The surface stains and color modifiers are specific to the e.max CAD block and not the same as those



used for the EmpressCAD blocks. The stains and color modifiers can be applied with the glaze paste to customize the final shade of the crown. Once the firing sequence is completed and the crown has cooled, the Object Fix putty is easily removed from the inside of the crown using running water and a stiff brush. The Object Fix will prevent glazing of the ceramic surface if it covers the external aspect of



the crown. (Figure #6) A steam cleaner or ultrasonic bath can be used for complete cleaning of the restoration.

The e.max CAD glass-ceramic is the only chair-side block material that offers the clinician

FIGURE 6

a choice of cementation techniques due to its high strength. One option is to adhesively bond the crown to the tooth as is required of other CEREC chair-side materials. The e.max CAD glass-ceramic can be etched with IPS Ceramic Etching Gel (4.9% HFl acid) for 20 seconds, and then thoroughly rinsed. The etched ceramic surface should be treated with a silane coupler before application of the adhesive resin cement. Alternatively, the e.max CAD crowns may be cemented with a resin-modified glass ionomer cement. This alternative offers the potential clinical use of e.max CAD restorations in non-adhesive situations such as implant crowns, or metallic cores.

**Conclusions** The e.max CAD LT block offers a significant high-strength alternative material for CEREC inlays, onlays, or crowns. Due to the high strength of the material, the clinician has the option of either adhesively bonding or cementing the restoration. The additional time required for milling the material and the crystallization firing sequence must be considered in the selection of the material for chair-side applications. Clinical research on the longevity of these restorations will provide valuable information for determining its clinical applications.



**FIGURE 7-1** 



FIGURE 7-2

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# ANTERIOR ESTHETICS

Sameer Puri, DDS

A CASE REPORT

The CEREC technology has come a long way. Gone are the days of restorations that look like glorified provisionals. In fact with a little effort, CEREC restorations can be every bit as esthetic as a laboratory fabricated restoration. Coupled with the fact that these restorations can be completed in one visit, this offers a great advantage to patients and practitioners alike.

**1.** A 22 year old male presented to the office with a traumatic fracture suffered the evening before in a night club on a mechanical bull. (*Figure 1*)



### FIGURE 1

**2.** Intraoral examination revealed that tooth #9 and #10 had been fractured and pulpal exposure had occurred. The fragments of the teeth were not found and a treatment plan was fabricated to restore the dentition to its original condition. (*Figure 2*)





**3.** Root canal therapy was completed on both teeth along with a composite build up. Final preparations were completed on the teeth and the tissue was retracted using retraction cord. (*Figure 3*)





**4.** The preparations were powdered in the mouth and optical scans were taken by the CEREC camera. (*Figure 4*)



FIGURE 4

**5.** A virtual model of the teeth was fabricated by the CEREC software to allow for design of the final restorations. (*Figure 5*)



FIGURE 5

**6.** The restorations were designed using the CEREC software and milled from a feldspathic porcelain material. (Vita Mark II Blocks) (*Figure 6*)





### FIGURE 6

**7.** The restorations were milled and verified for fit, contours and esthetics. The shade of the milled restorations was deemed too light by the clinician and patient alike. (*Figure 7*)



### FIGURE 7

**8.** Utilizing glazing and staining pastes, the restorations were custom stained chairside to the desired shade and esthetics to match the adjacent teeth. (*Figure 8*)

**9.** After custom staining, the final esthetics were revealed. (*Figure 9*)

**10.** The final restorations blend harmoniously into the surrounding dentition. The CEREC makes the restorative process simple and easy.(*Figure 10*)



**FIGURE 8** 



**FIGURE 9** 



### FIGURE 10

Utilizing the CEREC technology can be a win-win situation for the patient and clinician alike. The clinician is able to save on overhead and the laboratory bill by eliminating a second visit, while the patient has his dentistry completed and fully restored on the initial visit.

To learn further details and view a complete video tutorial on the design process of this case, please visit *www.cerecdoctors.com/potentialowners* 

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# DESIGN PROCESS

Capturing quality data with optical images forms the basis of the CEREC design process. Accurate images are essential to render an accurate virtual model. This is done by creating a clean, even and uniform coat of titanium dioxide powder on any surface that you wish to capture.

There has been, and continues to be, debate on which system, approach or technique is the best to capture this data. I would like to demonstrate one way that has been very successful for me over the years for achieving predictable and proficient virtual models on most of my CEREC cases.

First off, I am not using anything new that most of you haven't already used, namely: adhesive medium and powder. The following cases illustrate how I like to approach the simple, yet important, step of powdering:

A 46 year old female presented to my office for a crown on tooth #3 and a DO on tooth #5. This patient has mesial, distal, occlusal, buccal and lingual decay present around an existing Amalgam MODBL restoration. (Figure 1)



#### FIGURE 1

The first step is to prepare the patient for a CEREC crown by removing the failing Amalgam and Recurrent Decay associated with tooth #3. (Figure 2)

Notice how close in proximity the tissue and the distal



#### FIGURE 2

margin of the prep are in terms of height. This has always been a challenge when powdering due to the fact that this tissue, can and will, often gets in the way of a crisp, clear margin when taking optical images.

There are a few ways that I have found to get real clean, crisp margins to capture with optical images, some with average results and some have been stellar.

I apply the adhesive medium on the preparation and cover the prep and any gingiva I can without irritating any touchy (bleeding) tissue – I specifically cover the mesial and distal box area of the preparation. By doing this, the majority of the powder will stay on the tooth when using the air to help define the mesial and distal marginal areas. After the medium is applied, it must be dried thoroughly. (Figure 3)



### I then use my powdering device and get a good initial coat on the adjacent tooth structures and surrounding tissues.

Notice that the margins are close to being ideal for optical images, but I have found that these areas are often the places that can give us undefined data, specifically when the gingival tissues and the preparation margins are at the same height. This is especially true when the preparation margin is slightly sub-gingival. (Figure 4)



#### FIGURE 4

The beauty with using the adhesive is shown in figure 5. By placing the adhesive medium on the prepared tooth I am able to use my air/water syringe and blast the interproximal areas with as much air as I can. What happens here is twofold:

1. Any excess amount of powder residing on the interface of the prep and tissue is removed.

2. The preparation margins are easily seen without having to use anything that will irritate the tissues, such as an explorer or cord. (Figure 5)





### **FIGURE 5**

The tooth is then lightly dusted once more, with your powdering device of choice, making the resulting mesial and distal margins more easily apparent and ready for optical images. (Figure 6)



### **FIGURE 6**

Here is the finished CEREC crown immediately post-op. Notice the gingival health: there was no cord, laser or medicaments used to irritate the tissue. (Figure 7)



FIGURE 7

# PowderPerfekt<sup>®</sup>

The Ultimate Powdering Device For Your CEREC<sup>®</sup> Made in the U.S.A. 1-800-290-1267 Here is a 54 year old patient who had a similar situation. The distal margin is at the same height as the gingival tissue. After powdering it is nearly impossible to distinguish between the tissue and margin. (Figure 8)



### FIGURE 8

The following picture shows the preparation immediately after using an air/water syringe to force away any excess powder on the gingival tissue. Notice how much powder stays on the tooth as you can now see the distal margin quite clear. (Figure 9)



FIGURE 9

The previous steps are necessary to follow up on the distal margin with your powdering device. The distal margin is now very easily distinguished after lightly dusting the prepped tooth again after the excess powder was removed. (Figure 10)



#### FIGURE 10

Here is a 59 year old patient who had a sub gingival margin. After excessive distal recurrent decay was removed you can easily see the irritated gingival tissue where the patient was experiencing food impaction. This can pose quite a problem when powdering if the tissue is irritated with cord, laser, or an electro surge. The area was medicated to stop the hemorrhaging and was coated with the adhesive. (Figure 11)



FIGURE 11

Directly after the distal margin of this molar's powder was thinned out using an air/water syringe. (Figure 12)



FIGURE 12

The mesial margin is visible. (Figure 13)



### FIGURE 13

Both of the margins after using adhesive, powder, air and then powder again. (Figure 14)

I hope this will help you become more proficient at your approach to achieving excellent CEREC restorations.



**FIGURE 14** 

To learn more about incorporating CEREC into your practice or to enhance your CEREC knowledge, please visit www. cerecdoctors.com. There you will I find tips on improving your technique with CEREC. For a hands-on approach to learning, visit the Scottsdale Center for Dentistry where you will learn from some of the most knowledgeable clinicians in CEREC technology today.

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# DOCTOR<sup>4</sup> SHOWCASE

We recently had the opportunity to interview Brian Schaefer, DDS. We were curious how his CEREC experience has impacted his practice.

Here he shares with us his early trials with the technology and what he has learned throughout the years. He explains how CEREC ultimately came to define his practice.

## Q: How long have you been in practice?

A: I graduated from Marquette

University School of Dentistry in 1986. I have been in practice for almost 22 years in Green Bay and will be opening our new state-of-the-art 4200 sq. ft. building 5 miles down the road next month. It has been a long time coming.

### Q: What is the size of your practice?

**A:** Currently we have an average size practice with 5 staff members. We have one full-time assistant, one part-time assistant, one full-time hygienist, one part-time hygienist and a front desk person. Our location has been relatively free from managed care and combined with a relatively low overhead, we have been able to work a three day week. That schedule will change with the new building but I look forward to spending the rest of my career in a great new environment.

#### Q: What types of dental services do you provide?

A: After 22 years of dentistry, I know what I like to do

and what I have no interest in. We have great specialists in this area, so I have little interest in getting involved in orthodontics, oral surgery or complete dentures. Our emphasis has been in restorative, endodontics and periodontics. This practice has made a strong effort to stay ahead of the curve with technology. We have been involved with CEREC since 1999, and have worked with Diode, Erbium and Nd-Yag lasers since 2000. We have been 100% digital for 5 years now. I feel very comfortable with computers and all dental technology. I'd like to think that CEREC has had a large part in making all this happen.

Q: How does the CEREC experience impact your practice?

**A:** There is no procedure that I look forward to more than using my CEREC. Putting all of the profit potential aside, there are so many other reasons to get involved with CEREC.

When I first began using CEREC in 1999, I had to deal with a rather extensive learning curve. As I look back now, I'm glad that I went through it because today's intuitive graphic software is built upon a foundation of early software that required a lot of that 3D mental positioning that we did on the DAT. However, that geek gratification does nothing to hide the fact that today's CEREC software is so easy to understand and use out of the box, that it will not take a new user long to feel very comfortable in designing a restoration in front of their patient. CEREC has become a major part of my practice. I concentrate most of my efforts on posterior restorations of which 90% are porcelain onlays. I feel that I am able to conserve more tooth structure and get a great blend of porcelain into enamel where the two become indistinguishable from one another. As long as I get 2mm of reduction, I have found that the restoration has been very strong and a great service to the patient. From experience, I can relate that I can count on less than two hands the number of root canals that I have had to perform on onlayed teeth since 1999.

Patients appreciate the one visit procedure and are always a great referral source for new patient flow.

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

### "The greatest part about CEREC is that there really is no unique procedure and has become second nature to me."

**A:** Love the porcelain onlay. I hate to see a new CEREC user come out of the gate doing all crowns with it. There is so much that can be done with onlays. I was doing lab porcelain and composite onlays for 4 years before I got my first CEREC, so I was already comfortable with the preparation and bonding procedure. An onlay allows you to freelance a preparation, removing the damaged tooth structure and conserving what is still good. Over the years, I have modified my prep designs toward more of the full coverage onlay and keeping margins out of occlusion- but that is just my preference. I don't believe that every scrap of paper thin enamel is precious.

#### Q: What has been your most unique CEREC procedure?

**A:** The greatest part about CEREC is that there really is no unique procedure and has become second nature to me. Some may find the ability to do a one visit, indirect procedure to be unique- it is not to me. Others may find the ability to replace a crown under a partial to be uniqueit is not to me. Others may mourn the death of root canal therapy after placing CEREC onlay restorations- but I can get over that.



## Q: If someone was to take your CEREC away today, what would you do?

**A:** I saw a cartoon in our local paper that showed what happened to a Packers fan that bought a buddy's season ticket and got out of hand at the game. Not only was he kicked out, but his season ticket was revoked. The ticket holder chased his ex-buddy to the ends of the world and found him cowering in an igloo on the far reaches of lceland.

I'm a season ticket holder at Lambeau, and that would pale in comparison to how I would feel if my CEREC was taken away.

### Q: Why did you buy CEREC?

A: The concept had always intrigued me and when I had a chance to attend a demonstration at a study club meeting, I was hooked. I was already proficient in porcelain onlays but I always hated having to deal with temporization in a non-retentive prep, so I felt that this was the answer for me.

### "Initially, I looked at CEREC as being a new tool to the practice. However, over time, it has helped to define my practice."

## Q: How did you think it was going to help the practice, staff and ultimately, you?

A: Initially, I looked at CEREC as being a new tool to the practice. However, over time, it has helped to define my practice. I'm proud to see my CEREC restorations at recall. I have found that patients who have had a porcelain onlay are more receptive to the next one when the time comes, compared to those who have received lab crowns in the past. It has been a real win-win-win across the board for myself, my patients and the practice.

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Dr. Alex Touchstone

# CEREC CONNECT

WEB-BASED DIGITAL IMPRESSION TRANSMISSION-FROM THE DENTAL OFFICE TO THE LAB

### **Author's Biography:**

Dr. Alex Touchstone has over 13 years of clinical experience integrating CEREC CAD/CAM and other technologies into his practice. He was recently invited to become the Clinical Advisor for the Sirona Dental Academy as well as the curriculum developer and trainer for the Galileos 3D Cone Beam Imaging System. As a consultant for Sirona, Ivoclar, Vident and others, Alex helps to develop and test new software, systems and materials. He holds several patents related to color control and he is the inventor of the EasyMatch Shade Advisor system. He recently sold his practice in Hattiesburg, MS and has relocated his family to Charlotte, NC where he has opened a new state-of-the-art clinic and teaching center. He can be reached at touchstonedentistry.com

#### INTRODUCTION

At the Chicago Midwinter Dental Meeting in February, Sirona Dental Systems announced the availability of their new CEREC Connect service. CEREC Connect is a web-based portal that opens up restorative options such as, crowns with core materials or cast cores and bridges, which were previously not available to Chairside CEREC clinicians.

Using the CEREC Connect web portal at www.CEREC-Connect.com, dental offices equipped with a CEREC Chairside CAD/CAM restoration system have a quick, easy and reliable solution for sending cases to the lab of their choice without the need to fabricate a physical impression. The service is always free and up and ready to accept new cases since the service is available 24 hours a day, 7 days a week and there is no registration charge or "dongle" fee to the dentist or the lab.

### **EXPANDING CHAIRSIDE CAD/CAM CAPABILITIES**

In addition to cast crowns and crowns with core materials such as zirconia, CEREC dentists can also use CEREC Connect to order restorations involving full-contour anterior and posterior single crowns, veneers or long-term temporary bridges made of polymer materials like VITA CAD-Temp. Essentially, CEREC Connect allows Chairside clinicians to greatly expand their CEREC system's restorative possibilities and benefit from the esthetic craftsmanship and capabilities of a lab.For example, cases that have esthetic challenges that require the experience or expertise of a ceramist—such as internal characterization—are excellent opportunities for the CEREC dentist to utilize the CEREC Connect service.

### **HOW IT WORKS**

To begin using CEREC Connect, the dentist simply takes a digital impression of the crown preparation in the usual manner—there are no new techniques to learn or master. Once the preparation image has been captured, it is now ready to be digitally delivered to any of the InLab laboratories that have registered with CEREC Connect. It is up to the prescribing dentist to select the lab of their choice from a list of all pre-registered InLab laboratories.

Once connected to the CEREC Connect website, the dentist logs in and fills out an online prescription form complete with patient data, tooth shades, materials and requested turnaround time. After completing the form and uploading the digital impression file, an e-mail is automatically generated and immediately sent to the lab notifying them of the order. The lab technician can then view the digital impression, inspect it for accuracy and proceed to design and fabricate the restoration—all of this without having to produce a physical model.

### **MODEL-LESS DENTISTRY**

Because there is no physical impression with CEREC Connect, there is also no physical model. Without a physical model,

how does the lab take into account important case aspects such as occlusion, restoration height or morphology? Easy, along with the digital impression of the preparation, the CEREC clinician may also send a digital scan of the preoperative condition, bite registration, diagnostic wax-up or temporaries. These options give the laboratory a template from which to work, or a reference to the proper position, length, and occlusion of the tooth that needs to be restored. In the near future, Sirona plans to offer labs the ability to create a physical model from the CEREC digital impression. This will give labs the option of working completely digitally or if preferred, using a model.

### EXAMPLE OF A CEREC CONNECT CASE, STEP BY STEP:



#### FIGURE 1

Figure 1: Pre-op photo where two upper centrals are existing PFMs. Patient wanted them replaced due to metal show-through at the margins



FIGURE 2 Figure 2: Bite registration material was placed on existing PFMs.



**FIGURE 3** Figure 3: Powdered bite registration, ready for digital impression to be taken.



**FIGURE 4** 



FIGURE 4a

Figures 4 and 4a: Crowns were removed, and prep shade was assessed.

Figure 5: Preps were built up with VITA preparation material shade 3M2S in order to block out the black stains. Preps were powdered and digital impression was taken.

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FIGURE 5



### FIGURE 6

Figure 6: The digital impression and bite registration files are uploaded to the lab via the CEREC Connect web portal www.CEREC-Connect.com.

Figures 7 and 7a: The final restorations are fabricated at the lab and sent back to the dental office for patient seating in as few as 3 days. These post-op photos show the new crowns (these were milled from VITA TriLuxe forte blocks, shade 2M2).

To learn more about incorporating CEREC into your practice, please visit www.cerecdoctors.com and click on the potential owners tab.



FIGURE 7



FIGURE 7a

# CARTOON CORNER









Comic Strip By Brian Thornton, DDS

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### HAPPENINGS IN THE CAD/CAM WORLD Sameer Puri, DDS

As we launch this inaugural issue of CEREC Doctors, The

Magazine, it gave me time to reflect on advances in the CEREC world. While the technology has been around for almost 23 years so many things have changed from what they used to be.

Those of you that remember the early days of 3D realize how much we now take for granted with the software. Green checks in the image catalog for example to let us know the images stitched together properly. A simple concept that wasn't always available. We used to have to take a bunch

of images and cross our fingers in hopes that the software would be able to combine all those images into one model and more importantly, correlate the prep and antagonist model. God forbid if there was a patient waiting in the chair while we anxiously waited for the "Grey Screen



of Joy" hoping to avoid that obnoxiously loud "dong" when the images and/or models didn't match. Hey Sirona, can you make that dong any louder? My patients in the waiting room didn't hear that, my images stunk enough for the software to kick them out! Then there is the form tool. Try and smooth the surface of a restoration using drop minus. Oh the horror, but it's exactly what used to happen when the tool didn't exist.

How about material evolution? What impact will the Blue Block have on our profession if Ivoclar can manage to get the crystallization time down to a reasonable level? Can

you say "No More Gold"! I know I will be getting hate mail for this from the Au lovers but this material may be too good to be true because of its strength and ability to be milled thin. Gold is just not as much of an option in my practice in Los Angeles because of all the waiters, errr, I mean "actors" that see us for treatment. My good friend and CEREC Doctors. com co-founder Armen Mirzayan has been trying to give me the proverbial "I told you so" when he first used this material almost 2 years ago and proclaimed its virtues. Yes Armen, for the one and only time in my life I can say you are right. Boy it's painful to say those words!

> Blue blocks are such a hot topic that I decided to devote my lecture to them at the CEREC Doctors Annual Meeting held at the Scottsdale Center in October. By now if you haven't registered, it may be too late as the program is limited to only 300 doctors. Don't get mad at me if you can't get

into this seminar with some of the best clinicians, present company excluded of course! Visit www.cerecdoctors.com for more information.

Another material evolution is the multicolored block from both lvoclar and Vita. It used to be that I had an inventory of every color and every translucency. Now I just stock the Triluxe and Multi blocks in the popular colors. My assistant loves me for keeping the block inventory to a minimum and I love it because the layered blocks allow me to do beautiful posterior restorations and anterior restorations without cutbacks. Yes you still have some snooty dentist who claims

that you don't get that exact incisal translucency but hey, it's an imperfect world we live in. Yes they are a few bucks more but well worth the price.

With my MCXL milling unit, I mill my restorations in 5-7 minutes. If I had to wait 15-20 minutes today to mill a crown, I think I would die of boredom. Uh oh, sorry E4D guys, I didn't mean to rub that short milling time in your face. Hey, you can always do a trade in! In all seriousness however, we would like to welcome the new kids on the block and wish them luck. If anything, their entry to the market is going to ensure that the engineers and programmers in Bensheim, Germany burn the midnight oil as they develop new hardware and software to stay ahead of the competition. A win-win for us end users.

Composite blocks may be making a comeback. Word on the street is that there is some research coming soon that

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shows this material has some serious strength. And yes, you guessed it. Pascal Magne will present it at the meeting. I sure do know how to plug an event, don't !!

Well, its time for me to hang it up. The wife is calling, the kids want to go swimming and I have a couple dozen videos to make for CEREC Doctors.com. Happy CERECing and see vou in the next issue.

To learn further details about the 1st Annual CEREC Owner's Symposium please visit www.scottsdalecenter.com or www.cerecdoctors.com



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To register, call the Scottsdale Center for Dentistry 1.888.781.0072. For a full course description see www.scottsdalecenter.com

# Meet Maeghan.

A pro wakeboarder who likes being up in the air, but with her mild fluorosis and asymmetrical smile, it was her confidence that needed a lift.

> Dr. Touchstone fully corrected her teeth, giving Maeghan the winning smile to match her winning style.

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