CEREC News
Issue July 2010

Editorial:
Aesthetics - natural CEREC anterior restorations

Are CEREC restorations suitable for anterior teeth? Quite unjustifiably, some dentists still think that CEREC delivers inferior aesthetic results. The software, hardware and materials have undergone such rapid development that it is a matter of personal preference – rather than aesthetics – whether anterior restorations are produced on the CEREC system or delegated to a dental lab. In both cases the results are truly convincing. The new CEREC 3.80 Biogeneric software reconstructs the natural tooth morphology at the click of a computer mouse. All you have to do is mark the preparation margin and click "Next". The software then takes care of the rest. The Biogeneric software is based on the realization that, like a fingerprint, each human tooth is unique. In addition, it exploits the morphological correlations between an individual patient’s teeth. In other words, the software extrapolates the natural shape of a tooth from the data derived from another, intact tooth in the patient’s mouth. When performing anterior restorations you can now reap the benefits of the new VITABLOCS RealLife for CEREC. The unique three-dimensional block structure perfectly emulates natural anterior teeth. With the aid of the CEREC MC XL milling unit you can create highly aesthetic veneers as well as full and partial crowns in just a few minutes.

Your CEREC Team

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1. CEREC 25
CEREC 25th Anniversary Celebration

In 1985, a patient at Zurich University was treated using the very first CEREC inlay. In the meantime more than eight million patients worldwide have received a total of 20 million CEREC restorations. CEREC is no longer an experimental technology. On the contrary, it has become a universally recognized treatment procedure. We look back on this success story with great pride.

In the course of this success story we marked CEREC’s 10th anniversary in Zurich. The 20th anniversary celebrations took place in Berlin and Las Vegas. This year the entire CEREC community throughout the world will gather in Las Vegas from 26 to 28 August 2010 in order to celebrate CEREC’s silver jubilee.

Taking part in the CEREC 25th Anniversary Celebration will certainly pay dividends. It is your chance to meet the “Who’s Who” of computerized dentistry. Leading international experts will deliver more than 50 lectures.

On the second day of the scientific congress we will open a poster exhibition, where academics and dentists who focus on CAD/CAM in general and CEREC in particular will present their investigations and clinical findings. The terms and conditions for the poster exhibition are available at www.cerec25.com

The city of Las Vegas is a fascinating venue. Further information is available at www.vegas-online.de For more than 40 years Caesars Palace has been one of the city’s top attractions and provides the perfect setting for CEREC 25.
DÜSSELDORF. – Digital impressions, biogeneric occlusion design, virtual whole-arch reproduction, rapid prototyping of dental models, computer-manufactured veneers – these are just some of the topics featured in recent scientific articles and lectures and now on their way into practical application. These and other issues were on the agenda at the well-attended symposium of the CEREC Masters Club in Düsseldorf on 11 and 12 June 2010. The CEREC Masters Club is a group of university academics, dentists and dental technicians who have pioneered digital technology in dental practices and laboratories and have presented their valuable experience in lectures and publications. The findings presented by this interdisciplinary working group prove that – 25 years after the creation of the first computer-manufactured ceramic inlay – the CEREC system has lost none of its innovative power and remains the worldwide driving force behind dental CAD/CAM technology.

Fig. 1: The speakers at the CEREC Masters Club (from left to right): dental technician Kurt Reichel, PD Dr. Andreas Bindl, Dr. Andreas Kurbad, dental technician Sonja Ganz.

Detailed information about the Dental Event of the Year, the speakers and registration procedures can be found at www.cerec25.com

See you in Las Vegas!

2. CEREC day – 2010, Düsseldorf
25 years old and geared up for the future

CEREC symposium looked ahead to the future on the basis of tried-and-tested CAD/CAM techniques.

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PD Dr. Andreas Bindl, Zurich, who was involved in the development and testing of the CEREC Bluecam imaging system, lectured on the topic of “Chairside Methodology”, with special reference to the precision of intraoral scanners. In this context he described the interaction of the CEREC AC acquisition unit and the GALILEOS CBVT system in the field of implant prosthetics. According to Bindl, the angled imaging function and the anti-shake function significantly improve the quality of intraoral scans, as well as the precision of digital impressions. This has been demonstrated on the basis of comparative measurements performed on a stationary, calibrated reference scanner. Whole-arch scans are feasible in principle. However, the deviation tolerance in the terminal area of the arch does not yet correspond to CEREC quality standards.

After the necessary software adjustments have been made, however, whole-arch scans will in future belong to the standard CEREC repertoire.

Monolithic posterior CEREC crowns made of lithium disilicate have proved successful in the area of implant prosthetics. According to Bindl, the mobility of the endosseous post when exposed to chewing forces does not pose a risk to monolithically milled, adhesively bonded crowns. Bindl went on to discuss the networking of CEREC and GALILEOS. The interaction between these two systems offers decisive advantages: firstly, the three-dimensional visualization of the osseous structure and the soft tissue leads to enhanced diagnostic accuracy; secondly, the tomographic X-ray, the planned endosseous post and the superstructures can be combined in a single screen image. Thanks to the networking of CAD/CAM and CBVT, surgical interventions are more reliable and the outcome can be predicted exactly in advance. In addition, the process of implantation is faster.

Dr. Andreas Kurbad, Viersen, reported on his experience with biogeneric occlusion design for partial crowns and crowns. Although he at first missed the dental database, the longer he used the new V3.80 software the greater was his confidence in the automatic reproduction of patient-specific occlusal surfaces. Kurbad confirmed that the individually computed restoration proposal is superior to the database tooth in terms of function. In addition, hardly any fine tuning is required when the restoration is finally placed. In many cases, minor contact problems can be eliminated by means of polishing paste. According to Kurbad, this is subject to the precondition that the reference tooth contains sufficient information. Additional angled images deliver enhanced morphological precision beneath the crown equator.

The dental technicians Kurt Reichel and Sonja Ganz, Hermeskeil, talked about the benefits of CEREC Connect to dental laboratories. Dental labs are now in a position to become actively involved in the fabrication of conservative dental restorations and can produce inlays, onlays, partial crowns, veneers and monolithic crowns with high precision and tailor-made aesthetics. According to Reichel, a stereolithographic (SLA)
When taking buccal shots, there are a couple of simple tips which should help achieve perfect results:

**Imaging for buccal bite registration**

Impressions for veneers, taken buccally up until now, should be taken from incisal. One workflow means one impression method!

CEREC Biogeneric changes a very important aspect of digital impressions: from now on, always scan from occlusal/incisal. Even anterior trial-try-ins, as this is the only way to arrive at a definitive evaluation of how the restoration fits the residual tooth. In addition, models generated via CEREC Connect can be fine-tuned using a standard articulator and a split-cast adapter, subject to the condition that a whole-arch scan has been acquired.

The RealLife feldspar ceramic blocks reproduce perfectly the cervical-incisal chroma gradation and pigment density of a natural tooth. This new addition to the VITABLOCS (VITA Zahnfabrik) portfolio is ideal for highly aesthetic restorations. Consisting of a dentine core and an enamel shell, the three-dimensional block structure simulates the arc-shaped shading progression from the dentine towards the incisal edge. In Reichel's opinion anterior crowns made of this material are aesthetically superior to layered ceramic facings.

Dental technician Sonja Ganz described the features of the new inEos Blue scanner. The implementation of the blue-light imaging system of the CEREC Bluecam has led to improved measuring performance. The XY table permits the model to be moved in all directions and angles. The model holder boasts a ball joint to facilitate whole-arch scans. A removable slide facilitates grid-pattern scans. The 3D image catalogue immediately displays the scanned areas of the model. It is also possible to scan conventional impressions — i.e., to do without a model entirely. Undercuts are detected by means of angled images. According to Ganz, these features result in significantly enhanced convenience, regardless of whether the inEos Blue is deployed as a stand-alone module in combination with an in-house milling unit or as a relay station for an external milling centre.

Following this, dental technician Kurt Reichel presented new veneering techniques for oxide ceramic frameworks designed to avoid veneer fractures. It is now possible to produce CAD/CAM feldspar veneers which are then sintered onto anatomically sized frameworks. This method avoids the tensile stresses which frequently occur at the interface between the framework and the manually layered veneer.

### 3. CEREC Biogeneric

**Biogeneric: The New Workflow**

**Tips and tricks for CEREC 3D Software V3.80**

With the buzz around CEREC Biogeneric, with talk of mathematical algorithms and clinical studies, it's possible to lose perspective on the core benefit: it's really all about you, the user. CEREC Biogeneric is yet another step — albeit a very large one — on our never-ending path to improve benefits: it's really all about you, the user. CEREC Biogeneric is yet another step — albeit a very large one — on our never-ending path to improve the results you deliver to your patients and to make it easier to achieve these results. Judged on this scale, Version 3.80 is probably the most important software upgrade since the first CEREC 3D version. The reason is simple: from now on, there is only one workflow. Whether Inlay/Onlay, Veneer, Crown or Bridge; regardless of correlation or replication coming into play: One single unchanging path leads you from start to finish. Here are some guidelines on the new workflow to help you get started working with CEREC Biogeneric:

**Providing input information**

With the removal of the dental databases, the software has to create each restoration "from scratch". CEREC Biogeneric is more than capable of this feat, but you'll want to be sure to provide ample information to ensure a good proposal. The software selects one or two "source" teeth and uses all the information it can get from them. In Biogeneric mode, the approximal neighbors are the default source:

- The distal neighbor is the preferred source for posteriors
- The mesial neighbor is the preferred source for anteriors

If more than half of the data from the preferred neighbor can be gained, that's all the algorithm needs to create a custom-fit proposal. If too little data is available from the preferred neighbor, it is supplemented with data from the other neighbor (mesial for posteriors, distal for anteriors).

**Prepping for the right insertion axis**

CEREC Biogeneric gains its input from the occlusal surface and the equatorial line of the neighboring dentition. The scanning process used to acquire the information needed is based on the restoration's insertion axis as provided by the user: the software expects both planes to be perpendicular to this axis. If the preparation is shaped in a manner that an insertion axis perpendicular to the occlusion would cause undercuts, you will be forced to alter the direction of insertion. The deviation of the scanning plane from the true occlusion will negatively affect the amount of information available for the Biogeneric algorithm, potentially impacting the quality of the initial proposal. The illustration to the right should help make the situation a little clearer:

1. Shows the original outline of the tooth to be restored. Perpendicular to the equatorial line (2) and especially the occlusal plane (3) will be the ideal orientation for the insertion axis (4) in order to deliver maximum data for the Biogeneric algorithm. If this ideal axis is not accounted for by the preparation (5), undercut areas (6) may be the result. (7) shows an alternative buccal preparation slope that would optimize the insertion angle and allow for optimal results from CEREC Biogeneric.

**Anterior impressions**

CEREC Biogeneric changes a very important aspect of digital impressions: from now on, always scan from occlusal/incisal. Even anterior impressions for veneers, taken buccally up until now, should be taken from incisal. One workflow means one impression method!

**Imaging for buccal bite registration**

When taking buccal shots, there are a couple of simple tips which should help achieve perfect results:
One image is usually enough. If desired, a second or third shot may help orientation during the registration step – for example by including the gingival ridge on the preparation and antagonist. Additional images have no negative effect on accuracy.

Your images should be approximately centered – one half composed of the prep side, with the antagonist taking up the other half.

Whenever possible, it's best not to include too much "empty space" in the buccal image. On crown preparations for example, try to take the buccal image from the neighboring teeth rather than including the oral cavity. Artifacts from such images are filtered out quite well, but images from intact teeth are better.

Correlation

With CEREC Biogeneric, correlation has become an even more powerful tool. By manipulating the copy line, the user can choose which areas of the original tooth to copy. Everything outside the copy line is re-created by Biogeneric. This makes correlation the perfect tool for restoring existing dentition, as shown in the following example. Record the original situation in the field "Occlusion". Don't forget to save, then prepare the tooth and record the preparation before continuing. Once the model has been reconstructed, select "Window", "Display options" from the menu. In the dialog "Display Options", activate the selection "Occlusion" in the column "transp.". This displays a semi-transparent view of the original dentition (which you recorded in the "occlusion" field) superimposed over the preparation, which allows you to double-check the stitching results. After the preparation margin has been marked, the copy line will be displayed on the original tooth. Everything within this line will be copied 1:1 for the restoration. Areas outside the line will be recreated by Biogeneric. Edit the copy line as needed - for example to omit a fractured cusp which you wish to replace via Biogeneric. Once the restoration results are displayed, they can be easily compared with the original situation and edited if needed.

Replication

If you would like to use a different tooth than the default source (see "Providing input information") as an information source for CEREC Biogeneric, Replication is the perfect tool. Record the desired source tooth (e.g. a non-default neighbor, contralateral, antagonist, even a model tooth) in the "occlusion" window before continuing. Once the insertion axis is set, the dialog "Select Tooth Number" will appear. Select the position of the source tooth, and mark its center with a red dot (double click) in the screen that follows. Make sure to set the dot on the incisal edge with anteriors. CEREC Biogeneric will then use the tooth set as an information source.

Summary

CEREC Biogeneric makes your daily work easier. No matter what type of restoration you are working with, no matter which method: the workflow is always the same:

Acquire, (with custom source in "Occlusion" window if desired), optional trim, prep margin, insertion axis, (Modify custom source if recorded), done.

If you have any questions or comments, please feel free to contact me at christopher.goodson@sirona.com

Until next time, take care and happy milling!

4. Purely natural: Anterior esthetics with VITABLOCS RealLife

From June 2010 VITA Zahnfabrik offers the VITABLOCS RealLife for CEREC / inLab MC XL for efficient fabrication of truly natural anterior restorations! The new blocks are perfectly suited for the fabrication of highly esthetic full and partial crowns and veneers in the anterior region since their unique three-dimensional block structure imitates the structure of natural anterior teeth. Experience the numerous advantages for yourself and order your FREE test set today.

5. inLab 3D Software Upgrade V3.80
When you upgrade to inLab 3D Software V3.80, you'll likewise benefit from the new Biogeneric design modes for inlays, onlays, crowns and full anatomical bridges. In addition, you can select a preferred morphology – for example, for edentulous jaws and in cases where a suitable reference tooth is not available. Thanks to the new “Multilayer” design mode, you are now in a position to produce anatomically sized bridges exclusively with the aid of CAD/CAM technology. The bridge design is automatically separated into two components: the framework and the veneer structure. Allowance is made for the minimum wall thicknesses of the materials. The components fit together perfectly (i.e. without undercuts) after milling and sintering have been carried out.

The abutment design functions have now been fully integrated into the software. New titanium bases have been added.

6. Market launch of CEREC Connect in Europe

Following last year’s market launch in the USA and Germany, the CEREC Connect portals went online in the Netherlands, Austria, Switzerland and the United Kingdom in June 2010. CEREC AC users and inLab laboratories can now register and reap the benefits of digital impressions. France and Italy will follow in September 2010 and October 2010 respectively.

A new English-language portal has been created for the United Kingdom. The portal is available in German to Austrian and Swiss users. Dentists and dental technicians based in the Netherlands can choose between German and English.

The workflow is identical in each case. The dentist takes a digital impression with the aid of the CEREC Connect software, evaluates the resultant model and marks the preparation margin (optional). Following this the dentist sends the data to a preferred partner laboratory from his country. With the help of the inLab software the laboratory downloads the data in just a few minutes and evaluates the model. Thanks to the high data transmission speeds, the laboratory can contact the dentist before the patient leaves the practice in order to discuss any necessary changes.

On the basis of the data supplied by the dentist the laboratory orders a stereo-lithography (SLA) model from infiniDent our central production facility in Bensheim, Germany. Parallel to this the laboratory can design the restoration ready for milling on the inLab or inLab MC XL unit and sintering (zirconium oxide). As soon as the model has been delivered the restoration can be completed and dispatched.

Further information about CEREC Connect is available from:

- www.cerec-connect.de
- www.cerec-connect.at
- www.cerec-connect.ch
- www.cerec-connect.co.uk

Three-unit bridges now available via CEREC Connect

Since 1st of April 2010 dentists and laboratories have had the option of ordering three-unit bridges via CEREC Connect. This significantly extends the spectrum of possible indications. As a result CEREC Connect is a very interesting proposition for CEREC AC users who have their own in-house milling machines.

As is already the case with single-tooth restorations the user creates a digital impression using the CEREC AC. After the impression has been checked it is transmitted to the partner laboratory via the CEREC Connect portal. The dentist indicates the required restoration type (full bridge or bridge framework) in the order form and marks the corresponding teeth in the dentition diagram. The program icons are identical to those used for temporary bridges.
The laboratory then orders an SLA model in the usual way. The restoration is then created on the basis of this model.

Dentists who own a CEREC milling machine have the option of importing the data into the CEREC 3D software, prior to designing and milling a bridge out of a provisional polymer material. In this way it is possible to create restorations with up to three units without the need for any conventional impressions.

7. New marketing materials
   Patient marketing

We have developed new marketing materials designed to inform patients about the CEREC procedure. A new flyer and appointment cards (claim: “Beautiful teeth with CEREC”) are available via your dental equipment dealer. You can also order practice posters featuring the same design.

The patient flyer “Beautiful teeth with CEREC” informs patients about the benefits of the CEREC procedure, describes the various therapy steps and emphasizes the outstanding longevity of the CEREC restorations. Printed in the handy format (21x10.2 cm), the patient flyer is available in packs of 100 from your dealer.

The appointment cards “Beautiful teeth with CEREC” are an effective way to advertise your CEREC treatment services. Printed on high-quality heavyweight paper and measuring 10x7 cm, the cards are available via your dental equipment dealer.

A digital version of the practice poster is available free of charge from your dental equipment dealer.