

CEREC Zeitung

No.13 November 2008 International edition

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EDITORIAL

Wilhelm Schneider
Head of CEREC
Marketing at Sirona

New challenges for CEREC

Although the CEREC CAD/CAM system already covers virtually all areas of restorative dentistry, it has by no means reached the limits of its potential. Implantology is a case in point. Dentists already use CEREC to create implant superstructures. For temporary applications they can use the composite materials manufactured by Vita und Merz. For permanent superstructures they can choose from a variety of fine-structured ceramics produced by Sirona, Vita, Ivoclar and 3M Espe. There are still open questions concerning individual abutments made of aesthetic ceramic materials. The same applies to integrated implant planning – i.e. the combination of CAD/CAM and digital volume tomography. Here as well, CEREC will have a significant impact on dentistry. You do not always have to be first to cross the finishing line. On the other hand, making up for lost ground can be very strenuous.
Kind regards

CEREC meets implantology

FORWARD-LOOKING CONCEPT. The implantology market is growing fast. Implants are a tissue-conserving alternative for the replacement of missing teeth. CAD/CAM provides the basis for creating prosthetic superstructures for virtually all clinical indications. Recent developments have transformed CAD/CAM into a useful tool for implantologists.

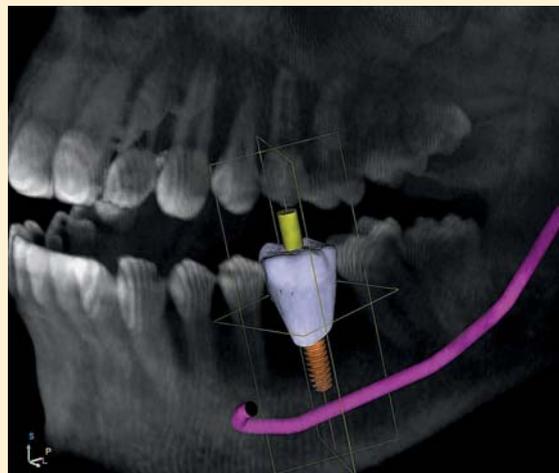
CEREC-fabricated single-tooth implants offer clear advantages compared with conventional lab-produced superstructures. It is now possible – within approximately two hours and directly at the chairside – to create and incorporate a zirconium oxide abutment plus an anatomically sized all-ceramic crown (made either of feldspar or lithium disilicate). No additional veneering is required. Thanks to adhesive bonding, the user can adopt a more elegant and aesthetic design approach for the crown and rule out the bacterial colonization of the joint zone between the abutment and the crown. In the case of more heavily loaded crowns and bridges the dentist can order a conventional zirconium oxide framework from his dental laboratory. This framework can be conventionally veneered or faced with a fuse-on ceramic material.

To maintain the chewing function and to stabilize the soft tissue surrounding the implant the dentist can deploy CEREC to create a long-term provisional crown made of an acrylic polymer. Based on the data acquired for the final superstructure, this provisional crown is screwed directly into the endosseous post, where it serves to contour the soft tissue. To enhance the osseointegration process the upper surface of the crown is designed in such a way that it is not in occlusion.

What's in store in the future?

Not all implants provide the perfect basis for prosthetic superstructures. Significant deviations from the load axis (which are often not surgically indicated) necessitate heavily angled mesostructures. Integrated implant planning enables such problems to be solved at an early stage. Cone Beam Computer Tomography (CBCT) allows the dentist to display all the relevant structures (e.g. the mandibular canal) in three dimensions. This leads to a significant improvement in diagnostic quality.

In addition, CBCT is a source of additional forensic certainty – i.e.



Revealing insights: a CEREC-designed implant crown visualized within a CBCT generated by the GALILEOS 3D X-ray system.

is confirmation that the dentist has used state-of-the-art diagnostic technology. Compared with CT images, CBCT delivers enhanced image quality,

The prosthetic proposal is allowed for in the planning process. See article on page 6.

especially in cases where the patient's jaw already contains several prosthetic restorations. The radiation dose is lower. In future the CBCT diagnostic findings will provide a sound basis for surgical implant planning.

With the help of the triangulation camera CEREC users will soon be in a position to acquire an optical impression of the implant site as well as the adjacent teeth. In just a few seconds CEREC will compute a virtual model, on the basis of which the dentist can design a crown or bridge in the usual way. The 3D X-ray and the CEREC model are superimposed. In other words, the CEREC design is integrated directly into the 3D volume. This permits the exact, centred positioning of the crown on the implant axis. An implant proposal is then generated, together with the angle of in-

sertion. The surgical feasibility of this proposal is verified and any necessary corrections made. After selecting the relevant implant type the dentist can simulate the entire situation within the 3D X-ray image.

Perfectly coordinated process

After the implant has been inserted the dentist acquires a new optical impression. A so-called "scanbody" is mounted on the implant, thus allowing the CEREC system to determine the exact position and insertion angle of the implant. Now the CEREC user can decide whether to design the abutment in-house or to transmit the data to a laboratory of his choice via CEREC Connect. (This service is already available in the USA.)

In collaboration with CAMLOG Sirona has developed all the components that dentists and dental technicians require. The new inCoris ZI meso blocks are perfectly adapted to the prefabricated adhesively bondable titanium base of the CAMLOG implant systems. The blocks, bases, scanbodies and the "inLab 3D for Abutments" have been available in Germany since October 2008 (the launch dates for other countries will be quoted upon request).

NEWS

Ceramics Symposium focuses on implantology

Are dental ceramics suitable for implant prosthetics? This question will be on the agenda at the 8th Ceramics Symposium of AG, to be staged at the Frankfurt/Main Congress Center on 29 November 2008 in collaboration with the German Implantology Society (DGI). Experienced clinicians and practitioners will report on the technical and clinical potential of all-ceramic abutments and crowns. Further information: www.ag-keramik.eu

Japan embraces international recommendations for all-ceramics restoration

With the publishing of the Japanese edition of „All-Ceramics at a Glance“ came this handbook established itself as one of the most common textbooks in dentistry worldwide. It summarizes all of the available know-how in all-ceramics restorative and prosthetic dentistry, covering areas such as material selection, preparation, manufacture and insertion. Its therefore a useful compendium for dentists, lab technicians, academics and students alike. Translator into Japanese is Professor Masao Yamazaki, Chairman of the Society of Japan Clinical Dentistry, who also added some of his own clinical cases to the book. The 112-page strong Japanese edition of "All-Ceramics at a Glance" is published by Ishiyaku Publishers, Tokyo.

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New product

artBloc Temp: convincing material properties

Compared with conventional temporary restoration materials Merz Dental's artBloc Temp is a fast, reliable and low-cost alternative for temporary anterior and posterior restorations (ranging from single crowns to four-unit bridges).

artBloc Temp is a highly networked PMMA plastic (Organic Modified Polymer Network, "OMPN") and is free of inorganic fillers and fibres. It is abrasion resistant, plaque resistant and tissue-friendly.

According to the study "Fracture resistance of conventional and CAD/CAM temporary bridges" conducted by Zurich University, artBloc Temp can withstand a median fracture load in excess of 300 N. Hence it is suitable for the creation of CAD/CAM temporary crowns, bridges and immediate implant superstructures until such time as the conditions for a permanent prosthetic solution have been fulfilled.



artBloc Temp is a PMMA material for temporary restorations.

Available in all A-D shades and in four different bleach shades (BL1 - BL4), artBloc Temp caters for a broad spectrum of user requirements.

The artBloc Temp blocks are available in sets of 2 and 10 in each shade. They can be machined on all CEREC and inLab milling units.

Implant superstructures: fast and cost-effective

IMMEDIATE IMPLANT SUPERSTRUCTURES. By setting up their own in-house dental labs CEREC practices can achieve clear efficiency gains with regard to single-tooth restorations. This benefits the dentist, the dental technician and the patient.

Implants which have been combined with a temporary crown or bridge should not be functionally loaded during the bone healing phase. Immediate loading is indicated only in situations where the

Sören Hansen's dental practice is located close to the VW car plant in Wolfsburg. He is a CEREC tester and user.



load is distributed between at least four implants. In this case occlusal loading can commence 48 hours after the insertion of the immediate implant.

Immediate treatment using CEREC

Compared with conventional lab-produced superstructures, CEREC offers considerable advantages in connection with single-tooth implants. It is possible to create and place a chairside crown within 90 - 120 minutes. In our dental practice we use zirconium oxide for the abutments and feldspar (VITA Mark II) for crowns. Alternatively, we deploy zirconium oxide (VITA YZ) in combination with a ceramic facing,

Isogingival or supragingival crown margins have proved themselves in practice

The abutment is screwed to the endosseous post. To minimize the risk that the post will loosen at a later date we use conical connections (Ankylos, Zeneca). This means that the crown can be adhesively bonded instead of screwed. Adhesive bonding is a prerequisite for a more elegant and aesthetic crown design. Less time and effort are required, and we can rule out the bacterial colonization of the joint zone between the abutment and the crown.

With regard to the preparation method for the abutment, a circular step and isogingival or supragingival crown margins have proved

themselves in practice. The gums are not irritated and it is easier to remove residues of the luting material. If the angulation of the abutment does not correspond exactly to the implant axis, the abutment preparation has to be reworked with the aid of a water-cooled fine diamond bur.

A provisional cement is recommended for the temporary repositioning of the Silicate ceramic crown. To prevent fractures occlusal contact should be avoided during

a diameter corresponding to that of the implant. However, this presupposes that the dentist has the necessary experience.

As shown in the accompanying illustrations, the first step when creating a CEREC superstructure is to remove the gingiva former. A balance abutment (Ankylos) is then fitted, followed by a rubber dam (necessary in order to keep the operation site dry and shield the wound against the contrast powder). If the implant axis is deviant, the abutment

This approach is not recommended for immediate implant superstructures, as the wound is subject to painful pressure and it is more difficult to clean the interdental spaces. Instead a generous space should be created for rinsing purposes.

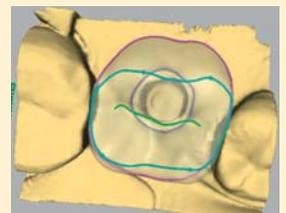
After the crown (preferably made of feldspar or lithium disilicate) has been milled, the surface is glazed and the crown is provisionally placed without any occlusal contact. Following the completion of the endosseous healing phase the crown



Delayed implantation in the area of tooth 36.



Fitting the rubber dam.



Designing the crown with CEREC 3D.

the try-in phase. During the endosseous healing-in phase the silicate crown can serve as a temporary restoration - however without any functional loading.

Due to their light transmission properties and translucency, silicate ceramic crowns (feldspar, lithium disilicate) are well suited as permanent restorations. However, these crowns require white zirconium oxide abutments, which are not available from all implant manufacturers. If a titanium abutment is used instead, we recommend an opaque zirconium oxide framework in combination with an additional ceramic facing, especially in the anterior region. This prevents a metallic grey shimmer emanating from the titanium.

CEREC crowns following delayed implantation

Delayed implantation takes place after wound healing and bone consolidation have been completed. To this end a mucoperiosteal flap is created, which is sutured after the insertion of a gingiva former. Some authors recommend a perforation in the mucous membrane with

preparation should be reworked. Alternatively, an angled abutment can be inserted. The dentist can now create an optical impression and design the crown with the help of the CEREC 3D software.

The scientific literature sometimes recommends that the preparation margin for implant crowns should be moved out into the gingival region in order to achieve a broader basis and a natural emergence profile.

is removed, thus allowing the condition of the tissue to be assessed, together with the occlusion and articulation. If the design has to be revised a new crown can be milled in a short time on the basis of the existing data. Final bonding is performed using a dual curing composite. Zirconium and aluminium oxide crowns (In-Ceram) can be bonded with the aid of a glass ionomer or zinc oxide phosphate cement. ■



Try-in and provisional bonding of the CEREC crown.



The check-up after two weeks indicates that the gums have healed well.

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CAD/CAM supports implant prostheses

COLLABORATION. The implantologist Dr. Ralf-Torsten Bernhardt (based in Bad Peterstal-Griesbach/Germany) orders all-ceramic superstructures for implant-supported bridges from the dental technician Kurt Reichel (located 300 kilometres away in Hermeskeil). This geographical separation does not pose any problems – modern CAD/CAM technology delivers precise results at acceptable costs.

CEREC Zeitung: Dr. Bernhardt, why did you decide to collaborate with a dental laboratory which is located so far away?

Bernhardt: Thanks to modern data transmission technology we can easily bridge this distance. What unites us is CEREC 3D and inLab.

How does your collaboration work – for example, in the case of an all-ceramic implant superstructure?

Bernhardt: Clinical planning takes place by means of models, photographs and X-rays. On a case-by-case

Dr. Ralf-Torsten Bernhardt is an implantologist and experienced CEREC user. He operates a dental practice in Bad Peterstal-Griesbach.



basis we create implant templates in the laboratory in order to determine the position of the titanium posts. After the endosseous wound has healed, we take an impression and create a model. Depending on the size and scope of the restoration, the all-ceramic frameworks are either produced in-house using the CEREC milling unit – or else externally with the help of the inLab system. Fine tuning always takes place in the laboratory.

Mr. Reichel, implant superstructures require precise planning and close coordination during the various treatment steps. How do you

achieve this and what systems do you use?

Reichel: The principal challenge is to reconcile the optimum positioning of

Kurt Reichel established his dental lab in 1985. Since 2000 he has been a tester and certified instructor for the inLab system.



the implant (from a surgical viewpoint) with the optimum positioning of the superstructure. Backward planning is the best solution for us dental technicians. Beginning with the as-is situation, we create a wax mock-up. This allows us to produce a scan template or a surgical guide. In addition, the wax-up serves as the basis for a double scan for custom abutments – and for designing the framework of the final restoration. The GALILEOS CBCT system is very useful in this respect, as it permits data to be exported in the Dicom format. We can produce any necessary surgical guides in-house.

What materials do you receive from Dr. Bernhardt – and how do you process them? Which procedure do you prefer – and with which materials?

Reichel: In our role as inLab users we are able to design and fabricate ceramic abutments for the Straumann and Camlog implant systems. This is particularly useful in the case of aesthetically sophisticated anterior restorations. Zirconium oxide is

How a CAD/CAM sceptic became a CEREC fan

With the assistance of the CEREC 3D and inLab systems, the group practice belonging to Dr. Ralf-Torsten and Ute Bernhardt now caters for a broad spectrum of all-ceramic restorations. CAD/CAM technology streamlines the production of superstructures. In particular, it promotes the close integration of implant treatment on the one hand, and the design of the prosthetic superstructures on the other. The husband-and-wife team Bernhardt have meanwhile achieved significant efficiency gains in their dental practice (located in Bad Peterstal-Griesbach in the northern part of the Black Forest).

Ralf-Torsten Bernhardt did not have a natural affinity for CAD/CAM. On the contrary, as a dedicated follower of Professor Gutowski's therapy concepts, he was initially quite sceptical about all-ceramic CAD/CAM restorations. On the other hand, he sensed that digital technology and all-ceramic materials were opening up new perspectives in dental treatment and practice management. Bernhardt realized that the introduction of adhesive bonding had allayed previous criticisms relating to the size of the marginal gap. He also realized that ceramic-specific preparations play a key role in long-term clinical success. In the meantime Bern-

hardt is pleased to note that Professor Gutowski now recommends the CEREC procedure as a means of simplifying the functional articulation of restorations – as evidenced in his contribution to the 16th CEREC master course.

Today, CEREC 3D and inLab are the central elements in Bernhardt's therapy concept. To an increasing extent he deploys these systems to create all-ceramic mesiostructures, superstructures, abutments (complete with emergence profiles) and implant crowns. Implant prosthetics require close collaboration with the in-house dental lab in order to fine-tune the function, fit, shape and shade of the restorations. "The CAD/CAM equipment at the chairside and in our in-house lab provides perfect support," Bernhardt explains. "We can optimize our workflows and save time and money. We delegate

wide-span reconstructions to an outside lab via an online connection." Thanks to the versatility of these CAD/CAM systems, Bernhardt is also in a position to fabricate zirconium oxide frameworks for posterior crowns and bridges, as well as primary elements for double telescope crowns.

The growing spectrum of indications has made a very positive impact on the cost-effectiveness of the CAD/CAM systems. "My first CEREC system paid for itself after just two years, and we now have the third generation in service," Bernhardt continues. "And thanks to inLab we have significantly reduced our third-party lab costs and boosted our flexibility. We can place restorations much sooner than in the past. This is a genuine gain in convenience for our patients."



The practice team of Dr. Ralf-Torsten and Ute Bernhardt.

our preferred material due to its stability and light transmission properties. Dr. Bernhardt supplies us with a master model, plus a removable, scannable gum mask. The design software computes the optimum emergence profile. After we have fabricated the abutments out of zirconium oxide, we then create single-tooth crowns made of feldspar ceramic, glass ceramic or lithium disilicate – or bridge frameworks made of zirconium oxide. For bonding purposes we deploy Metal/Zirconia Primer (Ivoclar-Vivadent).

Dr. Bernhardt, how do you bridge the time until the final prosthetic restoration can be fitted?

Bernhardt: We bridge this gap by fitting temporary restorations. The patient's wishes are of primary importance here. Whenever possible we choose provisional crowns or bridges made of acrylic polymers, e.g. VITA CAD-Temp. The goal is to achieve an optimum red-and-white aesthetic effect, in a short time. Financial factors play a role here. Many pretend that money is immaterial with regard to implants. This is not the case. Hence we are very grateful that CEREC 3D and inLab allow us to create aesthetically pleasing temporaries – quickly and at reasonable cost.

Dr. Bernhardt, Mr. Reichel – thank you for talking to us today.



Model with a removable gum mask and a screw-fixed ZrO₂ abutment.



Milled crown frameworks (teeth 45-47) prior to veneering.



Veneered implant crown prior to placement.



Veneered crowns 45, 46 (implant supported) and 47 prior to placement.

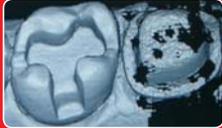




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Creation of monoceramic implant crowns

CLINICAL EXPERIENCE. The Department for Tooth-Coloured and Computerized Restorations at Zürich University tested a number of CEREC implant crowns placed on zirconium oxide abutments. 25 implants (manufactured by Straumann and 3i Implant Innovations) were combined with all-ceramic abutments und Vita Mark II crowns. Dr. Andreas Bindl is satisfied with the outcome: after up to three years in situ no failures have been recorded.

Extensive scientific studies have been carried out into the clinical application of CEREC inlays and partial crowns made of feldspar ceramics. CAD/CAM copings and monoceramic CEREC crowns have been successfully deployed as anterior and posterior restorations. For aesthetic reasons there is now an

in the patient's mouth – as illustrated in the following example.

A 25 year-old male patient had lacked tooth 45 since birth. As the adjacent mesial and distal teeth were caries- and filling-free, an implant was the indicated method of treatment. The anatomical situation permitted the use of an implant measuring 11,5 mm in length and 4 mm in diameter.

easier than expected. After the abutment had been screwed in place, the screw canal was temporarily sealed using a composite material. A thin retraction cord was placed in the buccal area of the step in order to slightly displace the gingiva.

The abutment and adjacent teeth were coated with anti-reflective scan spray. The CEREC intraoral camera was then used to acquire an optical impression of the preparation, as well as supplementary mesial and distal images. In addition, we acquired an optical impression of a static occlusal register created with the aid of a rapid-cure silicone. The CEREC 3D software allows the occlusal surface to be adapted to the antagonists.

The crown was milled out of a feldspar block (shade: 2M3C) and then placed on the abutment following the removal of the sprue attachment. It has proved useful to check the proximal contacts, cervical fit and occlusion prior to staining and glazing. The crown was bonded to the ab-

utment using the chemical-cure luting composite Panavia 21 TC. The coarse residues were removed by means of a scaler; the fine residues in the area of the join were removed with the aid of a rotating flame-shaped diamond bur.

CEREC chairside crowns placed on in-vivo adapted zirconium oxide abutments have so far performed well during the four-year observation period.



The permanently placed customized abutment.

What the user requires:

- Implantat:** Osseotite NT (3i)
- Abutment:** ZiReal Abutment, No. ICAP464 (3i) made of zirconium oxide with a titanium connector.
- Fixing screw:** Universal gold screw (Goldtite, 3i)
- Diamond bur for intraoral adjustment:** ZiReal Post Preparation Kit (3i)
- Retraction cord:** Ultrapak size "000" (Ultradent)
- Sealing of the screw canal:** Fermit (Ivoclar Vivadent).
- Preparation for the optical impression:** Scan Spray (Dentaco)
- Optical impression:** CEREC 3 image acquisition unit (Sirona)
- Centric occlusion register:** Metalbite rapid cure silicone (R Dental)
- Design:** CEREC 3D (Sirona)
- Ceramic block:** Vita Mark II (Vita)
- Characterization of the crown:** Vita Akzent (Vita)
- Bonding to the zirconium oxide abutment:** Panavia 21 TC chemical-cure composite (Kuraray).
- Etching and silanization:** 4.9% hydrofluoric acid Vita Ceramic Etch (Vita) and Monobond S (Ivoclar)
- Cleaning of the zirconium oxide abutment:** Alcohol
- Airblock gel:** Oxyguard (Kuraray)
- Removal of residues:** 8 µm flame-shaped diamond bur (Intensiv)

PD Dr. Andreas Bindl is a dental practitioner who collaborates with Professor Mörmann at the Centre for Oral and Maxillofacial Medicine (ZMK), Zurich University.



increasing trend towards zirconium oxide implant abutments. At present these abutments are industrially manufactured. In future, however, it will be possible to fabricate them directly in the dental laboratory or dental practice. Implant treatment can also be performed directly at the chairside. In this case an industrially prefabricated 3i zirconium oxide abutment is individually adapted

Easier than expected: milling the abutment in the patient's mouth

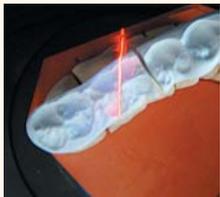
Upon completion of the six-week transgingival healing phase, the prosthetic implant superstructure was placed. To this end the healing abutment was removed and an industrially prefabricated zirconium oxide abutment (cervical diameter: 6 mm) selected. The adaptation of the preparation margin (height and contours) to the gingival situation was performed directly in the patient's mouth. With the help of effective diamond burs and a high-speed contra-angle this proved to be

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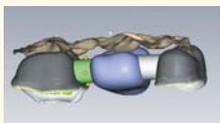
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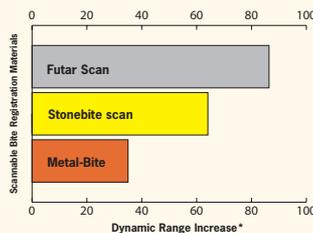
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Single-tooth implants in one appointment

CHAIRSIDE ZIRCONIUM IMPLANTS. For aesthetic reasons ceramic materials are rapidly superseding titanium in the field of implantology. Single-piece zirconium oxide implants offer distinct practical advantages, argues Dr. Wilhelm Schweppe.

Admittedly, the delayed implantation procedure described here is indicated only in cases in which sufficient bone structure is available and the

Dr. Wilhelm Schweppe opened his dental practice in Fröndenberg/Germany in 1987. He is a certified CEREC trainer and lecturer.



extraction wound has healed to a large extent. If these conditions have been fulfilled, implantation is relatively simple. The patient in question was a 36 year-old woman whose tooth 36 had been extracted several weeks previously. We decided to insert a single-piece zir-



The OPG shows a single-piece zirconium oxide implant.



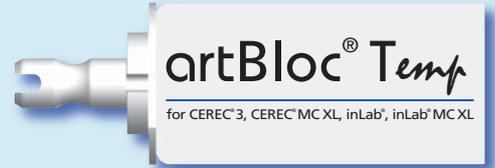
After closing the wound with four sutures the implant abutment was shaped in the patient's mouth.

conium oxide implant; two-piece implants were not yet available. At the time the implant manufacturer Bredent had not yet succeeded in creating a durable connection between the implant and the abutment. Hence the company made a virtue out of necessity and introduced a single-piece solution – the White Sky Implant System.

We began by opening up the soft tissue around the implant site in order to assess the bone situation

and establish the implant position. We then specified the axial alignment of the implant with the help of a rose-head centring bur and a 2 mm pilot bur. The implant bed was successively enlarged to 4.5 mm. Following this the thread was pre-cut in the compact bone. Using a torque wrench we fixed the implant in position. The wound was closed with four sutures.

Continued on page 6



Toothcoloured PMMA block for the fabrication of long-term temporary and preprosthetic restorations

Best of its category.

Stawarczyk, B., et al.: Bruchlast von konventionell oder mittels CAD/CAM hergestellter Brücken Provisorien. Universität Zürich, 2007

Software requirements: inLab V3.04 with inLab Material Extension Pack V3.04 or inLab 3D V3.10



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SEMI-CHAIRSIDE IMPLANTATION. All-ceramic implant crowns and abutments are a quick and cost effective solution. When choosing the superstructure Dr. Gerhard Werling bases his decision on the height of the abutment, the patient's aesthetic demands and the complexity of the restoration. For the past two years our author's preferred material has been lithium disilicate.

When creating all-ceramic abutments and implant crowns we adopt a two-stage approach (as recommended for most implant systems). In other words, we allow the endosseous post to heal before placing the crown. As a rule the prosthetic abutment is created after six to eight weeks in order to achieve the desired shaping of the peri-implant tissue and to prevent a collapse of the papilla. When the implant is opened up it is important to retain sufficient keratinized mucous membrane around the implant. The first step is to place a gingiva former, followed by a computer-milled temporary. This serves to stabilize and shape the soft tissue prior to placing the permanent prosthesis.

Silicate ceramic "masks" the titanium abutment

We now deploy zirconium oxide in order to create a secondary abutment on top of the titanium abutment. We either use the implant manufacturer's emergence profile or else create a customized solution on the inLab system in our in-house laboratory. The zirconium oxide and titanium are always bonded with the aid of a monomer phosphate. For the past two years we have been conducting trials with lithium disilicate superstructures (e.max CAD). This material offers various advantages. Firstly, it is not prone to shrinkage, i.e. the fit can be checked prior to crystallization firing. Secondly, its light transmission properties provide the basis for good aesthetics. And thirdly, li-

Dr. Gerhard Werling set up his dental practice in Bellheim in 1992 and specializes in implantology and CAD/CAM procedures.



tium disilicate can be conditioned with the aid of hydrofluoric acid and silane – a prerequisite for a resilient adhesive bond.

Conventional abutments for all-ceramic crowns

The working model consisting of the scannable gingival mask and the prefabricated titanium abutment are powdered and then digitized by the inEos scanner. Using the inLab Framework software we then design the abutment, complete with retention grooves to prevent the rotation of the crown. We

prefer equigingival or supragingival crown margins, as this simplifies the subsequent removal of excess luting material. The abutment is milled out of a lithium disilicate block, crystallized, checked for accuracy, polished and bonded to the titanium abutment. The abutment is then scanned as a basis for fabricating the all-ceramic crown. After the abutment has been screwed in place, the feldspar crown (VITA TriLuxe) can be adhesively bonded. In cases where the implant cannot yet be fully loaded we place a temporary crown made of the acrylic polymer VITA CAD Temp.

This method allows us to produce customized abutments with compensated angulation in the event that the implant axis is misaligned. Production in our in-house lab is

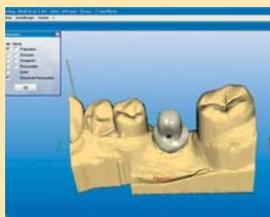
fast and cost-effective; it is considerably cheaper in comparison with industrially produced custom abutments.

Clinical experience

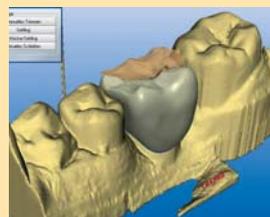
Although it has not been approved for this indication by the ceramic and implant manufacturers, lithium disilicate has proved itself in more than 70 cases in our dental practice. The soft tissue surrounding the implant healed naturally and without any gum irritation. In cases of correct indication no failures have occurred. Only two crowns have suffered fractures, due to the fact that we had chosen a wall thickness of less than 1 mm in the area of the screw channel.



Digital scan of the titanium abutment.



Designing the lithium disilicate abutments.



Designing the crown and the occlusal surface.



The screwed-in abutment.



The incorporated crown (tooth 46).

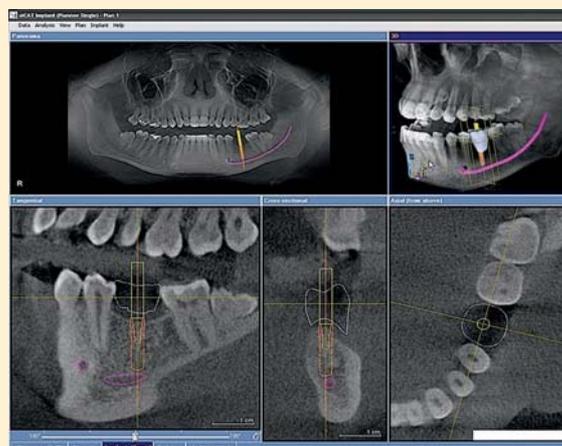
The prosthetic proposal is allowed for in the planning process

IMPLANT PLANNING. Combined CBCT images and CEREC restoration proposals offer a very useful planning tool. Now all the pieces fall into place, say Professor Joachim E. Zöller and Dr. Lutz Ritter.

Three-dimensional imaging and computer-aided implant planning have been in existence for more than ten years. So far, however, implant planning systems have suffered from a key disadvantage: before a prosthetic proposal could be generated a conventional template had to be created in a dental laboratory. Only then was it possible to make allowance for the proposed resto-

Extremely precise superimposition
After a clinical examination has been performed the first step is to acquire the necessary 3D X-ray images. Following this, the intraoral camera creates optical impressions of the edentulous area. With the aid of the Wax-Up modelling function of the CEREC software the user can then generate a virtual prosthetic proposal. The two sets of three-dimen-

The two sets of information are visualized simultaneously in a new software (siCAT Implant, siCAT, Bonn). This allows the user to assess the available bone structure and – at the same time – make allowance for the prosthetic proposal when planning the implant. In addition, the user can mark the gingiva and the mandibular canal on the user interface and incorporate true-to-life images of the implant. This leads to optimum implant planning outcomes.



The position of the implant and the crown can be visualized in various ways.

Implant planning is simplified
This new process considerably simplifies the implant planning process and economizes on materials. In particular, a lab-produced model of the planned prosthesis is no longer required. What's more, the dentist can exert a direct influence on the design of the prosthesis and give the patient a visual impression

of the planned course of treatment. Optimum implant planning outcomes were achieved throughout the entire trial phase, due above all to the ability to visualize the real-life implant, the available bone structure, the gingiva, as well as the prosthetic proposal.

Prof. Dr. Joachim E. Zöller is Director of the Department of Dental Surgery and Plastic Maxillofacial Surgery at Cologne University.



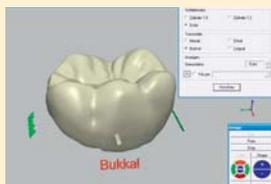
Dr. Lutz Ritter is employed at the Clinic for Maxillofacial Surgery, Oral Surgery and Implantology at Cologne University.



ration. Sirona has now developed a new method which integrates the virtual prosthetic proposals generated by the CEREC system into the 3D X ray images acquired by the GALILEOS CBCT system.

sional data are then superimposed with a sub-millimetre precision. The visualization is highly intuitive. The outcome is easily verifiable and has proved to be reliable in all cases so far.

Continued from page 5: SINGLE-TOOTH IMPLANTS IN ONE APPOINTMENT



Crown design with CEREC 3D.



The milled crown viewed from the base.



An implant annealed.

The implant abutment was individually prepared in the patient's mouth. To avoid contaminating the wound a small rubber dam was fitted. The abutment was powdered prior to creating an optical impression with the CEREC 3D camera. On the basis of this impression and a virtual three-dimensional model we designed the all-ceramic crown using the CEREC 3D software. In the interests of optimum aesthetics we chose a polychromatic feldspar ceramic block (Vita Tri-Lux). The milled crown was bonded with the aid of RelyX Unicem (3M ESPE).

Unlike a natural tooth the implant does not yield to pressure. For this reason the crown was taken out of contact. In this way the implant is not subject to high chewing forces during the healing phase. In addition, the patient wore a dental splint continuously during the first few weeks in order to minimize lingual and buccal pressure on the implant.

COMING SOON

- 21 / 22 November 2008 Nomads Conference Johannesburg
- 30 November – 03 December 2008 Greater New York Dental Meeting, New York City
- 24 – 28 January 2009 CIOSP Sao Paolo
- 26 February – 01 March 2009 Midwinter Meeting Chicago
- 14 / 15 March 2009 ADA Exhibition Perth
- 10 – 12 March 2009 AEEDC Dubai
- 24 – 28 March 2009 IDS Cologne
- 25 / 26 April 2009 JSCAD Symposium Tokyo

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