

CEREC Zeitung

No. 18 - 2011 International edition

Step by step

CEREC Connect and CEREC AC even easier to use. **PAGES 4 AND 5**



Information for users

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Digital impressions deliver significant cost benefits. **PAGE 7**



EDITORIAL

Birgit Möller,
Marketing Director
Dental CAD/CAM
Systems, Sirona

Yesterday an inlay machine – today CEREC AC

"You haven't changed at all." Such well-meaning compliments always make me think twice. Isn't it clear how much I've developed in recent years? That I've broadened my horizons and become more mature? And: what is wrong with change, anyway? We all want to improve – at work and in our private lives. We have come to expect the continuous improvement of technical products and systems. The CEREC system has certainly come a long way since it was launched 25 years ago. CEREC 1 and CEREC AC are worlds apart. The original inlay machine has meanwhile become the standard solution for a broad spectrum of indications: crowns, bridges and implants. And the CEREC system is going from strength to strength. At IDS 2011 we will unveil a new user interface which is more intuitive and therefore easier to use. The basic design procedure remains unchanged. However, it is now possible to work on various restorations in parallel. What is more, dentists can now design and mill surgical guides directly in-house. Every dentist should continuously develop his or her skills and treatment methods. CEREC provides invaluable assistance in this respect.

Kind regards
Birgit Möller

It's great when everything functions

HIGH TECH. Technology should serve mankind and not vice versa. When developing the CEREC system Sirona has always accorded top priority to a seamless digital workflow and intuitive user friendly software. In this way increasingly complex applications can be managed reliably and simply.



Modern times – are all about technology.

Caught up in the wheels of technology: famous silent films such as *Modern Times* and *Metropolis* testified vividly to the inhuman working conditions of the early industrial age. These films portrayed a bleak world in which human beings are subjected to the dictates of machinery. Today we are sometimes reminded of this – for example when our PC crashes or our mobile phone refuses to function properly.

In the meantime we've learned that computers only obey instructions – i.e. the user determines the quality of the final product, not the machine. This is also true for computerized dentistry. There are no grounds for anxiety.

Instead we should concentrate on the enormous opportunities offered by new treatment methods. And we should realize that computer technology is here to stay.

Unlike Charlie Chaplin's tramp we do not want to escape from modern technology. Instead, we want to harness it to our own interests. When used properly, modern technology simplifies our everyday lives – at home, at work, in dental practices and in dental laboratories.

So let us focus our attention on the practical realities. CEREC is a tried and tested treatment procedure. Currently

the most advanced dental CAD/CAM system on the market, CEREC offers unique benefits in terms of convenience and versatility. CEREC is a proven procedure that delivers perfect restorations. It is constantly being developed in order to cater for new indications and specializations. Patients can witness the creation of their dental restoration on the monitor – and leave the dental practice with a satisfied smile in the secure knowledge that they have received the best available treatment. These are the defining features of the CEREC system.

Computerization is entering into more and more areas of modern dentistry. The systems are becoming increasingly sophisticated – and at the same time easier to use. This is the outcome of continuous development efforts. Sirona is the acknowledged pioneer

and technology leader in the area of computerized dentistry. In recent years Sirona has closed the last remaining gaps in the digital processing chain. At IDS 2011 the company will unveil a new software generation with an enhanced user interface. This will ensure that users will continue to master the most difficult challenges with a relaxed smile on their faces. ■

„A day without a smile
is a day wasted.“
(Charlie Chaplin)

CEREC is changing the world of dentistry

PROGRESS. What started out 25 years ago as an "inlay machine" has become a versatile CAD/CAM restoration system for crowns, veneers, bridges and implant prostheses.

CEREC has the potential to revolutionize dentistry all over the globe. Having said this, different (and even contrary) trends can be observed. In Europe CEREC was initially known as an inlay machine – i.e. the focus was on cavity treatment. Following the introduction of dedicated crown design software and new silicate ceramics, it was then possible to create an anatomically sized crown in the course of a single treatment session. The launch of automated occlusal surface modelling (CEREC Biogene-

ric) has unleashed a genuine boom in computer-aided crown fabrication. In the USA the reverse is true. Thanks to CEREC, American dentists have come to value the benefits of tissue-conserving preparation techniques and are offering their patients more and more inlays.

Collaboration between dentists and dental technicians has also undergone a significant change. New types of oxide ceramics require new machining methods. The compact inLab unit, a spin-off from the CEREC system, faci-

litated the subtractive milling of industrially produced ceramic blocks, the basis for creating crowns and bridges. Every year in Germany approximately 200 tonnes of ceramic oxide powder are pressed into blanks ready for processing on dental CAD/CAM systems. To an ever increasing extent, digital data and records are superseding traditional stone models and conventional documentation. CAD/CAM technology is changing the world of dentistry – and CEREC was the starting point for this development. ■

NEWS

CEREC now firmly established in student dental training

The paper "Digital processes and all-ceramic materials" delivered by two lecturers from the Polyclinic for Prosthodontics in Mainz made a big impact on dental students in Frankfurt. Professor Dr. Herbert Scheller and Dr. Helmut Dietrich focused on the role of computerized restorations in student training.

The university faculty in Mainz has acquired extensive experience with CAD/CAM training seminars. Trainee dentists enjoy an opportunity to familiarize themselves with all-ceramic restorations and conservative treatment procedures. Numerous CEREC AC and inLab units are available to students. Dr. Dietrich explained the benefits of digital impressions and the placement of all-ceramic restorations during a single treatment session without the need for temporaries. He emphasized that dental practices are under pressure to increase their efficiency and profitability. Compared with traditional procedures, CAD/CAM technology paves the way to being more cost-effective. According to Dr. Dietrich, the CEREC system fulfils these criteria due to the fact that the entire processing and value chain remains within the dental practice.

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More precise than a conventional impression and more pleasant for the patient...



...Stefan Gottschalk would prefer to treat all his patients using the CEREC system.

One process, one appointment, two winners

CROWN RESTORATIONS. The comfort and convenience of patients are important aspects when deciding to implement the CEREC system. For Stefan Gottschalk another aspect is equally important: the ability to exercise complete control over the treatment process from beginning to end.

It is just an ordinary day for dentist Stefan Gottschalk – yet his mood could not be more positive. Today he is going to treat a patient who has remained loyal to his dental practice for several years, despite the fact that she now lives 50 km away in the city of Düsseldorf. Gottschalk is well aware of the importance of patient loyalty for the long-term success of his dental



Stefan Gottschalk, is a partner in the group practice Gottschalk & Kreft in Bensberg, near Cologne, Germany.

practice. At the same time quick and efficient treatment plays a key role. He needs less than two hours to complete a CEREC crown – i.e. for the preparation, optical impression, design, milling, characterization and placement. What is more, the patient does not have to come back for a second appointment.

The joint dental practice Gottschalk & Kreft in Bensberg (near Cologne) introduced the CEREC system in 2009. A few years elapsed before the two dentists finally decided to adopt this new treatment procedure. "I got

to know CEREC during my university training, but was not totally convinced about the accuracy of fit," Gottschalk remembers. The turning point was the International Dental Show (IDS). The innovative and ultra-precise CEREC Bluecam made a strong impression on both partners. The CEREC system had now acquired the necessary degree of technical perfection.

Having finally decided to become a CEREC user, Gottschalk came to grips with the technicalities. He attended a Sirona training course and quickly familiarized himself with the CEREC system. Looking back he says: "It was great fun. A basic knowledge of computers helps to make the learning process quicker and simpler." Gottschalk attaches great importance to the traditional craft skills of the dental profession. "It is very satisfying to carry out the entire workflow in your own dental practice – i.e. to produce a final restoration instead of just performing the preparation and acquiring a dental impression."

The patient from Düsseldorf came to Gottschalk's practice with a defective amalgam filling in tooth 35. After

administering the local anaesthetic Gottschalk began the preparation of the tooth. He removed the old filling, as well as new caries which had formed in the underlying area. As the preparation margins of the new crown were partly subgingival, he inserted a retraction cord between the tooth and the gums. After carefully powdering the treatment site he generated a digital impression using the CEREC AC acquisition unit. As soon as the intraoral camera was steadily positioned over the tooth stump the exposures were triggered automatically. In this way Gottschalk could quickly acquire impressions of the preparation, the adjacent teeth and the antagonists. Instead of taking a conventional bite registration he captured an additional bite impression with a buccal scan. The computer then converted the individual images into a virtual model.

After trimming the preparation Gottschalk marked the preparation margin with the aid of the automatic margin detector. The CEREC system then guided him through the subsequent design steps. When generating the initial proposal for the crown the

software no longer referred to the tooth database but instead used the so-called Biogeneric modelling function.

This innovative process detects morphological features that are unique to the patient as a basis for reconstructing the original occlusal surface of the tooth. An optimum crown for tooth 35 was quickly computed. After checking the contact points, cusps and fissures, Gottschalk sent the data to his CEREC MC XL milling machine

in the neighbouring room, where the restoration was milled out of a ceramic block. Only 11 minutes later the restoration was ready for a try-in in the patient's mouth. Shading and glazing took a further 20 minutes. The CEREC crown was then ready to be placed. The patient was very satisfied with the final result – a further reason why the investment in the CEREC system has paid dividends for Stefan Gottschalk. ■



After milling and trying-in, Stefan Gottschalk characterizes the crown individually.

No more unnecessary visits to the dentist

PATIENTS OPINION. Jessica Schnabel travelled 50 kilometres for a CEREC crown – because treatment could be performed during a single visit and because she has implicit trust in her dentist's skills.

CEREC Zeitung: Ms Schnabel, including travelling time, today's dental appointment took up three hours of your time. Was this worth the effort?

Schnabel: Yes, definitely. After all, I needed only one appointment. I'm self-employed and I simply don't have the time for repeat visits to my dentist. In addition, I feel well looked after in this dental practice. That's why I'm prepared to travel a long distance.

It sounds as if you actually enjoy going to the dentist. Aren't you afraid?

No, not at all. I've been a patient here for four years and am familiar

with the dentist and his team. At the beginning I lived nearby, but then moved house. I didn't want to change



She expects modern treatment methods: Patient Jessica Schnabel.

my dentist. I receive excellent advice and treatment here.

What makes you feel so satisfied?

Before and after treatment Mr Gottschalk takes pictures of my teeth, which I can then view on the monitor. We discuss in detail which course of treatment is ideal for me. This means that I'm much better informed.

Was the CEREC treatment procedure unpleasant?

Well, I'd prefer a beauty treatment session! No, but seriously, treatment was much more pleasant than I'd anticipated. In the past the rubbery

impression material always made me feel sick. It was pretty awful. I was very relieved when Mr Gottschalk told me that he would use a camera instead.

What was it like being able to view your teeth and the restoration on the computer monitor?

It was fascinating. Normally it is not possible to obtain such detailed views of the interior of my mouth. It was interesting to watch the crown taking shape step by step on the computer monitor. Modern technology is pretty amazing!

Is it important that your dentist uses modern equipment?

Yes, definitely. I'm not a technology freak, but I expect my dentist to be up to date technically. I would like to benefit from improved treatment techniques. Why should I visit my dentist twice when treatment can be performed during a single visit?

Would you recommend your dental practice and the CEREC procedure to other people?

Yes, I talked about this to my partner this morning. He couldn't believe that I didn't need a temporary filling and didn't have to return to my dentist for a second appointment. Let's see what he has to say this evening... ■

Intraoral impressions are the future

DIGITAL IMPRESSIONS. At the 10th Ceramics Symposium of AG Keramik Prof. Bernd Wöstmann, Head of the Prosthetic Dentistry Department at Giessen University, focused on developments in digital intraoral impression-scans.

From a dentist's viewpoint it is essential that a restoration fits first time without the need for manual adjustment. This presupposes the precise acquisition of the preparation and the patient's bite situation. Digital intraoral impressions were pioneered at Zurich University by Professor Werner Mörmann, the inventor of the CEREC system. In the succeeding decades digitization has made significant progress. However, the fabrication of permanent ceramic restorations, ranging from inlays to multi-unit bridges, places high demands on the quality and accuracy of intraoral impressions – both analogue and digital. This important processing step is beset with problems: "Due to material-related and haptic factors, it is not yet possible to create an error-free stone model by means of a conventional elastomer-based impression," maintains Dr. Bernd Wöstmann, Professor of Prosthetic Dentistry at Giessen University. The resultant virtual model will always be inaccurate, regardless of the precision of the scanning process. For this reason it makes



Compared with conventional tray-based impressions, the short-wavelength blue light of the CEREC Bluecam is much more precise.

sense to perform the scanning process directly in the oral cavity.

Today it is hard to envisage the labside fabrication of all-ceramic restorations without the use of CAD/CAM technology. The introduction of optical intraoral scanning pre-

pared the way for the complete digital workflow, beginning with the preparation of the tooth and ending with the incorporation of the final dental restoration.

A key benefit of digital impressions is that the scanned prepa-

ration can be evaluated directly on the computer monitor, thus permitting any inadequacies to be corrected immediately. For patients with a pronounced gag reflex the digital scanning is a considerably more pleasant experience. In addition, digital acquisition eliminates numerous manual processing steps in the dental practice: the selection of the impression tray; the mixing of the impression compound; waiting for the impression to cure; disinfection; and the production of the dental model. Fewer treatment and processing steps result in fewer sources of error and greater standardization. This in turn enhances the predictability of the treatment outcome.

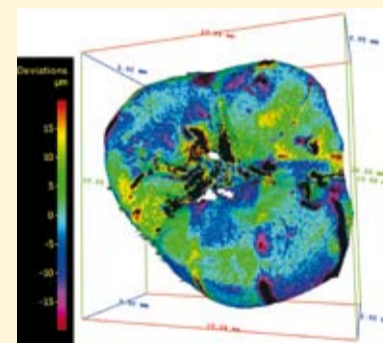
Digital impressions are more precise

Professor Gerwin Arnetzl from Graz University confirms Wöstmann's findings. In a paper delivered at the annual conference of the German Society for Computerized Dentistry (DGCZ) he compared the precision of digitally generated impressions with that of conventional elastomer impressions. He established that conventional impressions displayed a post-deformation recovery rate of 98.5%. In relation to an inlay cavity this corresponds to an inaccuracy of fit of 35 - 75 μm . In relation to cast objects the cumulative tolerances amount to 46.5 μm (Lehmann, DZZ 43, 1988). In the scientific literature there are reports of directly fabricated crowns with deviations of 114 μm (Plekavich, J Prosthet Dent 49, 1983). Varying elastomer impression techniques can lead to significant deviations, ranging from 49 μm (standard impression) to 122 μm (comparative impression) (Cox, J Prosthet Dent 87, 2002). As a rule, the investigations into analogue impression techniques have been based on 2D measurements, whereas the

more recent investigations into the accuracy of optical impressions have been based on differential 3D volume analysis. Digital/opto-electronic impressions generated by different clinicians achieve a measurement accuracy of 11 μm (Mehl, Int J Comp Dent 12, 2009). In relation to entire quadrants the analogue impression technique results in deviations of between 72 und 101 μm .

Digital impressions contain fewer errors

In combination with precision-enhancing angled images the deviations of digital impressions are in the region of 35 μm . Potential sources of error include incorrect scanner adjustment, magnetic interference during image processing, image noise and faults in the processing software. Arnetzl has established that, subject to the correct operation of the camera and scanner, digital impressions contain fewer errors and are more precise than conventional elastomer-based impressions. (Arnetzl, ZMK 5, 2010).



Measurement of precision between digital and elastomer impressions. The colors show the degree of deviation.

According to Wöstmann, opto-electronic impression systems have a strong future potential and will enter into widespread use in dental practices. Digital impression systems offer perceptible advantages in terms of standardization, quality assurance and patient-friendliness. Digital data records facilitate simple communication between the dentist and the dental technician, irrespective of geographical distance. The small data volumes – as in the case of CEREC Connect, for example – speed up the communication process. It is also possible to transmit additional information – for example, supplementary facial photographs, details of the tooth shade, characterization instructions, material specifications, details of occlusal concept, etc.

No elastomer bite registration – no gag reflex

Above all, it is possible to do without the conventional impression. This minimizes the risk of provoking the patient's gag reflex and eliminates the need for elastomer-based bite registrations and stone models. ■

Providing treatment in special circumstances

CHAIRSIDE. When time is of essential importance, CEREC offers enormous advantages. Dentist Kathrin Tobien can confirm this on the basis of her personal experience at Frankfurt Airport, Germany.

It is four o'clock in the afternoon at Frankfurt Airport. In just a few hours an Airbus is due to take off for São Paulo. The crew is in the process of preparing for this long haul flight. Suddenly there is a crunching sound: the pilot has inadvertently bitten on a cherry stone and fractured a molar crown. The tooth is causing him great pain. What happens now? A replacement crown is needed as quickly as possible. This does not pose a problem – assuming that a CEREC dentist is available nearby. With the aid of the CEREC system the dentist can scan the tooth, design a patient-specific

crown on the computer, mill this restoration out of a ceramic block and place it on the patient's defective tooth. This entire process takes a little longer than one hour. And the pilot is ready to board the plane at the scheduled time. Not every dentist regularly treats airline pilots. Nevertheless, Kathrin Tobien frequently encounters busy professionals who demand quick, aesthetic and high-quality dental restorations.

Time is an important factor

"Due to shift work, they often have problems arranging a series of successive appointments," she explains. Time is becoming an increasingly im-

portant factor. And not only for busy professional people. For example, for the bride-to-be who wants to repair her damaged front tooth ready for the wedding photographs the following day. CEREC can fulfil such wishes – in the evening and at weekends. The dentist does not depend on a dental technician and is free to provide treatment outside normal working hours.

High-speed treatment is not at the expense of aesthetics, however. A wide range of ceramic materials is available for the CEREC system – including high-quality polychromatic blocks for anterior crowns that accurately reproduce the shading of natural anterior teeth. The longevity of CEREC restorations is beyond any doubt. Kathrin Tobien knows this on the basis of her personal experience: her father (now retired) used CEREC in his dental practice for many years and was in a position to monitor his patients over a long period. It was from him that she 'inherited' her CEREC system.

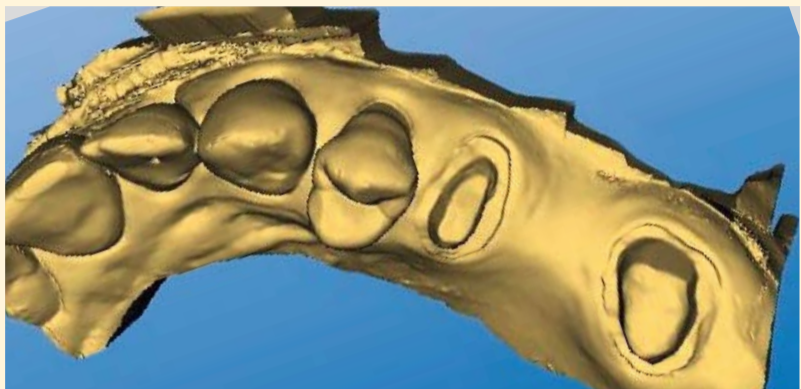
"Because my practice is located at an airport, I often have to treat patients in special situations. This is why I opted for the CEREC procedure," Kathrin Tobien explains. "Although I'm still a relative newcomer to CEREC, the system offers enormous potential for expanding my portfolio of dental treatment services." ■



Sometimes speed is decisive: CEREC has proved itself in exceptional circumstances.

Direct digital workflow

COLLABORATION. Thanks to CEREC Connect, the dental technician can be more closely integrated into the treatment process. Dentist Hermann Loos is able to perform complex restoration tasks.



The virtual model facilitates efficient collaboration between the dental practice and the laboratory.

For Hermann Loos the decision whether to fabricate a restoration in his dental practice ("chair-side") or in an external laboratory ("lab-side") depends on the clinical situation, the desired aesthetic outcome and the volume of work in hand. In the interests of flexibility he decided several years ago to introduce digital impressions. This facilitates the computer-aided fabrication of restorations – and is the ideal basis for efficient collaboration between dentists and dental technicians via the CEREC Connect web portal. Loos now works closely with the dental lab Kerstin Strassburger in Rochlitz (Sachsen), which delivers high-quality restorations machined on the basis of the inLab dental CAD/CAM technology.

CEREC Connect allows the dentist to concentrate on his or her core skills – i.e. tooth preparation and incorporation of dental restorations. With

the aid of the CEREC AC acquisition unit Hermann Loos captures the preparation, the opposing jaw, as well as the patient's habitual bite situation (by means of a vestibular scan). Depending on the extent of the planned restoration, the scan covers either a quadrant or an entire jaw arch. Hermann Loos has the option of entering the preparation margin himself. Alternatively, he uploads the virtual model to the CEREC Connect portal with the



Hermann Loos, is a dental practitioner in Chemnitz, Germany. The experienced CEREC user initiated the "Sachsen Ceramics" training program.

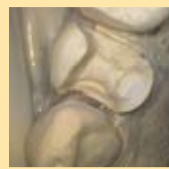
aid of the CEREC Connect software. If required he can append additional information to the virtual order – for example, supplementary facial photographs, details of the tooth shade, characterization instructions, mate-

rial specifications, details of occlusal concept, etc. Just a few minutes later the data can be viewed on the computer at the Strassburger dental laboratory. "Thanks to CEREC Connect, the lab is located right next to my treatment chair. As my dental technician and I have access to an identical set of data, we can discuss the details of the job in an uncomplicated way," Loos explains. If supplementary digital impressions are needed, they can be acquired quickly before the patient leaves the practice.

Hermann Loos is an experienced CEREC user. He creates anatomically sized crowns and other single-tooth restorations directly at the chairside – quickly, conveniently and without involving a dental technician. In addition, he fabricates short-span bridges in his in-house dental lab with the aid of the inLab milling unit. The real strengths of CEREC Connect lie in the creation of sophisticated multi-unit restorations, implant superstructures, attachment dentures and telescopic prostheses. In such cases the ordering process is no more complicated than for a simple crown.

"We have already produced numerous complex restorations via CEREC Connect – for example, bridges with up to five units and telescope-born two-part prostheses with zirconium oxide primary crowns – and everything fitted perfectly," Loos confirms. ■

CEREC Connect – step by step



1. Powdering: The user starts the CEREC Connect software and creates a new patient case. To ensure that the tooth surfaces can be captured accurately and without reflections the treatment site must be insulated against moisture and powdered using CEREC Optispray.



2. Digital impressions: With the aid of the CEREC Bluecam the dentist then captures the preparation, the antagonist and the bite situation. The camera is triggered automatically as soon as it is held steadily. A 3D preview appears on the monitor, thus allowing the quality of the images to be evaluated immediately.



3. Computing the virtual 3D model: In just a few seconds the CEREC Connect software computes a virtual 3D model of the upper and lower jaws. With the aid of a buccal image of the patient's bite situation the dentist can correlate the upper and lower jaws on the monitor.



4. Ordering: The dentist fills in the online order form, adds supplementary information and images and then uploads the model data to the CEREC Connect portal. Prior to this he has the option of entering the preparation margin on the virtual model using the automatic margin detector. This step can also be delegated to the dental technician.

The system informs the dental laboratory about the new order. The technician downloads the model data from the CEREC Connect portal. Various options are open: the dental technician can machine the restoration on the inLab MC XL unit; outsource the order to infiniDent, Sirona's central production service; or fabricate the restoration in-house using conventional methods. If the technician needs a working model for veneering and articulation purposes, he can place a corresponding order with infiniDent via the CEREC Connect portal.



5. Insertion: Following the receipt of the finished restoration, the dentist places it in the patient's mouth

Efficient collaboration with dental practices

TEAMWORK. No need for conventional impressions and sometimes not even for models. The ability to handle digital impressions via CEREC Connect generates new business, says Jens Richter.

The era of digital collaboration began two years ago when a dentist informed us that he wanted to generate opto-electronic impressions and then send us the data via the CEREC Connect web portal. Speed



Jens Richter works as a dental technician at the Strassburger Dental Laboratory in Rochlitz, Germany.

was of the essence. We decided to take up this challenge. The data arrived early in the morning – partial models of the upper and lower jaws and the digital bite registration. We were given the job of creating a partial silicate ceramic crown for tooth 16. The preparation margins had been clearly marked and we were able to begin designing the restoration immediately. Following this the restoration was milled on the inLab system. We could have ordered a model via CEREC Connect, but in our case we simply did not have the time. We were very interested to find out how the restoration performed during the clinical

try-in phase. "Fits perfectly," was the response from the dental practice.

Restorations without the need for elastomer impressions

Since this first successful trial run, we have been in a position to fabricate dental restorations without the need for elastomer impressions – either with or without models. Our portfolio now embraces single-tooth restorations, multi-unit zirconium oxide bridges, long-term polymer temporaries, as well as non-precious-metal restorations designed in-house and then outsourced to infiniDent, Sirona's central production service. If required, we order working models from infiniDent. As a rule these mo-

del are not needed for the adaptation of the frameworks (which always fit perfectly), but for veneering the ceramic facing and the articulation of the occlusal surfaces.


Concerns that CAD/CAM technology will destroy jobs in dental laboratories are completely unfounded. With the aid of CAD/CAM we can work very efficiently and compete with aggressively priced laboratories located abroad. Thanks to CEREC Connect, we can collaborate more closely with dentists, communicate more efficiently and react more quickly. We now work with new dental practices that are located further away. After all, digital technology transcends geographical limits. ■

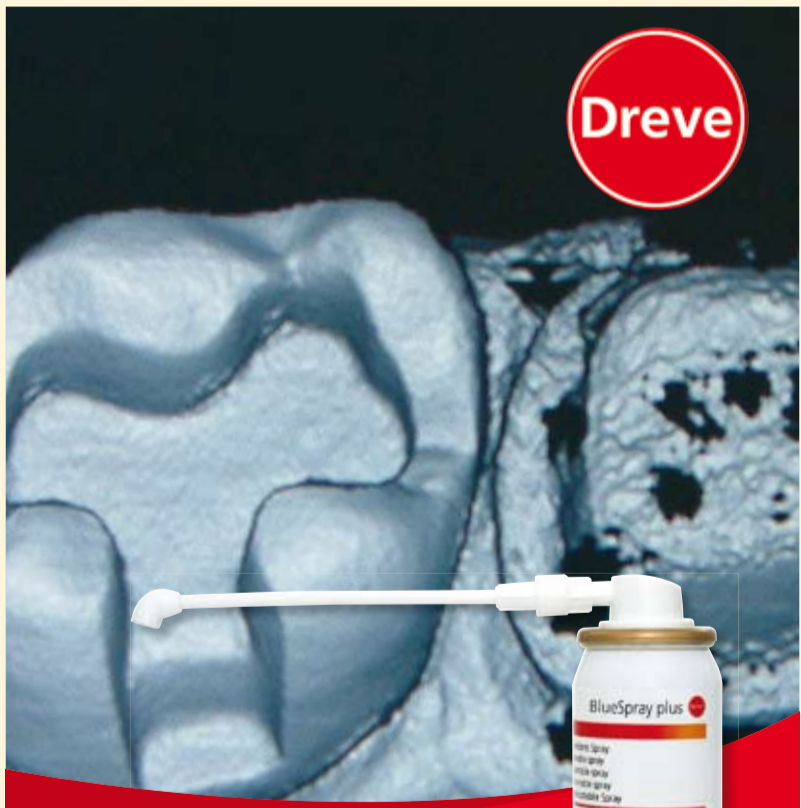


Bridge framework mounted on the centrally fabricated stereolithographic model.




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The user determines the quality of a dental restoration - not the hardware

CHAIRSIDE PROCEDURE. CEREC is the only system on the market that facilitates the fabrication of restorations directly at the chairside, without the need for temporaries and models. Dr. Michael Maier from Munich knows from experience, that CEREC functions perfectly.

I first became acquainted with the CEREC system during my time as a junior dentist in Lucerne and Chiemgau. When I set up my own dental practice in 2005 the CEREC



Dr. Michael Maier is a dental practitioner in Munich and has used CEREC ever since he set up his dental practice

3D system was one of the most important items of equipment. My prime motive was to create and place all-

ceramic restorations during a single treatment session without the need for metal materials and conventional impressions, which some patients regard as extremely unpleasant, and temporaries.

CEREC helps to increase productivity and cut costs

I opted for CEREC because it gives me complete control over functional and aesthetic aspects. In cases where simple polishing did not achieve the desired aesthetic result I had the option of using feldspar or

lithium disilicate ceramics, which can be glazed and individually characterized. In such cases the restorations were fired in our dental lab. We soon learned how to apply and glaze various staining products. By performing these tasks in-house we were able to increase our productivity and cut costs.

In combination with adhesive bonding partial crowns offer significant advantages. In the case of multi-surface defects it is possible to adopt a substance-conserving preparation technique. By contrast, a PFM crown requires a circular preparation in order to achieve the necessary retention. This leads to the loss of healthy tooth enamel and dentine.

Biogenic surface modelling is a substantial step forward

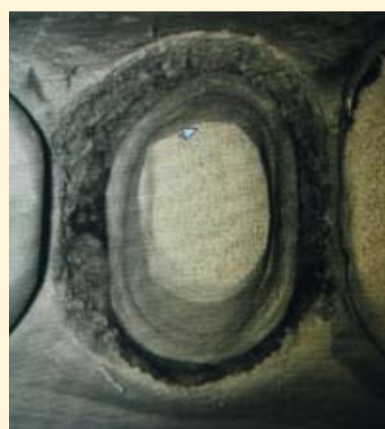
In the meantime we have upgraded to the CEREC AC system. Its predecessor had already paid for itself over a period of four years. With the aid of the V3.80 software we began to produce chairside crowns. The biogenic design function simplifies the creation of patient-specific occlusal surfaces. To begin with we regretted the loss of the tooth database – but soon discovered that the biogenic proposals achieve a better fit and require less manual adjustment before they are finally placed. In addition, we use the correlation design mode, which reproduces the occlusal surfaces on the basis of the existing tooth tissue. Although the biogenic design tool functions well, we still make manual functional adjustments in order to cater for difficult bite situations.

CEREC functions perfectly

For 25 years CEREC was the only system on the market that was capable of generating digital intraoral impressions. In the meantime other competing digital systems have become available. I have made enquiries and established a significant



Preparation of tooth 35 for a full ceramic crown. Chamfered preparation of the preparation margin.



Scan of the prepared tooth stump. Bleeding was stopped with the aid of a surgical laser and the gingival margin reduced.



Occlusion of the restored teeth 35 (crown), 36 (MOD inlay) – fabricated using the CEREC AC and feldspar ceramic (TriLux VITA).

CEREC AC – that's the way



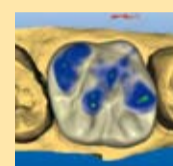
1. Digital impression

The steps are the same as in the case of CEREC Connect. In other words, the user starts the CEREC 3D software and creates a new patient case. After insulating the treatment site against moisture and powdering the tooth surfaces, the dentist then acquires a series of digital intraoral impressions.



2. Computing a virtual 3D model

On the basis of these intraoral impressions the software computes a virtual 3D model. With the aid of the automatic margin detector the user marks the preparation margin and defines the axis of insertion in such a way that undercuts are avoided.



3. Biogenic Reconstruction

The biogenic software creates a patient-specific restoration. On the basis of a reference tooth the software computes the precise morphology and the occlusal surfaces of the restoration. The user then checks the proximal and occlusal contact points and makes any necessary manual adjustments.



4. Milling preview

In the milling preview the user can view the position of the restoration within the ceramic block. In the case of polychromatic blocks the user can align the restoration in such a way that the shading of the ceramic layers corresponds exactly to that of a natural tooth.



5. Milling

Following this, the user activates the milling unit and selects a block from the list of options contained in the software. He clamps the block into the milling unit and initiates the machining process.



6. Insertion

The user tries in the restoration in order to check the accuracy of fit. After the restoration has been polished, it is ready for adhesive bonding. If required, the restoration can be individually characterized by means of staining and/or glazing.

difference: CEREC is the only system that facilitates the complete fabrication of a crown during a single treatment session. In addition to acquiring digital impressions the dentist is also in a position to mill the restoration and place it immediately.

Other intraoral scanning systems merely generate data sets which are transmitted to an external production facility, where the data has to be

checked at an extra charge. A few days later the dentist receives a package by post containing a plastic try-on model, plus a milled framework ready for further processing. In many cases manual adjustments are unavoidable. "Complete treatment in

a single visit" is a unique feature of CEREC – and the concept functions perfectly. This is something that my patients value highly. ■

„Complete treatment in a single visit is a unique feature of CEREC“

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IDS 22-26.03.2011 Hall 10 Booth No.: F043

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Sirona completes the digital process chain

DENTAL SHOW. At IDS 2011 Sirona will present new possibilities for dentists and dental technicians in today's digital age. Streamlined workflows, digital impressions, computer aided fabrication of models and restorations, integrated implant planning with the aid of CBCT and surgical guides – visitors at IDS will be able to get to grips with these innovations first-hand.

For dentists the first CEREC crown is something of a highlight. "This is great fun!" is a common response among the participants in the CEREC training courses. They are fascinated to watch the automatic detection of the preparation margin and the computation of a restoration which perfectly matches the patient's existing dentition. This fascination will be very much in evidence at the Sirona presentation in Hall 10.2 at IDS.

Digital impressions

Since the launch of the first CEREC CAD/CAM system 25 years ago, dental technology has made significant progress. The spectrum of indications has expanded enormously. New applications are constantly being added. In pursuit of faster, cost-effective and patient-friendly treatment many dental practices now collaborate digitally with dental laboratories. In place of conventional physical impressions, dentists scan the teeth digitally using the CEREC Bluecam camera – a process which Sirona will demonstrate live at IDS. In addition, Sirona will offer an opportunity for discussion between dental professionals. Thirty experienced CEREC users will be on site, ready to demonstrate the CEREC system and describe the various options open to the user – i.e. the complete fabrication of restorations during a single treatment session (chairside method) and collaboration with external dental laboratories via CEREC Connect (digital impression transfer method).

New software enhances ease-of-use

Software is a key component of the CEREC system: it guides the user through the various design steps. In the past designing occlusal surfaces was a lengthy process. Thanks to the new biogeneric software, which automatically reconstructs the original tooth morphology, this now takes only a fraction of the time. Although the capabilities of the CEREC system have been extended, the software is even easier to operate. The new graphical user interface visualizes the processing steps – generation of the digital impression, design of the restoration, milling of the ceramic block more clearly than ever before. The photo-realistic visual elements focus on the essentials and ensure optimum ease of use. This also means that new users can learn the CEREC system even more quickly than in the past and deploy the system effectively in their dental practices.

Integrated Implantology with CEREC and ORTHOPHOS XG 3D

CEREC not only facilitates the fabrication of all-ceramic restorations – it is also synonymous with a holistic dental treatment concept consisting

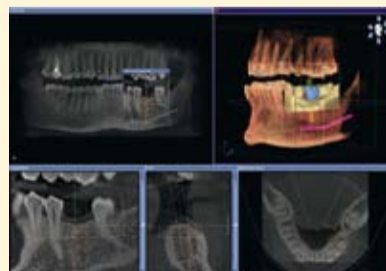


As was the case at IDS 2009, shown here, Sirona is well prepared to welcome a flood of visitors...

of complementary components that mesh together perfectly and thus permit completely new methods of treatment. One example is "integrated implantology" based on 3D X-ray images and 3D surface data generated by the CEREC system.

Alongside GALILEOS, the premium CBCT system for specialist users, Sirona has now introduced a new multifunctional 3D X-ray system for general practitioners, the ORTHOPHOS XG 3D. This new system paves the way to CBCT-based diagnostics and therapy planning. The user is in a position to select a therapy approach which minimizes risks and delivers maximum comfort and convenience for the patient.

For CEREC users the combination of CAD/CAM and CBCT technology offers a decisive advantage – i.e. the simultaneous surgical and prosthetic planning of implants. Prior to implantation the prosthetic proposal generated by the CEREC system is superimposed on the 3D X-ray volume. In this way the dentist can evaluate the treatment outcome in advance and ensure that the implant corresponds to his or her clinical and aesthetic requirements. This delivers enhanced predictability and reduces the overall number of treatment sessions.



Flexibility by the production of surgical guides

After the implant planning process has been completed the dentist has the option of using the available data to generate a surgical guide which precisely defines the depth and alignment of the drill holes. This allows the planned insertion to be realized

with optimum precision. As from autumn this year, users will be able to machine surgical guides directly on their CEREC and inLab MC XL milling units. This new in-house solution will speed up the implant procedure and deliver clear benefits in terms of vertical integration and revenue generation. Importantly, the dentist will no longer have to wait for delivery of the surgical guide from an external source.

If required, the dentist can outsource the production of the surgical guide to SICAT in Bonn. The surgical guide is based entirely on the digital impression data acquired on the CEREC system – i.e. there is no need for an X-ray template or stone model. The surgical guide is delivered to the dental practice within a few working days.



Milling models on the inLab system

If a dentist does not want to use the chairside method i.e. does not want to mill the restoration directly in the dental practice, he or she can acquire digital impressions and then delegate all the subsequent processing steps to a dental technician. To this end the dentist uploads the virtual model data to the CEREC Connect web portal and fills in a digital order form. The laboratory workflow has been further improved. At IDS 2011 Sirona will present a new process which allows dental technicians to machine their own working models on their inLab MC XL milling units. This will enable them to fine-tune the restorations more quickly than in the past, ready for shipping to the dentist.



Frameworks and veneer facings based on a single set of data

At this year's IDS Sirona will present a new procedure for fabricating anatomically sized bridges on the CEREC system. So far dentists and dental technicians have only been in a position to create frameworks. These then had to be individually veneered or overpressed using the time-consuming wax-up method. The new multilayer procedure delivers clear efficiency gains. Equipped with patient-specific occlusal surfaces, the bridges consist of two separate components: a framework (zirconium oxide) and a veneer facing (feldspar or lithium disilicate). When it computes the framework the software makes allowance for the specified minimum material thickness of the framework and the veneer and creates a geometry which is free of any undercuts.



The inFire HTC speed accelerates the sintering process

CAD/CAM technology speeds up and streamlines the fabrication of dental restorations. This is clearly evident in the new inFire HTC speed furnace, which delivers time savings of up to 75 percent when sintering zirconium oxide frameworks. This is the direct result of technologically enhanced heating elements, insulation materials and sintering trays. Zirconium oxide restorations with up to five units can be processed in just 90 minutes. A CAD/CAM veneered multilayer bridge can be processed from beginning to end in the course of a single working day. The built-in timer function allows the sintering process to be performed overnight. Last but not least, the inFire HTC speed achieves enhanced energy efficiency thanks to its significantly reduced heating and cooling times.

With this impressive lineup of new product developments Sirona has underlined its reputation as a total-solution provider along the entire CAD/CAM processing chain. This opens up entirely new applications and treatment approaches. Despite their enhanced capabilities, Sirona's CAD/CAM systems have remained easy to use. The new, intuitive software user interface will enable dentists and dental technicians to perform complex restoration assignments even more effectively than in the past. ■



... 50 members of staff and 30 CEREC users will be on hand to help and advise.

CEREC pays dividends

COST-EFFECTIVE. High-tech medicine is not necessarily expensive. Whether or not an investment pays off depends on the extent to which the dentist employs new technology on a day-to-day basis, says Dr. Julian Caplan, a dentist based in St. Albans, Hertfordshire, UK.



Patients are very impressed by the CEREC technology and greatly appreciate the quality of the restorations.

Before purchasing new equipment a dentist is entitled to ask: will this investment pay off? In many cases the determining factor is not the initial capital outlay, but the way in which the dentist employs the new equipment. With the aid of modern technology the dentist can automate treatment steps and offer an extended portfolio of services. By reorganizing and streamlining the practice workflow it is possible to obtain significant efficiency gains. This allows the dentist to treat more patients in a given period of time and hence achieve higher profitability. The CEREC dental CAD/CAM system is a good example of this.



Dr. Julian Caplan is a dental practitioner in St. Albans, Hertfordshire, UK. He is director on the board of The British Academy of Cosmetic Dentistry.

The CEREC system allows dentists to create and place ceramic crowns, inlays, onlays and veneers in the course of a single treatment session. It is also possible to fabricate anatomically sized temporary bridges on the CEREC system. Ceramic materials offer several key benefits. Firstly, they fulfil high aesthetic standards in terms of translucency and natural shading. Secondly, ceramic materials are biocompatible: they do not cause allergies and are therefore preferable to amalgam. These reasons prompted me to choose the CEREC system. Over a period of time I recognized the advantages of exercising complete control over the treatment process – beginning with the acquisition of digital impressions, followed by the design, milling and final placement of the restoration.

Much more efficiency and economic success

After I had installed a complete CEREC system – consisting of an acquisition unit and a milling unit – I discovered that I could treat patients much more efficiently and thereby achieve significant economic advantages. Regardless of whether I want to treat a single tooth or restore an entire quadrant, the patient receives a perfect result during a single appoint-

ment. The various hygiene procedures need to be performed only once. The patient does not require several injections or a temporary restoration. While the patient is waiting for his or her restoration to be milled, I can turn my attention to the next patient.

I can now delegate several of the intermediate processing steps to my assistant. For example, she inserts the ceramic block into the milling machine, starts the milling process and removes the finished restoration after approximately ten minutes. The actual milling process does not have to be monitored. If molar restorations require additional characterization, I delegate staining and glazing to my assistant. In the case of challenging anterior crowns restorations I perform this process myself. The CEREC system has not only changed the way I work – it also means that my practice is much more closely involved in the workflow than before.

It is not only the streamlined workflow and shorter treatment times – 20 minutes less compared with the conventional treatment method – that makes the CEREC system so economically attractive. It is also the reduced laboratory costs. If I offset the savings generated by each CEREC treatment session against my investment costs, I need to perform only ten restorations per month to break even. As from the 11th restoration I make a profit. Given that I create an average of 30 restorations per month, this amounts to a considerable sum of money. I recommend that all dentists who want to work cost effectively should invest in the CEREC system.



Assistants insert the ceramic block and start the milling process.

Training the preparation and early detection of faults

Of course, certain factors have to be borne in mind when using a new technology – for example, the ceramic-specific preparation guidelines. The user also has to powder the treatment site in order to prevent reflections and image artefacts.

A further advantage is the virtual model, generated on the basis of the intraoral impressions. The dentist can tell at a glance whether or not the preparation has been performed properly. On the one hand, this is a good form of training. On the other hand, it means that faults can be detected prior to the final try-in. The costs of reworking or creating a completely new restoration cannot be passed on to the patient. Assuming that the dentist has worked carefully, CEREC delivers a perfect restoration every time.

Word of this soon spreads among patients, resulting in an enormous image boost. CEREC is a unique selling point which distinguishes my practice from its competitors in a sizeable catchment area. Patients deliberately choose to come to me. In my experience, patients are very impressed by this new technology and greatly appreciate the quality of work that I offer.

Cosmetic and aesthetic applications

In addition, they are less likely to question my treatment fees. A further decisive advantage is the incredible variety of materials available for the CEREC milling unit. CEREC restorations are ideally suited for cosmetic and aesthetic applications. It is possible to mill ultra-thin veneers out of translucent, polychromatic ce-

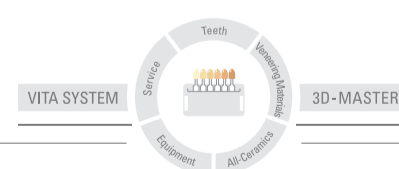
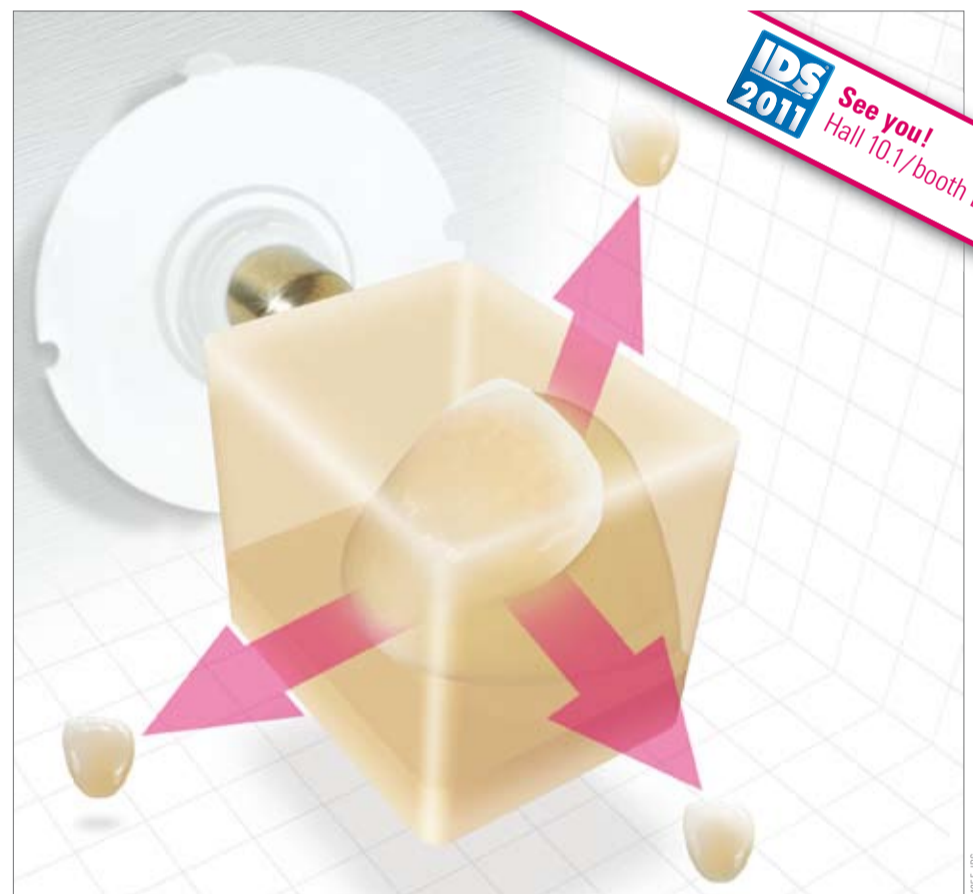
ramic blocks. These veneers give the anterior teeth a natural, aesthetically pleasing appearance. This provides the basis for an expanded portfolio of cosmetic treatment services, which in turn appeal to new groups of patients.

Conclusion

Dentists who are willing to get to grips with the CEREC system and restructure their practice workflow will quickly achieve clear benefits. In addition to aesthetic, long-lasting ceramic restorations for the patient, the CEREC system delivers clear economic advantages. Laboratory costs can be reduced. The dentist can complete the restoration process during a single appointment and has more time to treat additional patients and devote his attention to other tasks. ■

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„The chairside procedure has transformed my profession ...!“

TRADITION MEETS MODERNITY. With the aid of CEREC Dr. Gunpei Koike, Japan, has extended his “generalist” concept.

Tradition plays an important role in Japan. Professional assets are frequently passed down from one generation to the next. After qualifying as a dentist and oral surgeon Dr. Gunpei Koike took over his grandfather's dental practice in 1999. Up until this point the focus had been on providing general dental treatment for entire families. Dr. Koike decided to introduce special preventive care programs targeted at children and juveniles and thus promote the trust of parents and grandparents. Such cross-generational communication is especially important in Japan's suburban districts, where several generations traditionally live under one roof and decide jointly on day-to-day matters.

Open to new treatment methods

Despite his traditional background, Dr. Koike is nonetheless open to new treatment methods. For instance, instead of amalgam, he opted for light-cured composites and dentine adhesives when treating cavities. In the case of cavities from three or more surfaces and cusp-replacement onlays he decided in favour of ceramic materials, even though this does not correspond to the standard care provisions of the Japanese health insurance system. This reorientation necessitated extensive patient counselling. The practice owner attached top priority to tissue-conserving, adhesively bonded partial crowns. By contrast, the preparation guidelines for cast palladium crowns, i.e. those favoured by the Japanese public health insurance system, require the removal of significantly more tooth substance in the cervical area.

Substance conservation and aesthetic ceramic materials became the hallmarks of Dr. Koike's dental practice. The patients soon understood the benefits of defect-oriented, minimally invasive preparations, as well as the aesthetic and biological advantages of ceramics versus metal. In 2005 Koike was one of the first Japanese dentists to install a CEREC system. In the meantime he creates approx. 30 CEREC



Dr. Koike pictured together with his team and the CEREC AC acquisition unit at his dental clinic in Yokosuka/Japan.

restorations per month – mainly inlays and onlays. Aesthetically challenging anterior crowns are fabricated out of multilayered, pigmented feldspar ceramic or lithium disilicate. Characterization, e.g. using ceramic stains or cutback veneering, is performed by a part-time dental technician. As a rule these labside restorations are ready for placement within one working day. All the practice staff have received CEREC restorations and are therefore well-placed to advise patients.

When asked about their experience with CEREC, patients were especially impressed by the non-contact optical impression and by the fact that treatment can be completed in a single appointment without the need for a temporary restoration. This was a particularly important motive for patients who have job commitments. Koike carefully documents all his cases and has established that CEREC restorations remain clinically perfect after many years in situ. According to Gunpei Koike, immediately placed chairside ceramic inlays reduce the risk of enamel cracking and marginal spalling. The force-locked bond between the restoration and the hard tooth tissue stabilizes the cavity walls. By contrast, the non adhesively-luted temporary inlay lies like a wedge in the cavity and transmits the chewing forces directly

to the weakened residual tooth. Under the influence of chewing forces the tooth is subjected to torsional stress due to the low elastic modulus of the temporary composite material. This results in an uneven stress distribution, with stress peaks at the interface

between the tooth and the temporary. The transmitted force also deforms the inadequately protected cusp walls.


The patients are recalled at six-monthly intervals. After several years in situ minor occlusal enamel abrasions can occur at the restoration


margins. These can be evened out by means of polishing. With regard to the cost-effectiveness of CEREC, Gunpei Koike emphasizes that the result depends largely on the hourly practice costs and the price paid by the patient. Conventional laboratory techniques are prone to cost overruns. “Thanks to CEREC, the production costs remain in-house and we can achieve a good contribution to our profits,” the practice owner explains.

Gunpei Koike is convinced that metal will largely disappear from dental practices. In addition to its aesthetic advantages, computer-machinable ceramics are biocompatible, adhesively bondable i.e. tissue-conserving and resistant to plaque formation. Koike concludes: “The chairside procedure has transformed my profession – and my patients have gratefully accepted this new treatment procedure.” Ceramics and CAD/CAM technology will play a determining role in the future of the Koike Dental Clinic. ■

COMING SOON

- 07.04. – 09.04.2011 Scandefa, Copenhagen, Denmark
- 07.04. – 09.04.2011 FDM, Barcelona, Spain
- 09.04 – 10.04. 2011 4. CEREC Forum der JSCAD in Tokyo, Japan
- 25.04. – 28.04.2011 Dental Salon, Moscow, Russia
- 28.04. – 30.04.2011 ODA Annual Spring Meeting, Toronto, Canada
- 05.05. – 08.05.2011 Expodentis, Porto, Portugal
- 12.05. – 13.05.2011 5th CAD/CAM Conference, Dubai, UAE
- 16.05. – 19.05.2011 Saudi Medicare, Riyadh, Saudi Arabia
- 19.05. – 21.05.2011 BDA Conference, Manchester, UK
- 26.05. – 28.05.2011 Amici di Brugg, Rimini, Italy
- 26.05. – 28.05.2011 TDB, Istanbul, Turkey
- 28.05. – 31.05.2011 JDQ, Montreal, Canada
- 09.06. – 12.06.2011 Sino Dental, Peking, China
- 17.06. – 18.06.2011 World Aesthetic Congress, London, UK
- 25.06. – 27.06.2011 SIDEX, Seoul, South Korea






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