

CUSTOM-FIT RESTORATIONS

CEREC Biogeneric: natural occlusions with just one click.

Image: Prof. Albert Mehl

The Dental Company

sirona.

FOR EVERY PATIENT AND CLINICAL SITUATION

Natural occlusal surfaces – created automatically.

CEREC Biogeneric* revolutionizes occlusal surface design. It is the first restoration method which metrically analyzes the patient’s individual dentition status as the basis for computing the occlusal morphology. This patented scientific procedure is the passport to natural, made-to-measure

restorations founded on precise metric principles. What is more this method is extremely simple. With a single mouse click the user is able to create crowns, veneers, inlays and onlays, as well as anatomically sized bridges with up to four units. **Enjoy every day. With Sirona.**

The benefits at a glance:

Simple. Automatic

- One-click method for creating lifelike occlusal surfaces
- Immediate restoration proposals are clinically and functionally valid
- Identical design process for all restoration types – crowns, veneers, inlays, onlays, anatomically sized bridges

Made to measure natural custom-fit

- The basis is the natural tooth morphology of each individual patient – a single intact tooth serves as reference
- Utilizes the morphological and functional information which is genetically stored in the patient’s dentition
- Natural occlusal surfaces adapted to their surroundings and for every clinical situation

Scientifically and clinically proven

- Mathematically exact description of any given occlusal morphology
- User-independent and scientifically reproducible
- Exclusive to Sirona: protected by patent

* Patented in Germany; further patent applications pending.

CEREC Biogeneric functions naturally

You can read the fragmented text without any problems? If so, you've already understood the basic principle behind CEREC Biogeneric. The human brain is capable of deciphering a sentence and completing it on the basis of just a few fragmentary letters. In the same way CEREC Biogeneric identifies existing structures and reconstructs the occlusal surface automatically on the basis of the patient's individual tooth morphology. Thanks to CEREC Biogeneric, the automatic reconstruction of teeth following natural principles has become a tangible reality.

Intact antagonist as basis source of information

Restoration: automatically generated initial proposal on the basis of the information from the antagonist

Comparison with the natural original occlusal surface



INTERVIEW WITH PROFESSOR ALBERT MEHL, WHO DEVELOPED BIOGENERIC DESIGN How fundamental scientific research has revolutionized dentistry.



Professor Mehl, what does the term "biogeneric occlusal surfaces" actually refer to?

The term "biogeneric occlusal surfaces" denotes the mathematical description of natural occlusal morphologies. It is based on the analysis of thousands of intact tooth surfaces and on objective algorithmic principles. This description is independent of specific expert knowledge and encompasses all previously valid occlusal concepts. The main advantage is that it is now possible to define all naturally occurring occlusal surfaces by means of just a few parameters and characteristics. This represents an effective data reduction. It is, in fact, comparable with the millions of different colours that can be described using the primary colours red, green and blue.

Why are patient-specific occlusal surfaces so important?

Occlusal surfaces have different characteristics in terms of cusp position and shape, fissure depth, tooth morphology, length and angular relationship. These features significantly affect the function of the masticatory system. For this reason dentistry has always attached top priority to creating dental restorations with natural occlusal surfaces – best of all occlusal surfaces which are as unique as the patient's fingerprints or DNA.

How did the development of the biogeneric principle come about?

Conventional wax-up and occlusion concepts cannot be transferred to a computer-aided design process due to the lack of the necessary metric data. If 10 dental technicians were asked to produce one and the same crown restoration, they would deliver 10 different occlusal designs. In most cases, with appropriate experience, these designs are clinically flawless, aesthetic and highly functional. But as a scientist I am interested in metric and provable results that one can use with CAD/CAM. After all, nature created only one individual original tooth. Should it not be our aim, that the reconstruction result should correspond as closely as possible to the initial tooth?

What are the implications for practical CAD/CAM dentistry?

It is important that the restoration harmonizes with the overall clinical situation. This goal cannot be achieved by means of a "standard occlusal surface" which does not make allowance for natural diversity. In order to attain a patient-specific outcome the dentist has so far been forced to make numerous manual adjustments – either via the software or during the placement and milling.

What about existing dental databases?

Dental databases were an important step on the way to patient-specific restorations. From a scientific viewpoint, however, the biogeneric principle offers simply more advantages. Regardless of how many teeth a very good dental database contains, it

will never reflect nature's morphological diversity. The selection process of the correct tooth will always be subjective. By contrast, biogeneric is founded on the basis of objectively measurable criteria and takes account of metric parameters. As a result biogeneric is capable of reproducing each clinical tooth situation. It encompasses much more information than even the largest dental database.

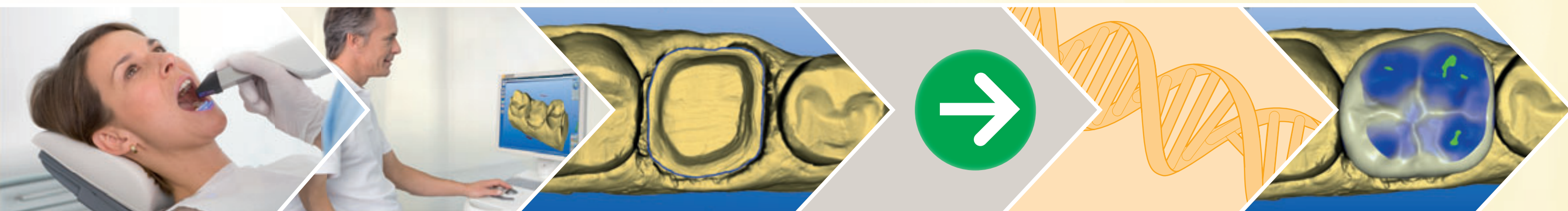
How does the biogeneric principle function specifically?

Like a fingerprint each person's dentition has its own signature, its own DNA. Biogeneric succeeds in identifying the genetic blueprint that determines morphology and occlusion and hence obtains vital information for the reconstruction. In the case of inlays and onlays the CEREC Biogeneric software uses the residual occlusal tissue surrounding the cavity of the prepared tooth. In the case of crowns the user creates digital impressions of the preparation and a further intact tooth, preferably the antagonist, adjacent tooth or contralateral (Fig. 1). On the basis of the intact morphology the CEREC Biogeneric software can generate a matching restoration proposal (Fig. 2). Scientific analyses demonstrate that the restoration proposal closely reproduces the original occlusal surface, individually for each patient (Fig. 3).

CEREC Biogeneric – a single design procedure for every indication.

The entire design process – including the generation of the biogeneric restoration proposal – integrates itself seamlessly into your treatment workflow. The procedure is identical for every indication – a major advantage over other CAD/CAM restoration methods.

Dispense with the time-consuming adaptation of standard teeth derived from dental databases. With CEREC Biogeneric you receive clinically natural customized restorations for every situation quickly and efficiently.



Optical impression of the prepared tooth using the CEREC Bluecam. The reference being the adjacent tooth, antagonist or any intact tooth.

Display of the 3D model on the CEREC AC monitor

Software steps: trim and draw the preparation margin

Click the "Next" button

Biogeneric evaluation by the CEREC software with automatic data analysis and computation of the restoration proposal

Initial proposal displayed either for additional characterization or immediate fabrication in the CEREC milling unit

Bluecam, margin, done.

Objective and operator independent

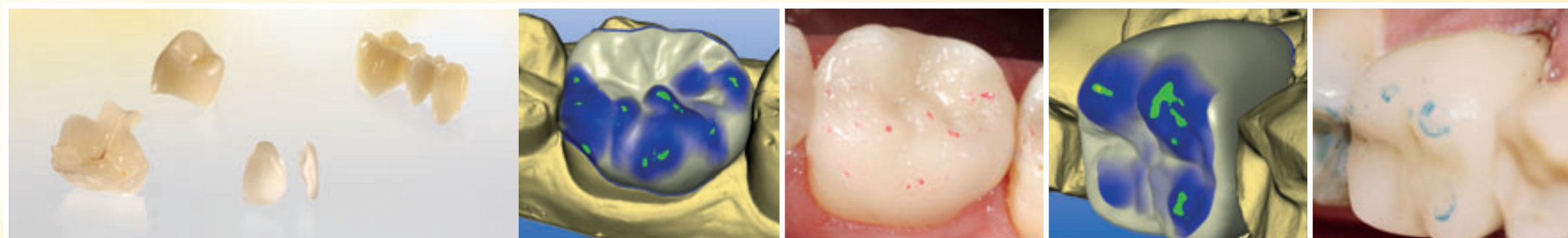
An integral part of the CEREC 3D software, CEREC Biogeneric is very easy to use. Irrespective of your previous CAD/CAM experience, the program features are quickly learned and immediately applicable – thanks to the standard procedure for every type of indication*.

* Biogeneric modelling has been available for inlays since Version 3.00 of the CEREC and inLab software. This function will be extended to crowns, veneers and anatomical bridges as from Version 3.80 – scheduled for release in May 2010.

CEREC Biogeneric indications:
inlays/onlays, crowns, veneers, anatomically sized bridges

Initial proposal from the software in comparison to the final restoration in vivo.
Onlay

Crown



RELIABLE, NATURAL, CUSTOM-FIT

CEREC Biogeneric – the patient is the measure of all things.

Your patients are always the centre of attention – all the more so if you decide to use CEREC Biogeneric occlusal surface design. CEREC Biogeneric is the only design method which relies exclusively on the genetic information stored in the patient’s own natural dentition.

Your patients profit from natural, made-to-measure customized solutions. And you benefit from the fact that patients carry a restoration blueprint in their mouths. The outcome: clinical reliability and increased satisfaction on both sides.



Benefits for patients and dentists

CEREC Biogeneric increases the acceptance of your restoration proposals by your patients. They will be delighted to “get their own teeth back”. This will enhance your reputation and increase the likelihood that patients will come back or recommend your practice to third parties.

*Crown on tooth 36 needs replacing.
Reference: intact tooth 46.
Reconstruction in 30 seconds.*

*Complicated cusp fracture
on tooth 25. Restoration of
the onlay with a single click.
Totally harmonious outcome.*

*Inlay for tooth 47. Designed
with a single click. No further
adjustment required.*

*Posterior bridge from tooth 14 to 16.
Reference tooth 17. CEREC Biogeneric
modelling used for the first time.
Impressive functionality.*

*Fractured anterior tooth 11 due to an
accident. Reference tooth 21. Automatic
crown reconstruction. Natural design
with a high aesthetic quality.*

CEREC Biogeneric – a scientific revolution.

Professor Mehl and Professor Blanz, the founders of the biogeneric principle, set themselves ambitious goals: to make allowance for all valid existing occlusal concepts, to mathematically describe any given morphology and to come up with a precise and uniquely customized restoration for each individual patient. After years of painstaking research they found the formula for the genetic blueprint of morphology and occlusion.

The genetic blueprint and its hidden information

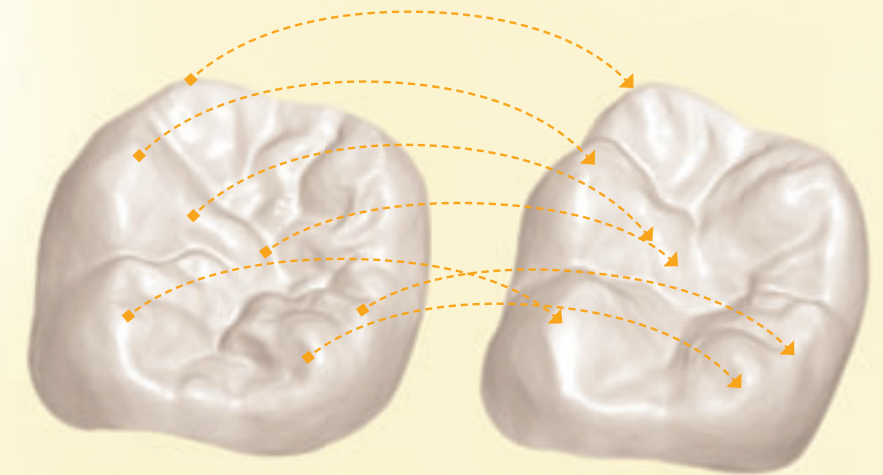
The easy-to-use CEREC Biogeneric software is the result of thousands of measurements of intact teeth and years of intensive research into morphology and function. Highly complex statistical programs were deployed in order to process the measurement data. The researchers succeeded in identifying a variety of characteristic morphological traits and interdependencies. These findings were then verified in a series of simulations.

Natural laws instead of rule of thumb

What does patient-specific occlusal surface design have to do with the cubic relationship between the mesial ridge point and the central cusp incline? Quite simply, this is one of the objectively measurable parameters for the mathematical description of naturally occurring tooth morphologies.

“Our first fundamental insight was that the entire spectrum of dental and occlusal morphologies can be described using just a few parameters. The second fundamental insight was that this set of parameters is capable of describing various teeth belonging to the same patient. With the basic information derived from an intact tooth we are in a position to reconstruct missing portions of any tooth by transferring these patient-specific parameters. In the case of inlays we do not even require an intact tooth. The information contained in the residual tooth tissue is sufficient.”

Professor Albert Mehl discussing his research breakthrough



The original morphology is reconstructed on the basis of information derived from the adjacent or antagonist teeth.

Scientific literature:

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THE NEW STANDARD IN DENTISTRY

CEREC Biogeneric: practice-proven worldwide.

Dental practices have confirmed the outstanding dependability of CEREC Biogeneric – irrespective of who is operating the software. Regardless of the demands and requirements, CEREC Biogeneric masters every challenge.



Dr. Bindl, Switzerland *"Because CEREC Biogeneric utilizes exact measurement data, it easily matches the best wax-up techniques. In addition, it offers all the benefits of chairside treatment. This is what I call modern and first-class dental care."*



Dr. Devigus, Switzerland *"Just a few mouse clicks – and my individually adapted anatomical bridge is completed. CEREC Biogeneric masters anatomically and automatically even complex designs. The initial proposals are excellent in terms of form and function. Only very minor adjustments are required."*



Dr. Fitzsche, Germany *"Veneers, crowns, onlays, inlays, bridges – my practice has to cope with wide-ranging demands. A decisive advantage is that I don't have to adopt a different design approach every time. This is easy to communicate in my CEREC user training courses."*



Dr. Lalet, France *"I don't need a degree in computer science in order to create top-quality dental restorations. Even veneer designs can be completed in no time at all. The results meet my high aesthetic expectations. No other CAD/CAM program is capable of this."*



Dr. Puri, USA *"The best part of the biogeneric process is that it requires no work from the clinician. Just a couple of clicks and you have a beautiful proposal every time."*



Dr. Touchstone, USA *"In the past I had to spend a long time editing the tooth model retrieved from the dental database. CEREC Biogeneric enables me to work more reliably and efficiently. 20% more crowns a month and completely satisfied patients – these facts speak for themselves."*



A CAD/CAM SYSTEM WITH MANY CONVINCING ADVANTAGES

CEREC – setting the new standard in dentistry.



CEREC – the systematic approach to success

The acquisition unit, design software and milling unit are perfectly matched and deliver the solution for nearly every clinical situation. Treatment can be completed during a single appointment. In addition, CEREC is synonymous with user-friendliness, cost-effective integration into the practice workflow, highly aesthetic restorations – and very satisfied patients.

Automatic, CEREC Biogeneric occlusal surface creation is just one of the many features of the CEREC system. Others include patient-friendly digital impressions, user-friendly computer-aided design and the milling of all-ceramic restorations directly chairside. CEREC sets the standard in computerized dentistry and delivers proven benefits in terms of clinical reliability.

CEREC is a firmly established treatment procedure with a 25-year track record and an impressive success rate. After five years 95–97% of CEREC crowns are still intact. Inlays and onlays achieve a survival rate of 90–95% after ten years. This is the gold standard!

Exceptional precision: CEREC AC

- Innovative acquisition unit featuring CEREC Bluecam
- Unprecedented precise measurements*
- Easy to use thanks to the automatic capture function

Reliable design: CEREC 3D software

- Intuitive user interface
- Precise 3D models
- Clinically and functionally valid proposals available with a single mouse click and CEREC Biogeneric

Automatic all-ceramic restorations: CEREC milling units

- CEREC MC XL: precise, fast, ideal for high-volume milling applications
- CEREC 3 milling unit: compact, proven, competitively priced, ideal for single-tooth restorations
- Extensive range of materials supplied by leading manufacturers

*In addition to its proven chairside capabilities the CEREC system opens up unique perspectives in CAD/CAM dentistry – for example, the direct link with external dental labs CEREC Connect** and simultaneous prosthetic and surgical planning (“CEREC meets GALILEOS”). For further information please contact your Sirona dealer or visit www.sirona.com*

* Result of a study by Professor Dr. Mehl (Zurich University, 2008): accuracy of depth measurement up to 19 µm.

**CEREC Connect not yet available in all countries.



From vision to reality brochure



Scientifically secure brochure



CAD/CAM SYSTEMS | INSTRUMENTS | HYGIENE SYSTEMS | TREATMENT CENTERS | IMAGING SYSTEMS

SIRONA – UNIQUE WORLDWIDE SYSTEMS EXPERTISE IN DENTAL EQUIPMENT PRODUCTS

Sirona develops and manufactures a comprehensive range of dental equipment, including CAD/CAM Systems for dental practices (CEREC) and laboratories (inLab), Instruments and Hygiene Systems, Treatment Centers and Imaging Systems. Sirona manufactures high technology products that guarantee ease of use and a high return on investment – for the good of your practice and for the benefit of your patients. In this way, you can approach every challenge you face with confidence. **Enjoy every day. With Sirona.**