

Dear Sir/Madam:

Cercon, our zirconia from Hanau, is celebrating its 15th anniversary this year. We as a laboratory are proud to have been offering you this unique ceramic material in a technologically advanced and economically viable form following since 2001. Today this material has become indispensable in the laboratory. All-ceramic restorations generally score points with dentists and patients.

While patients appreciate the esthetic benefits of all-ceramic restorations, dentists praise the biological and gingival compatibility of zirconia. So there are many reasons to enjoy this material.

With all our enthusiasm, we have always been very keen on making sure that this high-performance material is demonstrably safe, specifically that it complies with applicable standards and proves itself in extensive laboratory tests and simulations and of course a variety of clinical studies.

Look at the research first, then recommend a material for a specific indication – this has been our motto, and our approach is now paying off. Those who work with our zirconia material can feel on the safe side within a broad range of indications. This would make Cercon the zirconia system with the best clinical evidence.

Currently, this is amply demonstrated by our Cercon ht with True Color Technology, a zirconia material available in all 16 VITA¹ classical shades. Find out more on pages 2 and 4 and read about first impressions, practical assessments and lab-to-lab advice on page 3.

This and much more you will find on the following pages. Or ask your Dentsply Sirona Prosthetics technical adviser. I wish you an enjoyable read and look forward to your suggestions for further issues – you can reach me directly by e-mail: anwenderbrief.degudent@dentsply.com.

Best regards,



Andreas Maier



Andreas Maier
Manager Marketing
Communications
Dentsply Sirona Prosthetics,
Hanau

www.dentsplysirona.com

Colorized zirconia –
safety first Pages 2 and 4



Double crowns as
supporting elements
Seite 4 & 5



Cercon ht with True Color
Technology – dentine from
the machine Page 6



Colorized zirconia – safety first

Dental technology ahead of aviation and wind power

Many dental technicians had wished that zirconia were available colorized in the 16 VITA¹ classical shades. This wish has now come true thanks to the Cercon ht True Color Technology. The coloring of this material brings it to the global top – and so do the methods that safeguard also with the method that hedge their endurance.

In an interview with Quintessenz Zahntechnik² recently explained Professor Hans Jürgen Christ of the University of Siegen, where among other things he coordinates the priority program “Life – infinite life cycle for cyclically loaded high-performance materials”, explain this as follows: “Coloring with pigments introduces targeted impurities into the high-purity ceramic material. So it would not have surprised me if the fatigue strength had been lower than that of pure white zirconia.”

The term “cyclic load” refers to the recurrent exposure to a subcritical load (i.e., a load not leading to breakage) and corresponds exactly to the situation in the chewing motion. Christ’s review in an experiment simulating 40 million load cycles showed no difference between the white and the colored zirconia by Dentsply Sirona Prosthetics, Hanau.

A thriller for the research team

For Dr. Lothar Völkl, Head of Development at Dentsply Sirona Prosthetics, Hanau, the hours leading up to the final confirmation of this result were very exciting, because if the test had not been successful, “we would not have brought our Cercon ht True Color Technology to market, and we would have had to start over from scratch.”

For the experiments in Siegen, Völkl and his team prepared special zirconia specimens in the proximate shape of a dog bone with a thread



Prof. Dr.-Ing.
Hans-Jürgen Christ,
Chair, Department of Materials
Science and Materials Testing,
University of Siegen



Fig. 1

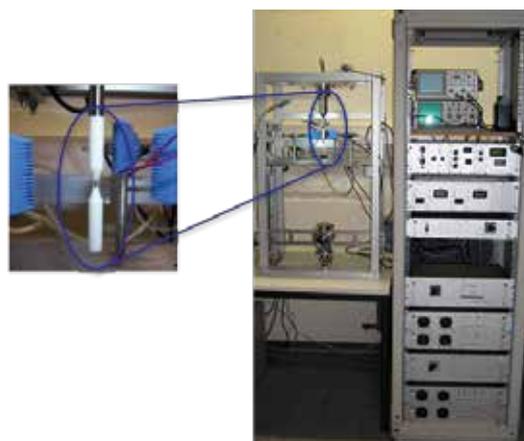


Fig. 2

Fig. 1: A typical zirconia specimens for the VCHF experiments at the University of Siegen: the thread with which the specimen is screwed into the apparatus (above) and the strain gauges (center). Photo: Christ

Fig. 2: The specimen is screwed into the apparatus to be tested for fatigue using ultrasound (left), Overall experimental design, including control electronics (right). Photo: Christ

allowing it to be screwed into the test apparatus – certainly not an everyday task. The workshop at the university would have been out of its depth, but for the materials science people in Hanau, something like this is well within the range of their daily chores.

The University of Siegen and its methodology are close to the top of the world rankings. In the field of ceramic materials, the research group led by Professor Christian in the cooperation with Dentsply Sirona Prosthetics has a unique position even globally, as most studies on the life cycle of loaded high-performance materials – “Very High Cycle Fatigue” (VHCF) – address classical metals for mechanical engineering applications.

“The VHCF properties of long fiber-reinforced components for aircraft such as Boeing’s Dreamliner Boeing or wind turbines are still unknown at this point, even though this would be immensely interesting”, as Christ wrote².

Using a fundamental principle of metal testing, he sends ultrasonic waves through his specimens. For the study of ceramics, Christ and his team made specific modifications to the experimental setup.



Dr. Lothar Völkl,
Direktor Forschung
und Entwicklung,
Dentsply Sirona Prosthetics,
Hanau



Fig. 3

Fig. 3: The fatigue strength exceeds a human lifetime; the color Fidelity surpasses everything known so far: Cercon ht True Color Technology.
Photo: Dentsply Sirona Prosthetics

Safety for everyone involved

Given Christ’s studies on the Cercon ht True Color Technology, one might be justified in saying that dental technology is ahead of aviation and wind power in this respect. After the Siegen results, dental laboratories, dental surgeries and their patients can be sure that the fatigue strength of this material under normal masticatory loading, at 40 million load cycles without fatigue failure, is so high that the material will last longer than a human lifetime.

¹ VITA is a registered trademark of Vita Zahnfabrik H. Rauter GmbH & Co. KG, Bad Säckingen, Germany.

² Ehrensberger C. Innovative Werkstoffprüfung bei weißem, transluzentem und werkseitig eingefärbtem ZrO₂. Interview mit Prof. Dr. Hans-Jürgen Christ und Dr. Lothar Völkl. Quintessenz Zahntech. 2016; 42(2): 235-240.

Double crowns as supporting elements for implant-supported overdentures – a proven clinical treatment option

Double crowns are established prosthetic retaining elements for removable dentures in the reduced residual dentition. Especially in the German-speaking countries, the use of double crowns to retain implant-supported overdentures had repeatedly been described already during the early 1990s. Over time, a great number of technical approaches have been described for overdentures to be retained by double crowns. In addition to classic cast-metal double crowns from high-gold alloys, a combination of a zirconia primary crown and an electroplated secondary crown has been described (ceramo-galvanic double crowns according to Weigl) for retaining implant-supported overdentures.

In recent years in particular, a variety of clinical studies on the use of double crowns as retaining elements for implant-supported overdentures have been published, which were summarized in a recent review (Rinke, 2016).¹ The results of this study reinforce the indication and allow a more detailed description of possible technical and biological complications of this restorative concept.

High overall survival rates for implants (94.8 % to 100 %) and prostheses (77 % to 100 %) were reported in those studies covering observation periods of between 3.4 and 14.1 years. These survival rates are comparable to the long-term data that have been reported for implants with bar-retained overdentures. Immediately loaded double-crown restorations have implant survival rates of 94 % to 98.4 %, which is slightly lower than for conventionally loaded double-crown restorations with maximum observation periods of 6.5 years. Especially the results of the more recently published data with justify the use of implant-supported double crowns in the edentulous maxilla due to the high implant and prosthetic survival rates.

For restorations in the edentulous mandible, at least two implants are needed for retention with double crowns. The present studies show only slight differences in implant survival rates between two-implant and four-implant support. However, the analysis of the technical complication allows the conclusion that a restoration supported by two implants is prone to a higher rate of technical complications than rigid mounting on four implants.



Priv.-Doz. Dr. Sven Rinke,
M.Sc., M.Sc., Hanau



Fig. 1



Fig. 2

Fig. 1: The components of the ceramo-galvanic retaining element: Primary crown made of Cercon base and an electroplated secondary crown made with the Solaris system.

Fig. 2:
Four implant-supported Cercon primary crowns in the anterior segment for retaining an overdenture.

If the overdenture retained by double crowns is mounted rigidly on at least four implants, only few technical complications are to be expected. The frequency is comparable to that we see with bar attachments, but from a clinical perspective, the double-crown approach has the advantage of easier accessibility for oral hygiene. In contrast, maxillary denture should be supported by at least four implants, as a clinical study has demonstrated increased failure rates for double-crown prostheses retained by only two implants. When using four implants in the anterior maxilla, implant survival rates of 98.5 to 100 % have been achieved with double-crown retention after a mean observation period of 5 years, according to the available studies. Again, this is comparable to implant survival rates using alternative retention systems.

Implant-supported conical retainers with all-ceramic primary crowns and electroplated secondary crowns were previously only describe the successful for restorations whose primary crowns are made using the Cercon system (Dentsply Sirona Prosthetics, Hanau) and whose secondary crowns were electroplated with the Solaris system (Dentsply Sirona Prosthetics, Hanau) (Figs. 1 to 3). Provided the following indications for respected, high implant (98.2%) and prosthetic (100%) survival rates were achieved:

- Support by at least four implants
- Intraoral bonding of secondary and tertiary structure
- Minimum height of the primary crowns of 5 mm

The available clinical data on double-crown retention using all-ceramic primary crowns and electroplated secondary crowns also show after a mean observation period of more than 5 years, no increased incidence of technical complications was seen compared to conventionally produced implant-supported double crowns. Specifically, no fractures were observed in any of the all-ceramic primary crowns. This means that routine use of the solution and clinical practice seems justified. It should be taken into account, however, that the data so far represent only results for overdentures supported by at least four ceramo-galvanic retaining elements.



Fig. 3: Basal view of the completed overdenture.

Reference:
Rinke S. Doppelkronen als Verankerungselemente für implantatgestützte Deckprothesen. Eine Literaturübersicht zur klinischen Bewährung, Quintessenz 67;53-68 (2016)

Cercon ht with True Color Technology

Dentine from the machine

As soon as the Cercon ht True Color Technology came on the market, I switched over completely to that zirconia variant. It is the right material coming at the right time – the dental technician’s answer to increasing patient demand for affordable highly esthetic restorations.

After half a year of intensive work with the new material, my experience can be summed up in one sentence: Cercon ht is the dentine that comes from the machine. I select the right shade for the patients from among all 16 VITA¹ classical shades, and I get a framework in, say, A2 or D4. The difference in color from a veneer of the same shade is no longer perceptible to the naked eye.

This gives me even more safety and designing a restoration. Little available space? Increased stability needs? Not a problem. Even unveneered aspects of a restoration appear esthetic and exhibit the “true” shade.

The translucency of zirconia corresponds to that of the patient’s teeth only in favorable cases – but by no means in every case. But when using the Cercon ht True Color Technology, I can offer all conceivable performance levels, from monolithic restorations to fully veneered frameworks with “unlimited custom esthetics”. Of particular interest to me personally is the cut-back technique with incisal build-up and the combination of fully contoured and partially and fully veneered aspects in the case of larger restorations, for example in a multi-unit bridge.



MDT Thomas Bartsch,
TRIODONT Zahntechnik,
Eschweiler



Fig. 1



Fig. 2

Figures 1 and 2
Application of pre-colored translucent zirconia (Cercon ht True Color Technology, Dentsply Sirona Prosthetics, Hanau) using the cut-back method with a vestibular incisal veneer and staining technique.
Photo: Bartsch

But have we not seen all this before? True, the previous Cercon ht with its variants Classic, Light and Medium already offered three distinctive options and already enabled me to offer the aforementioned performance levels. Now, however, I can manage each one of them in shorter time at a lower cost and with higher shade fidelity. If, in the case of a pure “shade guide” restoration, all I want to do is to match A2, D4 or another VITA¹ classical shade, I can get this done in half the time. Thus, the immediate conversion of my zirconia inventory to Cercon ht True Color Technology at the time of its launch has paid off handsomely in every respect.