

The Cercon® Smile

The Cercon® Smart Ceramics system from Dentsply Ceramco has brought the ability to place reliable metal-free restorations with ease and confidence to thousands of practitioners. Since its launch in 2002, about 100 systems have been placed in North America, and over 40,000 units have been placed. In this article, we outline a few suggestions for practitioners looking to place Cercon® restorations.

Fig. 1: Cercon® base zirconia blanks, Cercon® CAM system and a Cercon® Smile!



- **System Overview:**

Cercon® is an innovative computer aided manufacturing (CAM) system, designed to accommodate up to 80% of routine crown and bridge case work. The system was designed to provide a reliable zirconia-based alternative to PFMs, for single units and bridges upto 38mm in span. This translates into a 4-unit molar bridge, or even a six-unit bridge for smaller lower anterior cases. The system's capabilities have been verified in over four years of successful clinical study so far.

Fig 2: The Cercon Process: Wax Model, Sintered Framework, and Veneered Bridge



- **Shade Selection:**

Cercon® restorations can be placed as an alternative to most cases where a PFM would be diagnosed. Cercon® restorations can be created in shades keyed to the Vita® Lumin Classic shade guide (shades A1-D4). Bleached restorations keyed to the Illuminé Shade Guide (Dentsply Ceramco) offer the esthetic practitioner eight more shade choices (i1-i8).

- **Preparation Guidelines:**

Standard shoulder and deep chamfer preparations are recommended for Cercon®. A proximal reduction of 1-1.5mm, and an incisal/occlusal reduction of 1.5-2mm is necessary. A prep angle of 6-8°, and a flat occlusal opening angle (~140°) is recommended. Sharp line angles and undercuts are to be avoided. However Cercon certified laboratories can smooth out sharp line angles and block out undercuts before

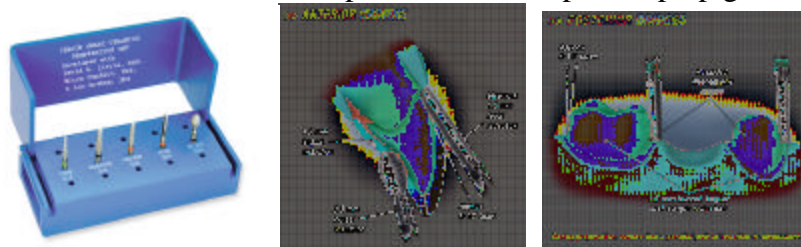
waxing restoration substructures. These guidelines are familiar to practitioners of esthetic dentistry who place all-ceramic units.

Fig. 3: *illuminé* shade guide (Dentsply Ceramco), professional Bleaching System (Dentsply Professional), and Ceramco3 *illuminé* restorations



Cercon® offers several advantages over other all-ceramic alternatives. Because of the strength and reliability of the core material, zirconia, a coping wall thickness of 0.4mm is sufficient in most cases. In the area of connector sizes, Cercon® offers an unparalleled esthetic advantage. Connector sizes of 9-11mm² are sufficient to create esthetic restorations, with harmonious dimension. These dimensions are much more lifelike compared to the 20mm² (4x5mm) connector dimensions demanded by lithium disilicate based restorations, such as IPS Eris. Currently, Cercon prep kits are available from Axis Dental (Cercon Smart Ceramics Prep Kit) and Gebr. Brasseler (TD 1275) in Europe.

Fig. 4: Axis Dental's Cercon Prep Kit, with examples of prep guidelines



- **Taking Impressions:**

The double cord technique is recommended for impression taking with Cercon® restorations. Cord systems such as UltraPak (Coltene), and ExpaSyl (3M/ESPE) have been recommended by Cercon practitioners. Impressions can be taken with a variety of materials such as hydrocolloids, polyethers (PolyJel, Dentsply Caulk), or polyvinyl siloxanes (Reposil, Dentsply Caulk).

We recommend the new Aquasil Ultra Smart Wetting® impression material from Dentsply Caulk, as it offers a combination of excellent impression accuracy, along with high tear strength that enables labs to process restorations confidently. We find that the Rigid, Heavy and LV viscosities are routinely used by most practitioners. In return, the practitioner and the patient achieve the fit and the performance they expect from a restoration. The mint flavored material also enhances patient's comfort and relaxation.

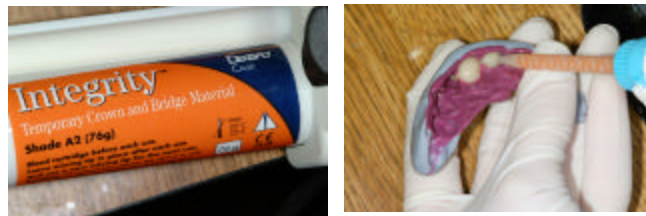
Fig. 5: Double Cord Prep Technique, Aquasil™ Ultra Smart Wetting ® Impression Material Starter Kit and Impression



- **Temporization:**

We recommend Integrity™ temporary crown and bridge material (Dentsply Caulk) for temporization. In placing temporary crowns, care must be taken to avoid eugenol-based materials, if the practitioner plans to bond the final restorations in place.

Fig. 6: Temporization using Integrity™ temporary crown and bridge material.



- **Crown Placement – Fit**

Because the fit of a Cercon® restoration is controlled by the lab, it is possible to achieve optimal fits, tailored to the dentist's preferences. Layers of die spacer are used to create fits ranging from exact to more passive fits. Average marginal gaps of 50 microns or better are consistently achievable. Several practitioners have verified the acceptability of fit by comparing the fit on the lab model to the fit in-vivo, and found it to be excellent.

- **Crown Placement – Luting**

Cercon® restorations have a clinical history of success, with both bonding and conventional cementation. This offers the practitioner a wide variety of choices in placing the final restoration. For example, Ketac Micro (3M ESPE), a resin modified glass ionomer cement, was used successfully in a clinical trial. Some of our clinicians have also reported satisfaction with RelyX luting cement (3M ESPE).

Fig. 8: Marginal adaptation of Cercon frameworks, anterior bridges and single units.



Cercon® certified laboratories are trained to microetch the cementation surface of the restoration before it is delivered. Microetching with alumina roughens the surface, and enables cements to adhere strongly to zirconia through micromechanical retention. Use of a bonding agent enhances the chemical bond, but only on the tooth side. As always, all recommendations of the bonding system must be followed. We recommend the use of Calibra™ Esthetic resin cement, with Prime and Bond NT Dual-Cure bonding agent (Dentsply caulk) for practitioners who prefer the stronger bonds and long-term clinical advantages offered by bonding.

Fig. 9: Calibra™ Esthetic Resin Cement Starter Kit, Ketac Cem, Cercon® crown with conventional cement.



- **Crown Placement - Esthetics**

Excellent esthetic results may be achieved for Cercon® restorations veneered with low-fusing, leucite-free Cercon Ceram S veneering porcelain. This veneering porcelain has been specially adapted to the thermal expansion behavior of zirconia (CTE ~ 10.5ppm/K, 500°C). This adaptation has been verified in long-term in-vitro oral stress simulation and thermocycling testing. Cercon® restorations are translucent, since they are composed of dense ceramics with a low (0.4mm) coping thickness.

Fig. 10: Transilluminated Cercon® restoration, with anterior esthetic crown results.



- **Post Placement Treatments**

During and after placement, any adjustments to the zirconia sections of the restorations may be performed with water-cooled diamond tools. The porcelain sections of the restoration may be polished with conventional ceramic polishing systems.

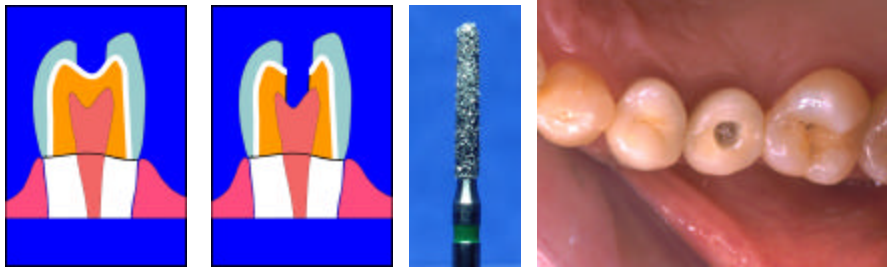
Cercon® restorations are radiopaque. If it becomes necessary, endodontic access can be easily established through a Cercon® restoration. Dr. Rinke recommends using a coarse (>125 micron) grit diamond tool, and using a two step procedure. In the first step, a wider porcelain access cavity is established, followed by a zirconia access cavity with a

narrower diameter. After appropriate therapy, the occlusal surface may be restored with a composite material.

Fig. 11: Occlusal adjustments and polishing, and a radiograph of Cercon® restorations.



Fig. 12: Radiograph of Cercon® restoration, Two-step endo access cavities, coarse diamond tool, and composite sealing.



- **Summary:**

Many practitioners have enjoyed the option of placing reliable, biocompatible and metal-free Cercon® restorations in the last year. We are grateful for their support and their suggestions. In particular, we would like to thank Drs. Louis Graham, David Little, Karl Leinfelder, and Sven Rinke for their suggestions and recommendations in this article. For more information on the Cercon® system, please contact Dentsply Ceramco (www.ceramco.com, 800 487 0100).

Fig. 13: Stages of a Cercon® Restoration: Before, Prep, Framework, and Final Result

