

das dental English edition labor

DIE GANZE WELT DER MODERNEN ZAHNTECHNIK

- The world of zirconium oxide
from a ceramist's perspective



The world of zirconium oxide from a ceramist's perspective

The field of dental CAD/CAM materials is developing rapidly. New materials are constantly appearing on the market, and we need to familiarize ourselves with these. For those who mill in their own laboratory, it is essential to assess the quality of the materials. This also includes testing zirconium oxide materials for their strength and aesthetics. Premium or low-price offer? It is advisable to rely on the reliable brands of well-known manufacturers and their consistent quality. At the same time, it is worth keeping an eye on the market to see if more cost-effective or higher-quality alternatives may become available.

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or a "semi-analog" ceramist like me, the challenges are even greater. The necessity of working together with 3D designers and milling centers often makes us dependent on their decisions, which are sometimes also influenced by economic considerations. And if we have the opportunity to have a say in the choice of material for a restoration, we can often only decide on the shade and strength. In many cases, however, only the type of work is specified and the milling center selects the material which it considers to be suitable.

However, the situation changes when more exclusive milling centers are involved. As the customer, we can choose from a range of different products here and thus have an influence on the materials used. Personally, I consider myself fortunate to be able to work with partners who even use the materials I supply for restorations (e.g. for training courses).



Author DT. Joanna Łupińska • Poland



Ten years of experience

In the following, I will discuss the zirconium oxide ceraMotion Z from DENTAURUM (Ispringen, Germany). Meanwhile I have been working with the Polish distributor of DENTAURUM products for almost ten years now. This has allowed me to become very familiar with the comprehensive material portfolio, and I am fond of emphasizing in my workshops, lectures and social media activities that this company manufactures truly excellent ceramic products. For me, the company is one of the leading suppliers of milling materials today. The product range extends from titanium blanks (Ti5) to blanks made of chromium-cobalt alloys (remanium star MD II) and to the highly valued StarWax-wax blanks, which are ideal for the CAD-Cast technique (milling, casting).

Premium-class zirconium oxide

In particular, I would like to highlight the company's zirconium oxides (ceraMotion Z). This is a complete assortment of premium-class zirconium oxide blanks (► 1).

In my opinion, the greatest success in the ceraMotion Z series is the hybrid material, a highly translucent, strong, multilayer zirconium oxide (► 2). ceraMotion Z Hybrid is characterized by a combination of different zirconium oxides in a single blank, which provides a continuously graduated flexural strength of 1,300 to 1,020 MPa. With a translucency of 48 percent at the incisal edge and 44 percent at the tooth neck, together with its high strength in the cervical area, this zirconium oxide enables a wide range of applications. Detailed technical data can be found on the manufacturer's website. At this point, "only" the most important properties will be discussed from my point of view.

► 1 The six different ceraMotion Z blanks cover all zirconium oxide-based indications and offer maximum reliability in shading and processing.



► 2 The multi-shaded, multi-layered zirconium oxide ceraMotion Z Hybrid is a truly multi-purpose material.





► 3 I photographed these crowns made of ceraMotion Z Hybrid at one of my training courses.

ceraMotion Z Hybrid can be used to fabricate both complex abutments on implants as well as individual fully anatomical crowns. The material is ideally suited for customization with the specifically developed 2D and 3D shades from the ceraMotion One Touch Set (also from DENTAURUM) and is perfect for the cut-back technique or for full-contour restorations. The zirconium oxide is available in nine basic shades, including two bleached shades, which I have recently tested myself in training courses (► 3).

More highlights

My second favorite from the ceraMotion Z series is the Cubic Multishade (► 4). This highly translucent zirconium oxide (49 percent) is ideal for fabricating veneers, single crowns, bridges of up to three units, inlays and onlays. It is evenly shaded and optimally designed for staining techniques. In combination with paste ceramics, this zirconium oxide enables outstanding aesthetic results and is therefore predestined for the anterior region.

Another classic which should not be missing in any dental laboratory is the ceraMotion Z HT Multishade. With a translucency of 43 percent and a strength of 1,100 MPa it is suitable for extensive aesthetic restorations on implants. This zirconium oxide is available in the four blank thicknesses 14, 18, 22 and 25 mm and is ideal for veneering with ceraMotion Zr.

For those who favor the veneering technique, ceraMotion Z HT Shade is a monochromatic zirconium oxide available in 16 classic shades. If one is looking for a beautifully colored zirconium oxide in D2 or another shade, this is the perfect choice. This zirconium oxide is suitable for both the cut-back technique as well as monolithic processing. However, I would advise against using the classic "flat" stains from standard sets for full-contour restorations in the anterior region. This is where specialized ceramic materials are called for – ideally 2D pastes in combination with 3D materials or other micro-layering products.



► 4 ceraMotion Z Cubic Multishade is a multi-shaded pre-stained and ultra-high translucent zirconium oxide.

And finally, the true classics: ceraMotion Z HT White and ceraMotion Z White, both recommended for the classic veneering technique, and both with different degrees of translucency. If, for example, a dark abutment tooth is to be concealed, then Z White, with its high opacity and a translucency of 39 percent, is well suited.

Case study by MDT Werner Gotsch

The potential of ceraMotion Z can best be illustrated using a representative example of the work by MDT Werner Gotsch. As is well known, work in the anterior region always presents a challenge. The selected case study highlights how a highly aesthetic restoration can be achieved with a carefully selected zirconium oxide and an optimally



➤ 5 Prepared situation (image source: MDT Werner Gotsch)



➤ 8 The finished crown in situ (image source: MDT Werner Gotsch)



➤ 6 Coloring the crown with 2D pastes (image source: MDT Werner Gotsch)



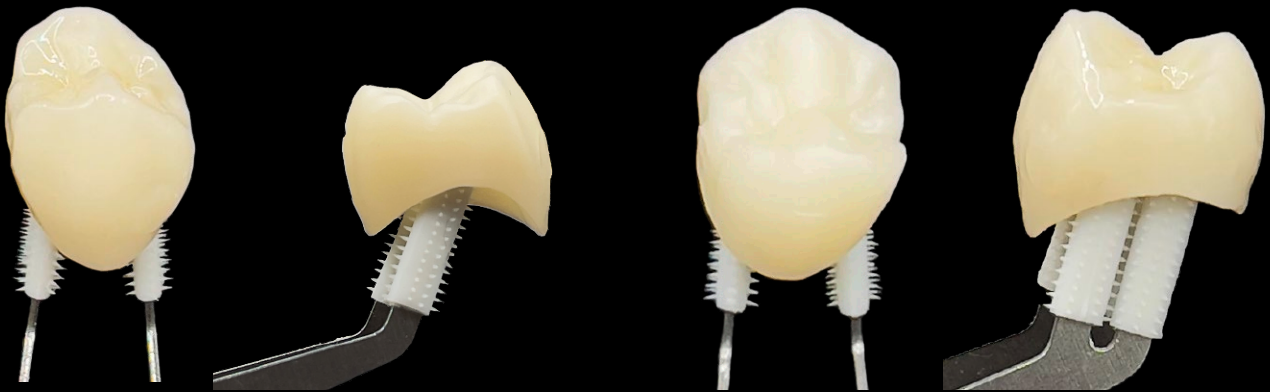
➤ 7 Surface characterization with 3D pastes (image source: MDT Werner Gotsch)



➤ 9 The color map for restoration (image source: MDT Werner Gotsch)



► 10 The different consistencies of the 2D and 3D pastes are clearly visible.



► 11a and ► 11b This crown also originated in a workshop; shown here is the state prior to characterization.

► 12a and ► 12b This is the condition after characterization.

matched color scheme. Noteworthy is the fact that the case presented involves a fully veneered crown; customized with ceraMotion One Touch 2D and 3D pastes.

Further education pays dividends

"Tell me and I forget, teach me and I may remember, involve me and I learn".

Confucius

Practice-oriented hands-on courses are available to learn how to work with zirconium oxide and a specifically matched ceramics system. In these courses, one can directly experience and learn how to stain a fully anatomical crown, how to apply the cut-back technique and even experiment with 3D gingival materials. If the crowns used in the training course are made of ceraMotion Z, this offers the opportunity to become familiar with the entire compatible DENTAU-



► 13 This result was achieved with only three materials.



► 14 The optical properties are very similar to those of natural teeth.

RUM ceramics system – from zirconium oxide (ceraMotion Z) to powdered veneering ceramic (ceraMotion Zr) and the modern 2D and 3D pastes (ceraMotion One Touch). The differences in consistency between the various veneering materials – 2D and 3D pastes – are illustrated in Figure ► 10. The next figures show the results of a workshop: the crown prior to characterization (► 11a, ► 11b) and after characterization (► 12a, ► 12b). Wonderful results can be achieved with only three materials – glazing paste, "honey-colored" 2D stain to intensify the fissures and opalescent enamel paste (► 13). Each of the materials, including the glazing paste, has fluorescent properties which come very close to those of natural teeth and are both opalescent as well as translucent (► 14).

Conclusion

This was just a small insight into the big, wide world of zirconium oxide. The range and diversity of the topic can hardly be fully covered in one article. For further information and specific questions about my work with ceraMotion, I recommend following me on Instagram (► 15) and contacting me via this channel, too.

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