What’s new…

…about the ZENO® Tec System?

Who could have imagined a decade ago what an enormous range of possibilities CAD/CAM systems would offer to the dental laboratory of today? The development of equipment and software, and also the materials which can be processed, has advanced at an unexpected rate in recent years. Anyone who as a manufacturer does not “go along with it”, or even worse lets the competition overtake him, has no chance of surviving in the market, because customers today are demanding, well informed and know exactly what they want. This is why the ZEON® Tec System, the result of a dental full-ceramic alliance between Wieland Dental + Technik (D-Pforzheim), i-mes Dental Systems (D-Eiterfeld) and xawex (CH-Ebmatingen), today combined under the name Wieland i-mes Dental Solutions (D-Eiterfeld), undergoes continual development. As a result, numerous new developments have recently been reported.

The ZENO® Tec System consists of the ZENO® Scanner 3Shape D 250, the 3D modelling software DentalDesigner™, the milling units ZENO® 4820, 3020 and 4030 MI and the material blanks ZENO® discs.

Acrylic

Until recently, the range of blanks available comprised the materials zirconium oxide (ZENO® Zr), chrome cobalt (ZENO® NP), a titanium alloy (ZENO® Ti) – Ti6Al4V – and acrylic which burns without trace (ZENO® PMMA).

Since 1st November 2007 one more acrylic option has been available. To avoid confusion, the former ZENO® PMMA now has the addition of cast in its name, and the new material is called ZENO® PMMA A3 or BI, depending on shade. The material is suitable for temporary restorations with a wearing time of up to over 30 days, thus also for long-term temporary restorations. A wearing time of 60 days should currently not be exceeded. The blanks are available in the thicknesses 15 mm and 20 mm, and as with all ZENO® discs, the circumference is 98 mm. The blanks are hot isostatically pressed and feature optimised material properties such as high flexural strength and plaque resistance, as well as good polishability. The use of the new PMMA material is recommended for the production of crowns and of bridges with up to two pontics, also for the area of the lateral teeth. It is theoretically possible to produce larger span bridgework, however there are insufficient studies to verify the clinical success of this. Therefore the use of the material is at the discretion of the user, who must base his decision on case-specific data. Thus in the area of the anterior teeth, for example, the possible height of the connectors is critical for the achievable flexural strength of the overall construction.

Zirconium oxide

To complement the cold isostatically pressed ZENO® Zr discs, more economical, axially pressed zirconium oxide blanks have also been available since 1st November 2007: ZENO® Zr eco. Both versions are available in white and shaded to resemble natural dentine which corresponds roughly to the shade B2. Because of the various manufacturing processes, different zirconium oxide powders are used. For large constructions, the cold isostatically pressed ZENO® Zr discs are still recommended, as these might otherwise be susceptible to warpage.
Pure titanium and aluminium oxide

Pure titanium Grade 2 has also been available since November 2007. To avoid confusion with the titanium-aluminium-vanadium alloy, the pure titanium blanks have the name ZENO® Ti pur.

Blanks made from aluminium oxide are also in development. However, before they are introduced onto the market, some series of tests have to be conducted to examine for example the milling equipment and other equipment specifications such as feed and rotation power, and also optimum sintering processes.

Wax

From the 1st quarter of 2008, wax discs will be available as an alternative to the ZENO® PMMA cast. These will be 20 mm thick and are still in the evaluation phase. For example, tests are still running into the reaction of investment compositions on the material and into the practicability of the planned designs in pressed ceramic and metal alloys, since wax should be used both for casting and also for CAO (Computer Aided Overpress) technology. The wax will be available in a shade similar to natural tooth colour, which experience has shown to make try-in in the patient’s mouth more acceptable to the patient. The basic material wax is stabilised with a proportion of acrylic which results in less warpage, for example if processing cannot be continued until the following day.

Software

The modelling software DentalDesigner™ offers numerous new developments. Until now it has only been possible to scan individual dies and transfer the corresponding data into the modelling software, but now it is also possible to scan a wax-up bridge, enter it as usual in an order form and produce a separate wax-up fixation. The data can be used for example initially to produce the fully anatomical model from ZENO® PMMA A3 or B1 as an interim restoration and then to reduce the modelling process in the software for the production of a veneered substructure. In order to be able to offer this option, a new holder was also developed for the scanner. The wax-up is first scanned on the model and then by itself in order to collect the surface data of the inner side of the wax-up.

Since the only method of producing anatomical occlusal surfaces available to the dental technician was the use of a wax modelling process, a library of tooth surfaces has been developed (Fig. 1). Anatomical modelling of occlusal surfaces is now also possible using the crown designs stored in the software and by adaptation to the opposing bite.

File splitting is a feature of the CAO process, i.e. two models, the primary and secondary model, are planned in a single process (Fig. 2). For example, a partially anatomical crown cap can be constructed within the planning process for production from zirconium oxide, and a fully anatomical suprastructure for production from ZENO® PMMA cast.
For implant-borne restorations, it is now not only possible to construct models on scanned abutments (Fig. 3), but individual abutments can also be created. At present the implant system WITAL from Wieland is stored in the software for this, and about five others are to follow shortly. Thanks to this software development, the creation of individual abutments or emergence profiles with suitable caps is possible in only one modelling process (Fig. 4 and 5). In addition, it is now possible to design individual bars according to individual requirements in the order form and with the aid of stored bar forms, whereas this used to be achieved only by defining the pontics (Fig. 6).

Another new feature is the automatic loading of pontics by the DentalDesigner™. For manual modifications, the design can be changed at will between the individual objects. All pontics and connectors can also be automatically generated in the process of Speedy Modelling. If a planned connector is under the connector thickness required for the material, the colour changes from yellow to red (Fig. 7). To simplify and improve visual control, the shape can be processed in three different windows. In general it is possible to measure throughout the entire modelling...
process whether required parameters such as material strengths in the corpus and marginal area are being adhered to.

**Efficiency**

In the development of the software, the procedures of standard manual techniques have been adapted for the processes of modelling at the computer monitor. Operators should thus recognize individual operations in the computer-aided process which they are already familiar with in their everyday work as a dental technician. The changeover and induction are thus significantly simplified. In order to increase the efficiency of the virtual modelling process, stability within the system was also improved. Amongst other features, the save routine has been optimised, as computer operations in larger constructions used to be very time consuming. Thanks to the new file manager, simple data transfer and uncomplicated data mining are now also possible via an internal network or an FTP server.

The advances in relation to materials and software in the ZENO® Tec System open up numerous new options to the user, with easier handling. Further innovative new developments and optimised processes are of course on the cards for the future.

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