No more one-way streets

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Fig. 1

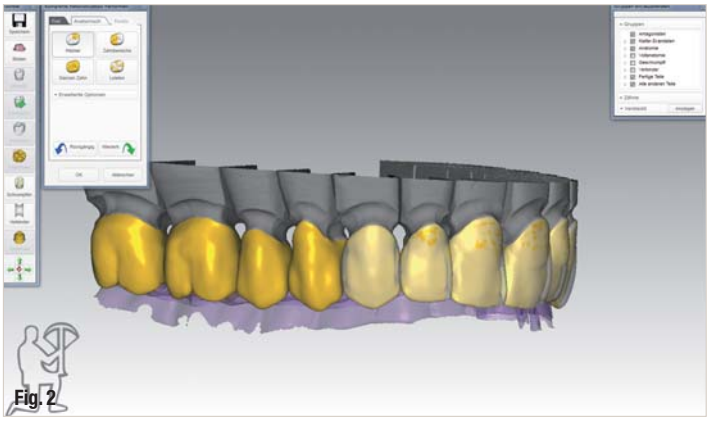
Fig. 2

Fig. 1_A versatile system, Tizian mills metal, ZrO_2, composite, burn-out plastics and PMMA.
Fig. 2_Quick assistance—the restoration is created digitally in only a few work steps.

_Dental technicians, who wish to produce high-class dental restorations and therefore need to select a particular CAD/CAM system, will quickly discover that the choice of materials and production procedures is limited. This is quite disagreeable, especially because in the majority of cases the cost of such systems is enormous. Presently, the market provides an abundance of mechanical and CAD/CAM systems. To prevent losing track of the choices, one must be aware that CAD/CAM is only profitable if expenditure is low and the system is suitable for a large range of applications. Furthermore, it is important that the added value remain with the laboratory and that the software is easy to use, even for dental technicians with little previous computer knowledge. For these reasons, master dental technician (MDT) Michael Anger uses the open Tizian CAD/CAM system (Schütz Dental), which offers a high degree of personal and creative freedom.

Zirconium dioxide (ZrO_2) is the material of choice for dental restorations. The material is strong, biocompatible, free of corrosion and long-lasting, the edges do not darken and it conducts heat in a similar way to natural teeth. The dense, smooth surface is conducive to a hygienic and clean situation inside the mouth. However, ZrO_2 is difficult to handle. It is so hard that it is extremely difficult to machine once it has been sintered. Therefore, it is advisable to mill the restorations before sintering the material.

_Flexibility without narrow confines

Anger and the 32 employees of his laboratory in Remagen in Germany have specialised in restorations produced from this next-generation material for quite some time. Aside from crowns and bridges, they produce inlays, as well as implant and attachment restorations from ZrO_2. For this purpose, Anger invested in a Tizian CAD/CAM system, which he and his colleagues use to scan, design and mill. The reason for his decision is that in contrast to other systems, Tizian CAD/CAM is not limited or regulated in its possibilities. "The scanner features an open data interface, which means that we are not dependent on certain software or on only one single manufacturing method," Anger states. He appreciates this freedom, as it allows him to react flexibly to his customers'

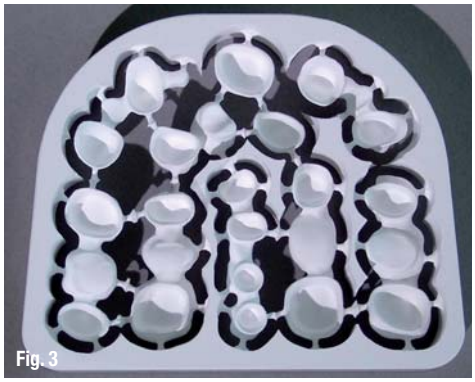
Fig. 3


Fig. 4

Fig. 3_Efficient material saving—optimal use of blanks with Tizian CAD/CAM.
Fig. 4_Reacts flexibly—Anger has had success using pin attachments in cases of strongly divergent insertion directions.


Fig. 5


Fig. 6

Fig. 5_White alternative—Anger offers pure white ZrO_2 as an alternative to silver non-precious alloy frameworks and integrates pin attachments in cases of divergent insertion directions.
Fig. 6_Appreciates his freedom of design—MDT Michael Anger.

wishes and their individual requirements (Fig. 1). "Tizian CAD/CAM allows us to machine not only ZrO_2 blanks, but also blanks made of wax, composite or PMMA." In addition, Anger is able to have restorations produced from gold, non-precious alloys and titanium at any specialised milling centre.

_Simply a matter of greater choice

The system's procedure is easy. A saw-cut model made from plaster is fixed inside the scanner. Then, the customer's data is entered and an outline scan is carried out. Subsequently, Tizian Scan scans the details. The scanner recognises even complicated geometries after determining separate points. "It takes only eight minutes to scan a three-unit bridge. The scan of a complete jaw takes no longer than 24 minutes, depending on the remaining dentition," Anger describes and adds, "At the same time, the model is displayed on screen so that the user can optionally create fully anatomic crowns and bridges, telescopes and conic crowns, inlays, onlays and veneers or even Maryland bridges and models for the overpressing technique." To make this even easier, Tizian users have open access to tooth and pontic libraries (Fig. 2). "This way, the desired restoration is created in only a few work steps and the user can adjust the diameters of connectors, the wall thicknesses and the sizes of the cement gaps up to the very last step and determine them individually," according to Anger.

_Mill at low cost, offer at low cost

As all data is created in the universal STL format, Anger can send it to specialised production centres of his choice. However, as all Tizian components are exceptionally well matched and give Anger the full choice of materials, he mills the restorations at his own laboratory. In addition, he does subcontractor jobs for other laboratories. At the same time, the production cost with Tizian Cut is so low that Anger can offer high-quality, biocompatible ZrO_2 restorations to his patients at competitive prices. He is even offering a special promotion on uncoloured ZrO_2 as a white alternative to silver-coloured non-precious alloy frameworks. The vestibular surfaces of these uncoloured ZrO_2 restorations are veneered at such a favourable price that this is fully covered by the patient's health insurance.

Anger can mill bridges of up to 16 units with Tizian Cut and at the same time work economically with regard to raw material, as Tizian Cut uses the blanks optimally (Fig. 3). He has also had success with pin attachments, which he uses in cases in which the prosthetic insertion direction of a prepared stump is so divergent that it cannot be treated using conventional restoration techniques (Figs. 4 & 5). The dental technicians at Anger dental laboratory prefer to use ZrO_2 for primary crowns in combination with secondary parts made from galvanic gold or in conjunction with implant abutments.

_Fascinating freedom

ZrO_2 is the perfect material for almost all forms of dental restoration. Its physical and biological properties account for the fact that the material can be used almost without limit in dental technology. "The Tizian system offers a great basis for our work and a multitude of different scopes for design." Anger further states that the system's easy menu navigation and free choice of all important parameters give him and his colleagues the necessary freedom of design they need and desire (Fig. 6). "This finally gets us out of the one-way street of the dependency of closed systems."_

_contact CAD/CAM

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