Many edentulous patients wish to have their oral functions re-established with a fixed esthetic restoration. We can meet this request by combining implantology with dental CAD/CAM technology.

Full-arch implant-supported superstructures can be achieved by various methods. Depending on the bone quality and number of implants, the patient may either receive a fixed or removable implant restoration. If a fixed prosthesis is indicated, the superstructure may either be cemented or, alternatively, screwed directly to the implant fixture, depending on the clinical situation. In the case described here, we opted for a cemented zirconium oxide bridge. Monolithic crowns were used in the posterior region. For the anterior region, the crowns were cut back and veneered. Translucent zirconium oxide [Zenostar® T, Wieland Dental] was utilized for the framework and IPS® e.max Ceram for the veneering of the anterior teeth. These materials allowed the desired strength and esthetics to be achieved.

Preoperative situation
When the patient came to our dental lab, she wore a classic full-arch denture in her upper jaw. She was unhappy about the esthetic appearance, functional qualities and the loose fit of the denture. Her oral condition was assessed with digital volume tomography (DVT) to confirm that adequate bone quantity was available to facilitate the anchorage of the implants. Although the placement of four implants would have provided adequate stability, the patient desired a fixed all-ceramic reconstruction. Having discussed the treatment options with her, we abandoned the idea of providing an implant-supported denture based on the “All-on-4” concept and instead chose to manufacture a fixed implant-retained bridge. The framework would be made of zirconium oxide and the anterior teeth would be individually veneered.

Implant treatment and healing phase
On the basis of the DVT examination, seven implants (Replace CC, Nobel Biocare) were planned and placed. An adequate primary stability of 30 to 35 Ncm was achieved. During the healing phase, the patient wore the existing denture that had been relined with soft silicone. After a six-month healing period, a satisfactory level of osseointegration was achieved, without any signs of bone resorption or inflammation. The implants were uncovered and gingiva formers inserted. Two weeks later, an impression was taken to transfer the position of the implants to the dental lab. After model fabrication, appropriate abutments were selected and adapted to achieve a common insert direction for the bridge (Fig. 1).

Digital technology was employed to manufacture the temporary bridge. The model was scanned using a Zenotec® E1800 lab scanner (Wieland Dental) and the temporary bridge designed with the shape dental design software. Milling was carried out in a Zenotec select milling unit (Wieland Dental) using a PMMA material (Telio® CAD).

Framework fabrication
As the patient was satisfied with the shape and function of the temporary bridge, the framework was manufactured. The patient was satisfied with the final outcome and the superstructure was cemented.

By Dr Dario Žujic, DT Velimir Žujic, Croatia, and DT Dragan Stolica, Slovenia

Figure 1: The seven implants in the edentulous jaw were to be connected to a fixed bridge made of zirconium oxide

Fig. 2a and b: Digitized model with temporary restorations (above) and abutments (below)
restoration, we used it as the basis for the design of the final restoration. The natural wear facets that formed during the tempuration period should be reflected in the final restoration. A conventional impression of the oral situation was taken in the patient’s mouth, eliminating of the restoration on the model and in the patient’s mouth, eliminating the need for later adjustments. At the end, the design of the restoration was checked once more against the individual design parameters. If these parameters are not met, the CAD construction is chosen. In this case, a milling strategy using 2.5 mm, 1.0 mm and 0.7 mm burrs was selected for the manufacture of the bridge. The option of using a 0.3 mm burr was not taken as it was not needed for the restoration in question.

Next, the job was placed in a virtual Zenostar® blank (Fig. 4). We decided to use a translucent, pre-shaded Zirconia oxode in the shade T sun, because the posterior teeth from 14 to 16 and 24 to 26 were planned to be restored with monolithic zirconium oxide. The warm, reddish shade of this disc closely matches the selected tooth shade and allows the A – D shades to be recreated efficiently and repositioned. In Next, a sinter support structure was designed to allow the sintering to be performed in an upright position in the Programat® S sintering furnace. The sinter frame maintains distortion during sintering and is instrumental in achieving a high accuracy of fit in long-span objects. Finally, the program calculated the milling data in a process that took less than three minutes to finish.

Then, the milling operation was started. This process was achieved in a Zenotec select milling unit that features 5-axis operation and an 8-disc material changer (Wieland Dental). The absolute precision with which this unit works is evident in the excellent milling results obtained on the occlusal and palatal surfaces and at the incisal edge (Fig. 5).

Customizing the framework

Once the milling was completed, the framework and the sister support structure were separated from the disc. At the next step, the unsintered bridge was customized with colouring liquids using the infiltration technique. The range of Zirconia Color Zr liquids is perfectly suited for this purpose. These liquids are supplied in the standard shades of the A – D shade guide. Additionally, Effect shades are available for further customizations. We used Zenotec Color Zr in shades A2 and A3 as well as the grey-violet Effect shade. To render the infiltration of the individual liquids visible, the virtually colourless liquids were mixed with a visualizer (Zenostar Visualiz). First, the interior surfaces of the crowns and the lateral surfaces were infiltrated, followed by approx. 1 mm of the cervical margins, the fissures and the central areas of the palatal surfaces. Infiltration of all these aspects was achieved with Zenotec Color Zr A4 mixed with yellow Zenostar Visualiz (Fig. 6). After that, the dentin area up to the incisal third was infiltrated with shade A2 mixed with red Visualiz liquid. The incisal area of the anterior teeth and the cusps of the posteriors were customized with a diluted version of grey-effect shade and Zenotec Color Optimizer mixed with blue Visualiz liquid (Fig. 7). It is essential to use a separate brush for each shade. After having been allowed to dry for two hours, the framework was sintered in a Programat® S sintering furnace.

After the sintering process, the restoration exhibited an excellent accuracy of fit, without necessitating any adjustments by grinding, e.g. on the insides of the crowns. The advantages of the translucent zirconium oxide used were obvious at this stage. Due to the colouring liquids, the cervical and dentin areas were beautifully accented. The incisal areas exhibited a slight greyish-translucency sheen, which should facilitate the subsequent layering procedure. Figure 8 shows the smooth transition of the shades. The simulation in figure 9 demonstrates how difficult it would have been for us to achieve the desired tooth shade if we had used opaque white zirconium oxide for the framework. Despite the high translucency of the zirconium oxide, the titanium abutments do not show through the framework.

Individual framework refine-

An optimum esthetic outcome is only achieved if the restoration exhibits ideal optical properties. A controlled brightness value, adequate saturation and translucency and minimized light reflection are essential to achieve a pleasing esthetic outcome.

If these parameters are not met, the result will never be satisfactory, even if the restoration is veneered with ceramics. The result would simply be a restoration that looks good on the model but appears too bright in the mouth.

Anterior area

Storing the zirconium oxide prior to sintering is the first measure to control the light reflection effects. Application of the veneer is the second measure. The bridge was veneered with IPS e.max Ceram. As the framework already exhibited a pleasing basic shade, we applied a mixture of IPS® e.max Ceram ZrSystem Clear and Inlay (30:70). Zirkon In-

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Custom-made titanium abutments produced in your own laboratory – with inLab MC X5 from Dentsply Sirona

By Dentsply Sirona

Dentsply Sirona’s CAD/CAM is extending the range of applications of its 5-axis milling unit inLab MC X5, with the production of custom-made one-piece titanium abutments with pre-fabricated connection geometries in authorized countries. With the latest version of the inLab Software 16.0, inLab users can now create implant supported prostheses that are even more closely matched to the individual needs of the patient.

Practitioners who are not prepared to accept any compromises in prostheses quality turn to custom made abutments. These enable the creation of a tailor-made implant abutment for the individual patient, thereby making special allowances for the specific implant situation. In addition, they offer dental technicians an even better basis for standard abutments for the creation of a functional and esthetically pleasing dental prosthesis.

With the latest inLab software update 16.0 from Dentsply Sirona, inLab users can now design and mill custom-made one-piece titanium abutments in their own labs. With the 5-axis milling unit inLab MC X5, for the first time it is now possible, not only to manufacture restorations from inLab design data but also take design data from another CAD software via the open inLab CAM interface. The one-piece abutments are machined from Preface® abutment blanks from Medentika with prefabricated connection geometries.

Advantages for the dental lab

One major advantage for the dental laboratory is in the characteristics of the one-piece solution: although partially ceramic hybrid abutments on TiBase create optimum esthetic results, only one-piece solutions are possible to certain clinical cases due to a lack of space, for example. The custom-made one-piece titanium abutment is the perfect solution in such cases, without requiring an additional implanting step. Moreover, inLab users can seamlessly proceed with the workflow and, in parallel to the milling process, virtually implant the designed abutment with the inLab CAD software so that further prosthetic treatment can be planned. This means that production control and the added value remain in the lab.

Preform starter kit for inLab MC X5

The prerequisite for the milling of titanium preforms is the new inLab MC X5 preform kit for Medentika Preface® abutments from Dentsply Sirona CAD/CAM. This comprehensive kit can be ordered from dealers in all authorized countries. It contains, for example, a preform holder that has been specially developed for inLab MC X5, new inLab MC X5 titanium milling tools, a special cooling lubricant additive [DentLab], separate container tank and other accessories.

Preface® titanium abutment blanks can be exclusively ordered from Medentika. For more information about these and other production options with inLab MC X5, visit www.sirona.com/inlab.

Dentsply Sirona at the IDS 2017

Visitors to the IDS can discover the whole world of dentistry at Dentsply Sirona. Dental technicians flock to the combined stand of Dentsply Sirona CAD/CAM, Dentsply Sirona Prosthetics and Dentsply Sirona Implants in Hall 11.2.

For more information about Dentsply Sirona at the IDS 2017, visit www.sirona.com/ids17.
Renfert: Making the dental technician’s work easy

By DTI

NEW YORK, N.Y., USA: Renfert is one of a record 42 German dental companies exhibiting their products at the Greater New York Dental Meeting (GNYDM). With the 100th anniversary of the Association of the German Dental Industry (VDDI) taking place simultaneously, the meeting is sure to have a celebratory tone. Dental Tribune International spoke to Greg Luengen, head of Marketing and Product Management, about the appeal of the American market for Renfert.

What is the reputation of the German dental industry in the U.S. market?

Greg Luengen: Positive, I would say. Firstly, the claim “Made in Germany” has a lot of clout, and many German companies have been around for quite a while: Renfert, for example, just celebrated its 90th anniversary, which demonstrates a certain understanding of our customer base. To be fair, most German dental products are not on the low end of the price scale and cannot really be compared to some domestic manufacturers that prioritize price. However, customers are definitely willing to pay that little bit extra because of the benefits and advantages our products offer. Value for money is an argument that resonates throughout the world, not just in the U.S. That is probably the foremost reason that Renfert introduced its new slogan—“Making work easy”—this year. Through intelligent solutions, the performance, quality and durability of our products, and reliable service, we can help our customers’ work better and more efficiently.

How has the relationship between the German and American dental industries developed?

I conducted some research in this regard a few years ago and came to the conclusion that, through the drastic increase in the use of digital and social media, the ability and the desire to share information, views and opinions have grown immensely. Today, we can find out what dental technicians and dentists are doing in any part of the world. Such information allows companies like Renfert to respond more quickly to the needs of the different markets, and this ultimately results in a win-win situation for both the user and the industry.

How does Renfert regard the U.S. market?

The U.S. is very important to Renfert, one of our top five markets. It is so important that we have developed new products just for the American market, like the Basic eco sandblaster. This unit incorporates the same sandblasting technology as our other, larger units, is perfect for the smaller dental laboratory or practice, and comes at an extremely competitive price.

What is Renfert looking forward to exhibiting at GNYDM?

We are extremely excited to be showcasing our class-leading equipment, instruments and materials to an appreciative audience of dental professionals at GNYDM. We are particularly proud to be presenting our new SILENT compact and SILENT compactCAM dust collectors. Attendees will also be able to view the new Basic eco compact microsandblaster with powerful blasting technology, being offered at an attractive price-performance ratio.

At the Renfert booth, we will be giving live demonstrations of the Easy clean ultrasonic and SYMPRO denture cleaning units.