

COMPUTER AIDED OVERPRESS - A SIMPLE PROCESS

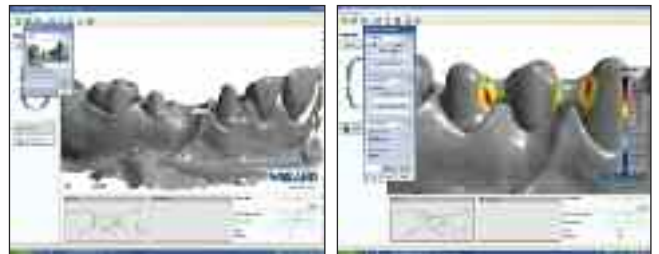
HORST KOINIG

The simplicity of Computer Aided Overpress (CAO) does not necessarily mean that the daily routine in dental laboratories is just as simple. Looking at it from a realistic point of view, one has to admit that the situation of dental labs has changed considerably. New techniques and processing methods as well as new materials inundate the dental market with almost no time to really verify them. Nevertheless, labs have an obligation and responsibility to their customers – both dentists and patients – to offer the best that is possible and to use an aggressive marketing strategy in order to guarantee the productivity of their labs. Using high-tech materials to maintain perfect quality of their work makes it necessary to acknowledge changes and new opportunities in the dental world.. What should never be forgotten is the individual attitude towards their profession, their perception of aesthetics and their passion for their profession as a dental technician. – things that are the cornerstones of dental life.

Computer Aided Overpressing of zirconium oxide frameworks

It was only a matter of time until the introduction of the technique of computer aided overpressing of zirconium oxide frameworks. Basically the technique of overpressing is nothing new – overpressing of metal- or AGC-frameworks is well known to every dental technician. The new development is the use of zirconium oxide in combination with the possibilities of CAD/CAM technology.

One of the most technologically advanced systems available is PressX™ (Wieland Dental & Technik GmbH & Co. KG, Germany), designed to be used with Wieland's CAD/CAM System ZENO Tec®. The CAO option makes it possible to process the framework and the anatomic superstructure



Figures 1 and 2

simultaneously by means of the CAD/CAM technology. Using Wieland's high-end porcelain ZiroX®, achieving an optimized aesthetic finish can be assured.

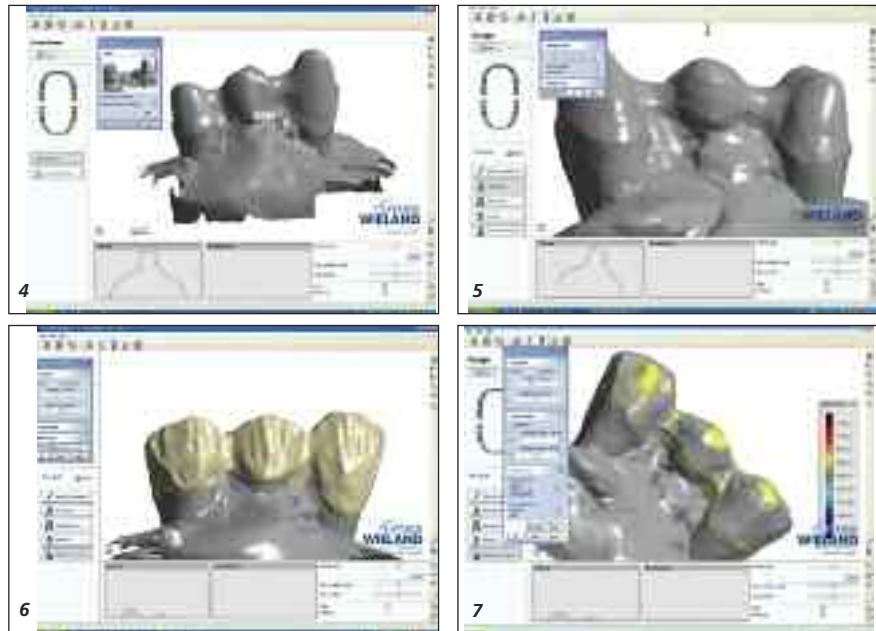
Indication and Basic Information

PressX™ is suitable for overpressing full ceramic frameworks (single crowns, bridges up to three units, Inlay-bridges and abutments) made of ZrO₂ with a thermal coefficient from 25 to 500°C ($9,3 \cdot 10^{-6} \text{K}^{-1}$) using either the stain or layering technique. If only the stain technique is used, PressX™ can be used for Inlays, Onlays and Veneers without a supporting ZrO₂ framework. With PressX™ all shades from A to D, as well as three bleaching and three gingival shades, can easily be reproduced.



Figure 3

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Figures 4 - 7



Figures 8 - 10

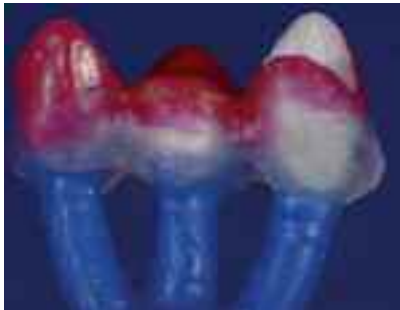
CAO Layering technique

The first step is the acquisition of data for the construction of the primary framework (zirconium oxide) by scanning the model (Figures 1 and 2). When constructing the framework, that the zirconium oxide framework makes up the stronger part in the combination of framework / press-ceramic must be taken into consideration. Care must be therefore be taken to ensure that the construction gives enough support and that each part of the framework is thicker than 0,6 mm and that the area of the shoulder has a rounded form. After constructing the framework according to these basic principles, it can be milled and sintered ((Figure 3)

Constructing the press-ceramics part as wax-up.

Normally the press ceramics part would be constructed simultaneously with the primary framework using ZENO® Dental Designer software, and milled and sintered.

The classical wax-up method is used for construction. It has to be decided whether the layering technique or stain technique will be used. If layering technique is used a scaled down dentine-core in anatomic form must be made and then finished with different ceramic masses, depending on the individual requirements of the restoration. Again certain parameters must be adhered to: the wax-construction, together with the zirconium oxide framework, should have an overall thickness of 1,2 mm.



Figures 11 and 12



Figures 13 - 15



Figures 16

Figures 17 and 18

When the wax-up is complete, the whole construction is scanned, and if necessary, corrections made. The construction is milled from a Zeno® PMMA blank (Figures 4-7)

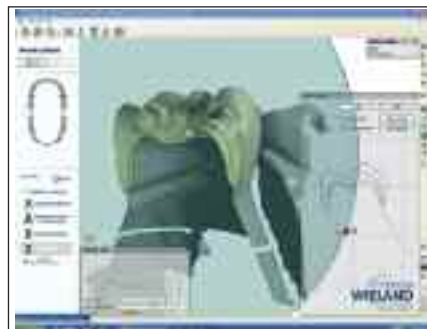
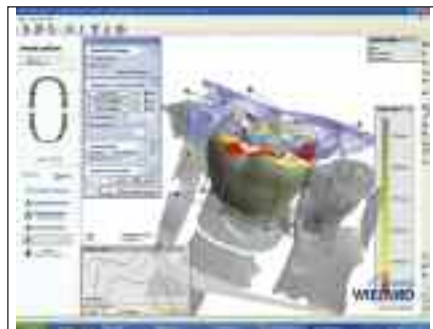
Figures 8 and 9 show the ready-milled frameworks from the PMMA-blank. In the next step cervical wax is applied to seal the primary framework and the PMMA-construction (Figure 10). This method is used to ensure no material can get in between the two frameworks. The advantage of using cervical wax is

based on the fact that there is almost no shrinkage during cooling and a perfect, high precision fit can be achieved.

The next step is over-pressing. Sprues with a diameter of 3mm and a length of 5 – 8 mm are required and are attached either incisally or occlusally in an axial direction. If a three unit bridge is to be over-pressed, one sprue for each unit should be used (Figure 11). The exact weight of the construction is required to determine the the number of press pellets to be used. Having



Figures 19 -22



Figures 23 and 24

done this the whole workpiece is placed in the muffle, with a minimum distance of 10 mm from the edge. (Figure 12)

Once pressing is complete, determine the exact depth of the pressed object is determined. To get the exact data, the depth of the impression is transferred to the muffle and separated exactly at this marker. A sand-blaster with a pressure of 2 bar is used to remove most of the investment, reducing the pressure to 1 bar when getting closer to the pressed object. To

correct the zirconium oxide framework, diamond-based rotary instruments are recommended. When processing zirconium dioxide frameworks, sufficient cooling must be ensured. Figures 13 -15 show the press object in the muffle. Figure 16 depicts the framework on the model, ready for finishing.

Press-over and Build-up technique with ZiroX

Using the layering-technique the dentine-core is built up



Figures 25-27

with ceramics to its final contours (Figures 17 and 18). Using various materials in the ZiroX range, it is possible to produce aesthetic restorations to the highest demands (Figures 19-22).

In the author's opinion, the quality of a dental restoration depends, to a great part, on an artistic approach to the individual requirement. The patient should be seen as a whole, with his/her individuality maintained. It is therefore not possible to outline a process which would meet all cases. In order to consider every detail, it is necessary to use stains. In this way one can imitate the colourful nuances of fissures (Figure 22) and determine interdental color shades (Figures 20 and 21).

Although these "defects" are quite natural, some patients don't like them and their wishes should be respected.

CAO-Stain Technique

If the stain technique is used, a full anatomic form has to be

created as a classical wax-up or using the Dental-Designer software. At this stage fully functional occlusion has to be considered (Figures 23 and 24). The steps of embedding and working out the framework is the same as with the build-up technique. As a final step the fully anatomic formed restoration is finished with stains. Basically, the build-up technique for anterior restorations is used, while for all other cases, the simpler and more cost-efficient stain technique can be applied. Figures 25 - 27 show a single crown restoration using the stain technique.

Summary

One of the most sophisticated CAD/CAM-Systems worldwide, the ZENO Tec® System with its CAO option, makes it possible to process the framework and anatomic superstructure simultaneously. In combination with the construction software Dental Designer, with its pre-installed parameters and safety-options, a successful process and precise results are guaranteed.