

LABLINE ACADEMY

TOTAL REHABILITATION

with Lithium Disilicate Ceramic - Part #2

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When to use what:

Zirconia selection criteria for Toronto bridges

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CLINICAL CASE

Direct anterior adhesive bridge using fiber-reinforced composite (FRC):

FOR LONG TERM EVALUATION

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lablineTM

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IMPROVED AUTOMATION, FLEXIBILITY AND REDUCED WORKING TIME

**A CATCH UP ON THE LATEST INNOVATIONS FOR YOUR
WORKFLOW, TO PRODUCE ZIRCONIA RESTORATIONS
FASTER THAN EVER BEFORE**

Some of the latest technological solutions recently launched in the market greatly simplify the production process of zirconia restorations. Small zirconia structures, for example, can now be produced and delivered to patients in a considerably faster time, but with no variation of flexural strength, colour or fit values.

Meeting the patient's growing demand for fast and aesthetic solutions without compromising on quality is an important goal we all strive for, with the added benefit of increasing one's service value. In the following pages, a general workflow example is presented based on the newest technological developments.

WORKFLOW STEP #1 MATERIAL SELECTION – PRECISE DETERMINATION OF TOOTH COLOUR AND THE CORRESPONDING ZIRCONIA MATERIAL WITH MONOLITHIC ZIRCONIA SHADE GUIDES

The reproduction of the natural tooth colour is a very complex process. Factors such as tooth structure, surface structure, translucency and fluorescence properties, brightness, light reflection and material selection play an essential role and interweave with objective and subjective factors of colour perception. To achieve the best possible result, it is therefore

important to control as many factors as possible. An exact determination of the natural basic tooth colour is fundamental for the artificial reproduction, and in the specialist literature* it is recommended to always use the shade guide of the material that will later be used for the restoration.

Colour theory shows that shape and surface structure of a tooth considerably influence the colour effect; for this reason, the monolithic zirconia shade guide is available not only in the shape of upper and lower incisors, but also in the shape of a premolar.



*2011: Strub, Jörg R. / Kern, Matthias / Türp, Jens Christoph / Witkowski, Siegbert / Heydecke, Guido / Wolfart, Stefan; Curriculum Prosthodontics, Volume II, 4th revised and expanded edition, Quintessenz-Verlags-GmbH

According to this principle, in order to provide patients with a final restoration identical to their natural tooth colour, zirconia shade guides should be used for colour selection in cases with a treatment plan involving zirconia prostheses. For this purpose, Zirkonzahn Shade Guides have been recently launched in the dental market; composed of monolithic sample teeth made of Prettau® zirconia, they permit identification of the patient's natural tooth colour and selection of the most suitable Prettau® material.

The sample teeth accurately reproduce the colour and translucency values of the corresponding zirconia blank. If the final restoration is milled from the selected zirconia material, it is then guaranteed that the final shade will reflect 100% of the natural tooth colour of the patient (One-to-One function). The

colour spectrum of the shade guide is inspired by the VITA classic range, comprised of 16 dentine colours (A1–D4) and 3 Bleach shades. Colour theory shows that shape and surface structure of a tooth considerably influence the colour effect; for this reason, the shade guide is available not only in the shape of upper and lower incisors, but also in the shape of a premolar. The shade guide is also available with minimally reduced, sintered sample teeth (minimal cutback), which can be further characterised by the application of different incisal materials. This results in truly unique shade guides that exactly reflect the individual's approach and aesthetic demands. Monolithic restorations fabricated in this way completely prevent ceramic chipping (no chipping of small ceramic particles), because the ceramic applied in the incisal area, according to individual interpretation and preference, only fulfils aesthetic purposes.



Zirkonzahn Shade Guides are available for all Prettau® Dispersive® materials. For the dental practice, the special Zirkonzahn Shade Guide Prettau® Line has been developed for easier determination of the natural tooth colour on the patient.

The shade guide is also available with minimally reduced, sintered sample teeth (minimal cutback), which can be further characterised by the application of different incisal materials.

WORKFLOW STEP #2 FROM ANALOGUE TO DIGITAL – 3D VIRTUAL REPRODUCTION OF PATIENT PHYSIOGNOMY AND ORAL SITUATION & DIGITAL ARTICULATION

Zirkonzahn's scanners offer an ideal introduction to the digital world of dental prostheses, even without a milling unit – the open STL data generated by the scanners are compatible with third party design software. However, Zirkonzahn's scan software is what really makes the difference for the production of custom-made prostheses and it works in perfect combination with the related hardware. All Zirkonzahn scanners are equipped with an extra-large scan field (16:9), making it possible to scan articulators and capture the entire model in a single scan process. This means that if a registered articulator is scanned with a model, the model is displayed in the correct position in the virtual world as well. Zirkonzahn.Scan includes a library composed of 23 articulators, which allows for customisation of digital articulation according to different articulation concepts (e.g. Slavicek, PlaneSystem®). Zirkonzahn's range of scanners includes the S600 ARTI, S300 ARTI and S900 ARTI scanners. The S600 ARTI scanner has recently received a technical relaunch, with new high-resolution 3.0 cameras and improved scan strategies. The extra-compact S300 ARTI, weighing in at 18 kg, has been designed for mobile use in dental clinics. The S900 ARTI, on the other hand, features three of the new high-resolution, high-speed cameras. Together with intelligent scan strategies, which make the scanning process even faster, the three cameras allow for higher measurement density and a depth scan, permitting a quicker scanning of impressions, for a faster workflow.



Zirkonzahn's ultra-compact S300 ARTI scanner. All Zirkonzahn scanners and related software permit the scanning of articulators and capture of the entire model in a single scan process. In this way, models are displayed in the correct position in the virtual world.

In order to articulate patients in a totally individual manner, the software shows reference planes and permits the matching of acquired scans with all other available patient data: 2D pictures, X-rays, intraoral scans and patient-specific occlusal information captured with the PlaneSystem® (Udo Plaster, MDT). The PlaneSystem® is an innovative approach for virtual patient diagnostic that digitally capture the patient's oral situation and occlusal planes then transfers them into the digital world 1:1 without the loss of precious information. The data recorded by means of the PlaneSystem® can be matched with all other digital data available as well as with

3D pictures of the patient's face, captured with the Face Hunter 3D facial scanner. In this way, dental teams can obtain a 3D virtual reproduction of the patient's physiognomy and oral situation, which can be used as a reliable support for designing restorations in any place and at any time, reducing the number of chair-side appointments.

The digital acquisition of patient information permits the improvement of predictability, reproducibility and accuracy of the treatment, in order to manufacture unique patient-specific prostheses.

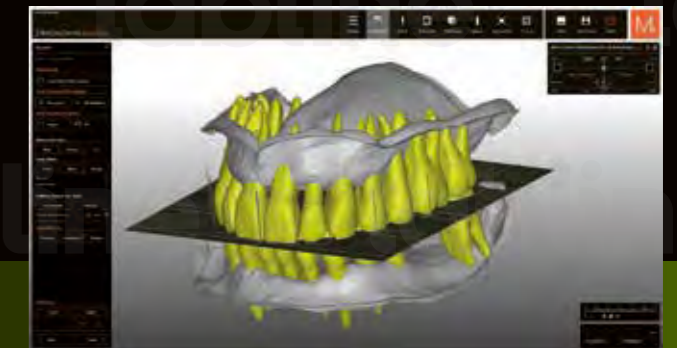


The digital acquisition of patient information using the PlaneSystem® and the Face Hunter 3D facial scanner permits the improvement of predictability, reproducibility and accuracy of the treatment, in order to manufacture patient-specific prostheses.

WORKFLOW STEP #3 DESIGN PROCESS – FAST AND INNOVATIVE VIRTUAL DESIGN OF SET-UPS, REDUCING CHAIR-SIDE APPOINTMENTS

All data produced in the scan software can be easily imported into the design software without any problems. Thanks to the new add-on software Zirkonzahn.Modifier – complementary to Zirkonzahn.Modellier – the design process for full-arch set-ups is now considerably faster and simpler. All model scans are imported from the scan software already aligned to the patient's individual reference planes and the articulator is also shown in the editor. During the design process, the dental technician is assisted with new functions and automations, with special focus on aesthetics. For example, the software enables automatic

design of the gingiva and provides a photorealistic preview of the restoration colours. With the articulated rooted-tooth library already provided with preset occlusions, all teeth are mounted in the optimal position, and the gingiva is subsequently designed based on the tooth set-up. Moreover, set-ups can be viewed in different positions thanks to the four different preset multi-views. 3D animated mouth movements can be simulated using static face scans combined with patient-specific jaw movements previously acquired with special tools (Plane Analyser). Set-ups can also be saved for integration in the design of future work.



Face scans, data obtained with the PlaneSystem® and the planned restoration can be combined to have a complete virtual reproduction of the patient's physiognomy and oral situation. 3D animations allow the treatment team to simulate mouth movements and work "on the patient" without space-time limits – as if the real patient was ever-present.

For a fast design of full arches, a first aesthetic and functional set-up can be designed with the help of the rooted tooth library that is already articulated and included in the software.

Zirkonzahn.Modifier identifies the tooth contact relationships automatically. If something is changed in the upper or lower jaw, the effects on the antagonist are always carried out automatically by the software.

Selection of different libraries provided with preset occlusions. Teeth can be moved together in occlusion by moving the planes.

WORKFLOW STEP #4 MILLING PHASE – SMART AND FLEXIBLE MILLING OF UP TO 57 CROWNS AND 4 BITES IN A SINGLE BLANK

The M2 line of milling units and the extra-large Teleskoper Orbit with Ø 125 mm are a perfect example of improved automation and flexibility. The M2 milling unit comfort line includes five machine versions. All machines are equipped with 5+1-axis simultaneous milling technology as well as a PC with touchscreen, which makes it now easier and more intuitive to select the burs. In particular, the "Dual" variants take their name after a special feature: the double milling chamber. The two milling chambers give users the flexibility to mill wet in one chamber and to mill dry in the other one, producing any type of restoration sequentially without losing time for in-between cleaning. These milling units have been conceived for precise milling of all common hard and soft dental materials, including all types of metal. For this reason, they are equipped with an integrated wet function as well as with a coolant supply into the milling spindle, which helps to keep the milling chamber clean and optimally cools tools and materials, like titanium and glass-ceramics, during elaboration. The machine shows a very stable double bearing suspension and an extra short spindle, which lend a high resistance to vibrations. This permits milling of particularly smooth surfaces: a very important aspect for telescopic work.



The M2 Dual Teleskoper Wet Heavy Metal milling unit, with two milling chambers and one extra-large Teleskoper Orbit, enables sequential wet and dry milling of material blanks with a diameter of 95, 98 (with step), 106 and even 125 mm. With the Ø 125 mm holder, dental technicians can produce up to 57 crowns, 4 bite splints and oversized bridges in one blank.

The machine shows a very stable double bearing suspension and an extra short spindle, which lend a high resistance to vibrations. This permits milling of particularly smooth surfaces, which is a very important aspect for telescopic work.

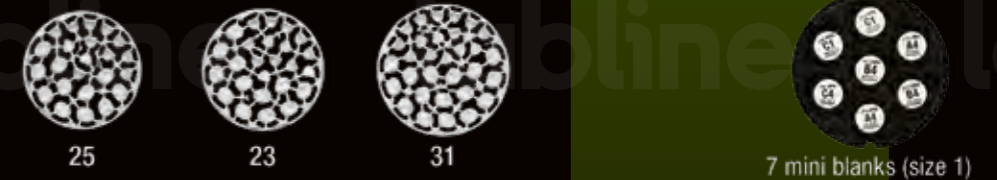


Combined with the Teleskoper Orbit, the M2 Dual Wet Heavy Metal milling units enable the production of more jobs in a faster time and with more flexibility, without compromising on quality. With this extra-large orbit it is now possible to mill in one single orbit blanks of four different sizes: Ø 95, 98 (with step), 106 and even 125 mm. With the Ø 125 mm holder, dental technicians can now mill up to 57 crowns, 4 bite splints and oversized bridges in one blank. The Teleskoper Orbit works in combination with special holders, which can be removed and reinserted back into the orbit with micron-range precision. This

permits adjustment of the friction of telescopic works by re-milling the friction surface several times. In addition, it allows for the two-stage fabrication of immediate restorations in cases of implant-supported prostheses (Double Milling technique).

To give even more freedom to the users, dental technicians can control their milling units wherever they are through specific Apps. The machines send automatic status reports to the user as soon as milling processes are completed or in the event of milling interruptions, so that they can intervene in a short time.

Zirconia elements



Resin elements



Bite splints



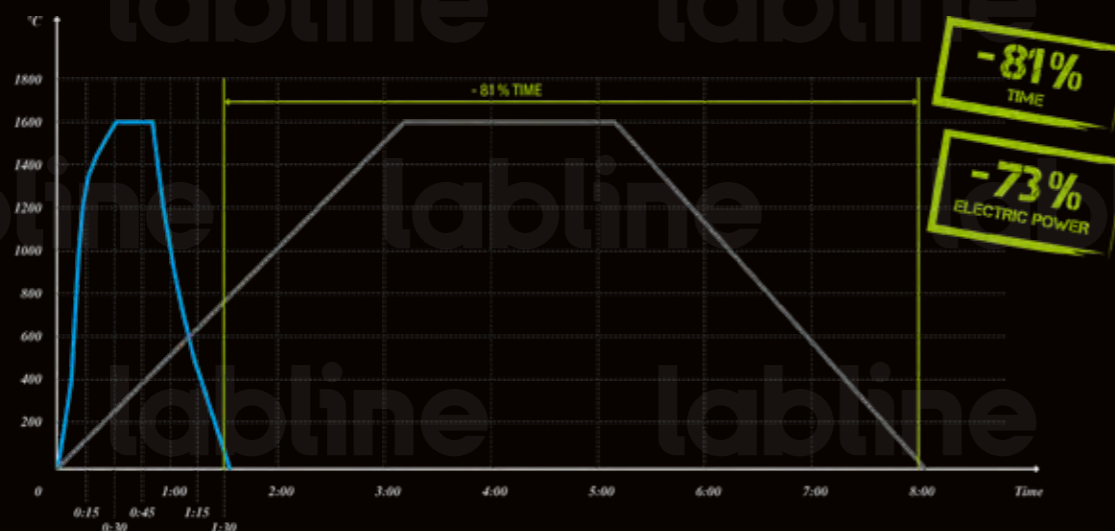
The extra-large Teleskoper Orbit (Ø 125 mm), in combination with special holders, permits the processing of all common soft and hard material blanks with Ø 95 mm, Ø 98 mm, Ø 106 mm or even Ø 125 mm as well as up to 9 glass-ceramic blanks, 6 blanks for precast individual titanium abutments and up to 7 mini zirconia blanks. Material discs can be removed from the orbit and re-inserted back in the same position with high precision in µm range.

WORKFLOW STEP #5 SINTERING PROCESS — **-81% OF SINTERING TIME AND -73% OF ENERGY CONSUMPTION WITH THE NEW ULTRASPEED SINTERING PROGRAMS**

Sintering zirconia restorations is now considerably faster with the new Zirkonofen Turbo, which is capable of cutting processing time by 81% and electric consumption by 73%. Indeed, the furnace is equipped with Ultraspeed programs perfectly adapted to all of Zirkonzahn's zirconia typologies: the smaller and thinner the structure to be sintered, the shorter the required sintering time. For instance, small restorations can now be sintered in approximately 1 hour and 30 minutes only, with no variation of flexural strength, colour or fit values.

The Zirkonofen Turbo includes a large number of pre-set programs perfectly matched to each kind of Zirkonzahn zirconia. This means that the heating, holding and cooling phases vary slightly depending on the material. To obtain the highest quality results with unchanged translucency, programs that are perfectly matched to each kind of colour gradient or flexural strength values are essential to adapt the sintering program to the material and for the structure to be sintered.

With Zirkonofen Turbo, the smaller and the thinner the structure to be sintered, the shorter the required sintering time. Small zirconia restorations can be produced in 2 hours and 10 minutes only, cutting processing time by 81% and electric consumption by 73%.



The round shape of the sintering chamber ensures optimum heat distribution and a uniform sintering of all zirconia elements. With a volume of 0.9 l, the sintering chamber can contain up to three sintering trays stacked on top of each other, permitting the ability to sinter 120 zirconia elements in one sintering process. For bridges sintered with a sintering stabiliser, the special ceramic plate must be used, which offers space for up to three full-arch bridges. The sintering platform is controlled by an intelligent electronic system developed in-house, which monitors the temperature curve of the sintering chamber and controls the platform during the cooling phase.

The furnace software is also developed in-house and has been re-designed specifically for this new furnace. Via the Internet connection, the user can download and install updates directly to the furnace. The user can also create individual sintering programs in addition to the already existing ones and perform independent temperature calibrations. In case of power failures, unsatisfactory sintering results are nearly impossible thanks to the Baking Recovery function. After a power failure, the software checks whether the sintering program can be regularly completed without compromising the result or whether the sintering process must be suspended, informing the user.

In the Zirkonofen Turbo, zirconia restorations can be sintered by means of special accessories to prevent discolouration and pressure marks on the zirconia structures.

WORKFLOW STEP #6 CHARACTERISATION – ZIRCONIA
WITH COLOUR GRADIENT AND WITH GRADUAL-TRIPLEX-TECHNOLOGY (NOW ALSO AS MINI BLANKS OF SIZE 1)

If Prettau® Dispersive® materials are used to produce monolithic zirconia structures, such restorations can be ready for delivery with just the application of glazing material. Thus, for all types of Prettau® Dispersive®, manual colouring becomes an optional step, since the materials – ideal for monolithic restorations – are already provided with natural colour gradient during the manufacturing process. However, for an even more patient-specific result, the restorations can be further characterised with colouring liquids or stains, or they can be minimally reduced and subsequently layered with conventional ceramics or the new Fresco Ceramics.

Prettau® Dispersive® materials, available with different flexural strength and translucency values, have been further developed with the new Prettau® 3 Dispersive® zirconia, made with Gradual-Triplex-Technology. The material is already provided not only with a colour shading, but also with flexural strength and translucency gradients: the incisally increasing translucency results in a highly translucent incisal edge, and the cervically increasing flexural strength results in an extremely high flexural strength at the tooth neck.



Prettau® 3 Dispersive® with Gradual-Triplex-Technology permits alignment of the incisal aspects to the highly translucent blank areas in the nesting software.

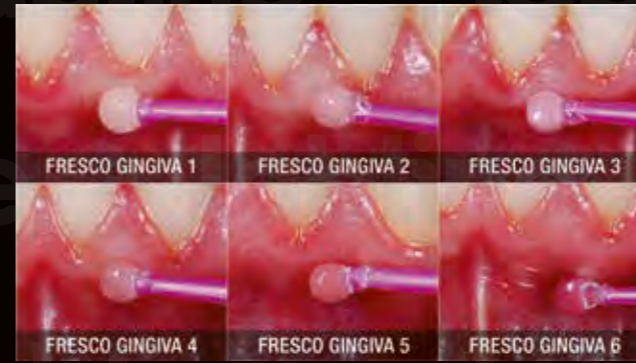
Zirconia with Gradual-Triplex-Technology – A triple gradient of natural colour, flexural strength and translucency.



*Average value of the biaxial flexural strength from several test series

After sintering, monolithic or slightly reduced Prettau® Dispersive® structures can be layered with Fresco Ceramics for improved individualisation. Fresco Ceramics are new ceramic pastes developed to veneer zirconia restorations in gingival (Fresco Gingiva) and vestibular tooth areas (Fresco Enamel) with a simple firing process and in less time. In fact, these ceramics exhibit high primary density and therefore very low shrinkage. This means that one Fresco firing cycle is sufficient to finish the tooth shape and the gingiva. With this firing process, zirconia structures of different sizes can be fired simultaneously. No parameters such

as holding time and/or temperature need to be changed: heating and cooling rates are the only ones to be adapted, since they are directly related to the size and mass of the zirconia structure. If a correction firing has to be carried out, this can be done with the same parameters previously used. If Fresco Ceramics are used for the gingival region, characterisation with stains is no longer necessary because a natural gingiva reproduction can be achieved by the sole application of the pastes. Furthermore, compared to conventional ceramics, Fresco pastes remain moist for a longer time and can be modelled for several hours.



Especially in the gingival region, a characterisation with stains is no longer necessary, since the natural gingival reproduction can be achieved by purely applying Fresco Gingiva.

Example to restoration with minimal cutback before and after characterisation with Fresco Gingiva and Fresco Enamel.



Using the Multi Blank Holders it is possible to produce up to seven zirconia single crowns for seven different patients all at once, and thanks to the smaller blank size it is no longer necessary to keep a large inventory of hardly used colours.

Prettau® Dispersive® materials are now available also in mini blank sizes, with 16 mm and 22 mm heights. Mini blanks can be elaborated with special holders (Multi Blank Holders) in orbits with Ø 95 mm or Ø 125 mm. Using the Multi Blank Holders it is possible to produce up to seven single crowns for seven different patients all at once. In addition, thanks to the smaller blank size, it is no longer necessary to keep a large inventory of hardly used colours.



With the latest hardware, software and material innovations it is possible to considerably reduce the overall workflow time and produce zirconia restorations faster than ever before.

Zirkonzahn®



1.5 HOURS ONLY
120 ZIRCONIA ELEMENTS
-81% TIME
-73% ELECTRIC POWER

- Turbo sintering of zirconia in 1h30
- Round sintering chamber with room for up to 120 zirconia elements
- 4 MoSi, high-performance heating elements
- Large sintering chamber with a capacity of 0.9 l
- Over 1000 min. of sintering time per program
- Baking Recovery function
- 7" colour touch screen
- New, user-friendly software
- Update via LAN or WIFI
- Heating rate of up to 120 °C/min
- Cooling rate of up to 60 °C/min
- Automated cooling through fully automatic sintering platform
- Maximum sintering temperature of 1700 °C
- Control accuracy of +/- 2 °C at a final temperature of 1600 °C
- Independent temperature calibration
- Large number of pre-set programs
- Creation of custom sintering programs
- Compact, modern design with high-quality full glazing

ZIRKONOFEN TURBO

SPEED BEYOND ANY EXPECTATIONS

With the new Zirkonofen Turbo and its pre-set fast sintering programs perfectly adapted to each kind of Zirkonzahn zirconia, it is now possible to sinter smaller zirconia structures in about **1 hour and 30 minutes**. This cuts processing time by **81%** and reduces electric consumption by **73%**. As a result, zirconia restorations can be milled, sintered and veneered in **2 hours and 40 minutes only**.

The round shape of the sintering chamber ensures optimum heat distribution and a uniform sintering of all zirconia elements. With a volume of 0.9 l, the sintering chamber can contain up to 3 sintering trays stacked on top of each other, which permit sintering up to 120 zirconia elements in one sintering process.

If bridges are sintered with a sintering stabiliser, the ceramic plate must be used, which offers space for up to three full-arch bridges.



The software, developed in-house, has been re-designed especially for this new furnace. Via the Internet connection, the user can download and install the updates directly in the furnace, in order to always work with the latest functions and sintering programs. With Zirkonofen Turbo, the user can also create individual sintering programs in addition to the already existing ones and perform independent temperature calibrations. In case of power failures, unsatisfactory sintering results are nearly impossible thanks to the Baking Recovery function. Indeed, after a power failure, the software checks whether the sintering program can be regularly completed without compromising the result or whether the sintering process must be suspended, informing the user.



Using three sintering trays stacked on top of each other (1) (2) and the ceramic plate (3), with the Zirkonofen Turbo it is possible to sinter up to 120 zirconia elements or three full-arch bridges with sintering stabiliser in one single process. To prevent discolouration or contamination of the zirconia structures, it is recommended to place over the base of the sintering tray special sintering granules and to cover the bridges with a ceramic protection cover. The new ceramic protection cover, with its curved shape, guarantees optimal heat distribution.



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