DENTAVANTGART

labline™

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INTERVIEW

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FOCUS ON WHAT YOU WANT TO ACHIEVE IN YOUR CAREER

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PROSTHETIC REHABILITATION OF THE EDENTULOUS PATIENT: IMPLANT-RETAINED OVERDENTURE PERSONALIZED WITH GINGIVA COLORED COMPOSITE

DT. **JOSHUA POLANSKY**

A TECHNICIAN'S JOURNEY
"A VISUAL INVENTORY"

MDT. **RODRIGO MONSANO** &
PHD. **WILLIAM KABBACH**

READING OF NONEXISTENT COLOR

Zirkonzahn®

ZIRKONZAHN'S WORKFLOW
ANALOGUE – DIGITAL – ANALOGUE-SWITCHING

Digital is good, but if combined with analogue it becomes great. At present, where strict deadlines and quick turnarounds govern life and work environments, digital is the right solution to manufacture good restorations, in great quantities, saving time. However, what makes the difference between a good and a perfect restoration are the dental technician's hands: his experienced eye. The Zirkonzahn digital workflow, including innovative devices and the Zirkonzahn.Software, has been conceived in order to allow dental technicians to integrate digital with manual steps, which means creating accurate restorations yet in a simplified and time-efficient manner. The underlying principle behind Zirkonzahn's workflow is based on the "synchronisation" and "transmission" of the digital and physical working basis: analogue and virtual working steps can be combined allowing the user to benefit from the advantages of both work methods. The work process can thus be individually planned, which again allows the user to achieve the best result for each patient case. All of Zirkonzahn's software and hardware are perfectly integrated into one workflow which allows the user to compose his own puzzle. How? Let's discover it together in the next paragraphs.

AN ACCURATE DETECTION OF THE PATIENT'S DATA: THE PLANESYSTEM®

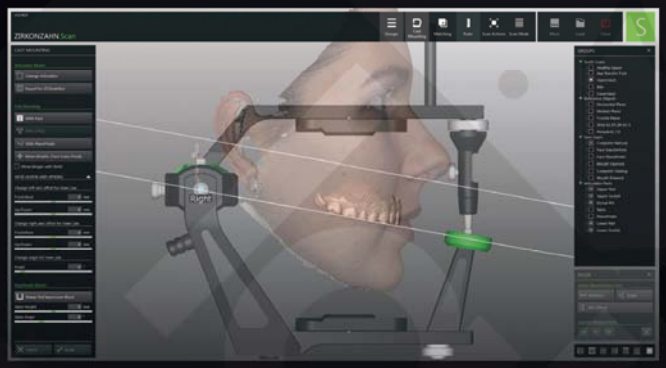
Of course, every laboratory has its own standard approaches to capture the patient's specific planes and facial physiognomy, as well as its own standard articulator to perform controls on the models. However, an innovative approach to detect and check the patient's planes can be used: the PlaneSystem®, developed by Udo Plaster, MDT, in cooperation with Zirkonzahn. The PlaneSystem® is composed of a tool (PlaneFinder®) for the detection of the patient's physical planes, the PS1 physical and virtual articulator as well as a specific mounting plate (PlanePositioner®) to position the models in the PS1 physical articulator. Furthermore, with the new PlaneAnalyser you can even measure, capture and implement the patients condylar movements into the articulator automatically, which is important e.g. for occlusal and functional rehabilitations. The PlaneSystem® is also compatible with the Face Hunter, the scanner for photo-realistic 3D digitisation of the patient's face, the working basis for manufacturing individualised dental prostheses.

The PlaneFinder®, for the detection of the patient's physical planes.

The PlanePositioner®, which features a transparent plate used to position the maxillary cast inside the articulator and to reflect the individual's occlusal plane.

The PS1 laboratory's articulator.

FROM ANALOGUE TO DIGITAL: THE ZIRKONZAHN.SCAN SOFTWARE



The articulated model in the Zirkonzahn.Scan software. The model scan has been matched with the patient's digital data got through the Face Hunter 3D facial scanner.

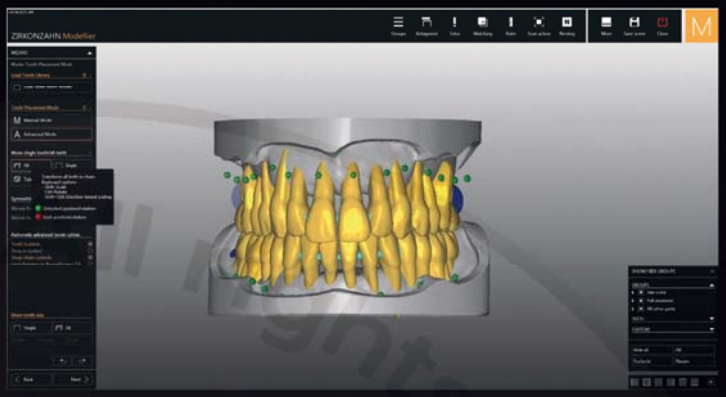
Regardless of the approach to capture the patient's planes and physiognomy, the patient information gathered has to be transferred to the Zirkonzahn.Scan software in order to proceed with the design phase. Transferring the patient's data into the software is a very simple task: the articulated models can be easily digitised in less than three minutes with a Zirkonzahn scanner (S300 ARTI, S600 ARTI, S900 ARTI) using the PS1 physical articulator. The Zirkonzahn.Software can work best with the PlaneSystem® components, however, any physical articulator can be used and registered into the Zirkonzahn.Software, so that the articulated models can be displayed directly in the correct position in the registered articulator. Once the models have been transferred 1:1 into the Zirkonzahn.Scan software and integrated with other possible digital data (DICOM, X-Ray...) the Zirkonzahn.Modellier designing software comes into the picture. Of course, the described process can also be performed using data from intraoral scanners.

The Face Hunter 3D facial scanner, for the photo-realistic 3D digitisation of the patient's face.

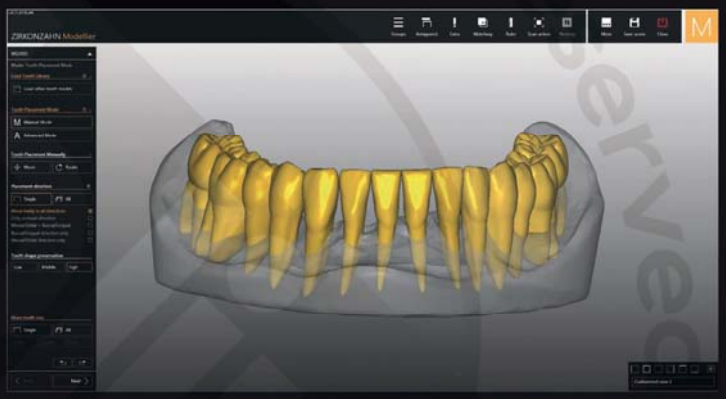
MODELLING IN THE VIRTUAL ARTICULATOR

In the modelling software, the Virtual Articulator CAD/CAM software module allows the technician to work on the articulated models exactly as if they were in a physical articulator. This module enables the simulation of the mandibular joints, since all movements are recreated virtually. Furthermore, the user can carry out a dynamic adaption of constructed contact points to the antagonist taking into account the masticatory movements and, if a split-cast system and vestibular articulator scan is combined with the model position detector the software positions the models into the virtual articulator automatically. The Virtual Articulator software module is a feature of the Zirkonzahn.Scan software, as well as a software module included in the Zirkonzahn.Modellier design software, which has been recently enriched with a wide variety of new functions and completely revised older functions.

With this new version of the Zirkonzahn.Modellier software the user can reproduce 1:1 the natural tooth aesthetics and use it as a model tooth. Full arches can be positioned quickly with just two clicks, taking advantage of a set-up guide using the 'string of pearls' function, which guarantees the constant contact between adjacent teeth when being moved without any overlapping of the anatomies. The new software also allows the user to generate dies that can be perfectly adapted to the patient's anatomy, virtually design the gingival area for an accurate adjustment to the tooth set-up, define the cement gap for each individual crown and create virtual wax-ups out of the designed tooth and gingiva set-up. Moreover, it is now possible to use the first virtual rooted tooth library in the Zirkonzahn Heroes Collection virtual library, which helps determine the tooth axis and create a highly aesthetic emergence profile of the tooth. At present, only the AIDA virtual library comes with roots, but rooted teeth are constantly implemented also into the other nine teeth sets of the library.



Set-up guide using the "string of pearls" function, for the virtual design of the gingival area in the Zirkonzahn.Modellier software.



The rooted teeth in the tooth galleries implemented in the Zirkonzahn.Modellier design software.

FROM DIGITAL TO ANALOGUE: THE JAWPOSITIONER

In the digital era, technology brings many advantages to dental technicians. However, dental technicians are born as artisans: their abilities need to be trained and their digital knowledge needs to be matched with the person's manual skills. With this aim, Zirkonzahn's workflow allows the dental technician to combine virtual and manual checks of the restoration. Thanks to useful tools such as the JawPositioner, it is possible to switch from a digital to a manual workflow. The JawPositioner is a specially designed resin blank and it is indeed the missing piece of puzzle for a combination of analogue and digital work steps in the production of prosthesis. Based on the digital data of the patient case, a positioning pattern for the model of the patient's maxilla can be milled out of the JawPositioner in less than ten minutes to be then correctly positioned in the laboratory's articulator. Now, the virtually planned restoration can be checked and manually adjusted. The most important advantage of this integrated technology stays in the fluid exchange between digital and analogue working steps, which allows the technician to benefit from the advantages offered by the two approaches. Any change applied in the physical world, indeed, can be immediately digitised and transferred back to the virtual world through one of the Zirkonzahn scanners.

The JawPositioner resin blank allows the production of a positioning pattern for the patient's maxilla. The JawPositioner, fixed on the JawPositioner support is then positioned into the laboratory's articulator to perform manual checks of the restoration.

SMART MILLING POSSIBILITIES WITH THE UPDATED ZIRKONZAHN.NESTING SOFTWARE

The parameters to mill the JawPositioner can be set in the Zirkonzahn.Nesting software. Indeed, with the recent software update, the Zirkonzahn.Nesting has moved a step further with many smart functions. The software provides the technician with positioning suggestions and a collision detection function, which reports possible collisions of the spindle with the orbit or the blank. The new version of the South Tyrolean company's nesting software allows Zirkonzahn users to mill third parties' individual abutment files in Zirkonzahn's Raw-Abutment® blanks, benefiting from their precast implant connections compatible with an increasingly higher number of implant systems. Most importantly, the software has been implemented with a special technique that allows the user to mill surgical guides as well as threaded screw channels with the respective sealing screws. These resin screws work as secondary sealing screws, with a counterclockwise thread. Once the restoration has been fixed with standard titanium screws these secondary screws seal the screw channel and also keep the titanium screws from loosening over time. The resin screws are milled in the Screw Blank resin block while the threads are milled by means of a specially developed CAD/CAM milling bur for threads. A special extractor allows an easy and proper removal of the restoration, during which the screw channel will not be damaged and can be closed again by using new resin screws.

A case description featuring this new special function of the Zirkonzahn.Nesting software can be found at page 104.

Screw Blank resin block for the milling of resin screws.

ANALOGUE AND RELATED DIGITAL WORK STEPS AT A GLANCE

ANALOGUE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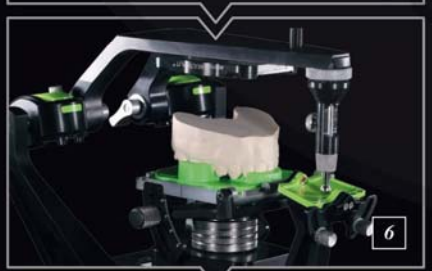
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All analogue working steps can be reproduced and transferred 1:1 in the virtual world, according to one's working method.
The underlying principle of Zirkonzahn's workflow is based on the "synchronisation" and "transmission" of the digital and physical working basis: analogue and virtual working steps can be combined, allowing the user to benefit from the advantages of both working worlds. The work process can thus be individually planned, which again allows the user to achieve the best result for each patient case.
All of Zirkonzahn's software and hardware tools are perfectly integrated into one workflow which allows the user to compose his own puzzle.

1: Intraoral scanner

2: PlaneFinder®

3: PlaneAnalyser

4: PS1 physical articulator

5: JawPositioner

6: The model checked in the PS1 articulator with the JawPositioner and the PlanePositioner®

7: The restoration milled in the material block

8-10: The data acquired with the scanner, the PlaneFinder® and the PlaneAnalyser are transferred 1:1 in the software

11-13: The Zirkonzahn.Scan software

14: The Zirkonzahn.Modellier software

DIGITAL


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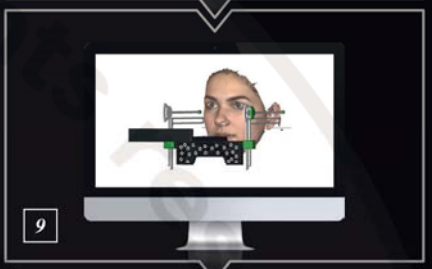
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SMART MILLING POSSIBILITIES: A PRACTICAL EXAMPLE

OCCLUSALLY SCREWED PRETTAU® BRIDGES WITH THREADED SCREW CHANNELS

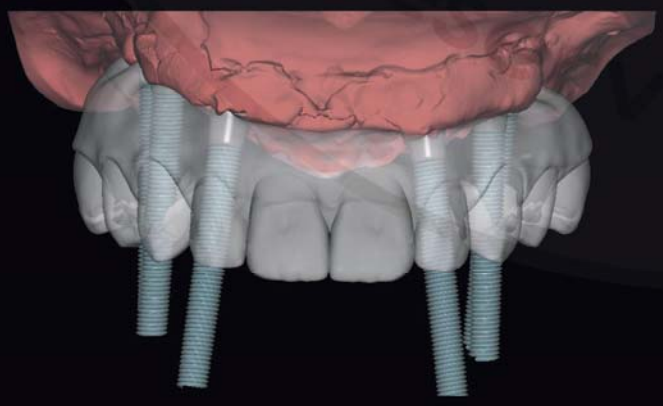
*Case made by **Dr. Harel Simon**, Prosthodontist (Beverly Hills, California), in collaboration with Zirkonzahn Education Center, Brunico, Italy*

THE INITIAL SITUATION

The aim of this case was supplying a young patient, who was toothless since birth, with fixed dental prostheses in the upper and lower jaw. Together with the dentist, we planned to make two Prettau® Bridges with titanium bases on implants. We chose to use Prettau® Zirconia for the material because of its aesthetic qualities and long-lasting durability.

SOLUTION

After the digitisation of the patient's situation, we created a digital denture based on the patient's previous prostheses. For the digitisation of the case, we used the S600 ARTI scanner, but the new S300 ARTI and S900 ARTI scanners could also be used. As tooth template we chose TRITON, one of our natural tooth sets from the Heroes Collection virtual tooth library, we milled the result in Temp Basic resin and layered the structures' gingiva with Gingiva-Composites. After finishing these resin prototype models, we sent them to the dentist for the try-in. By scanning the structures, we digitised the few modifications the dentist made and subsequently matched them with the virtual denture in our design software. Like this, the desired adjustments were precisely transferred. Before milling the Prettau® Zirconia restoration with the M5 Heavy Metal milling unit, we digitally included threads for the screw channels. We set the milling parameters in the Zirkonzahn.Nesting software and milled the threads using the special CAD/CAM milling bur for threads.



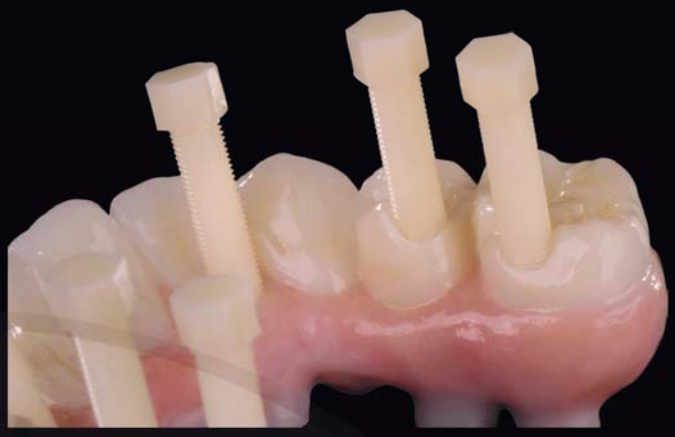
The digitally provided threads in the Zirkonzahn.Modellier designing software.

To close the screw channels, we also milled suitable threaded resin screws out of the Screw Blank resin block. After these steps, we coloured the zirconia structures with Colour Liquid Prettau® Aquarell, then we sintered and personalised them with ceramics and stains.

The Prettau® Zirconia restoration infiltrated with the Colour Liquid Prettau® Aquarell and then sintered.

We anodised the titanium bases in a golden colour with the Titanium Spectral-Colouring Anodizer and subsequently bonded them to the structures. The golden colour reduces the grey value of the structure near the bases and the rehabilitation gains a more natural appearance. After the final polish, the Prettau® Bridges were ready to be screwed into the patient mouth and closed with the own-milled threaded resin screws.

The structures with the milled threaded channels and the titanium bases anodised in golden colour.



The threads milled with the special CAD/CAM bur for threads and the sealing screws milled out of the Screw Blank resin block.

The final restoration screwed in the patient's mouth. A special extractor allows an easy and proper removal of the restoration, during which the screw channel will not be damaged and can be closed again by using new resin screws.

To learn more about Zirkonzahn's range of products, training courses and to have a look at the case galleries visit www.zirkonzahn.com.

Zirkonzahn®

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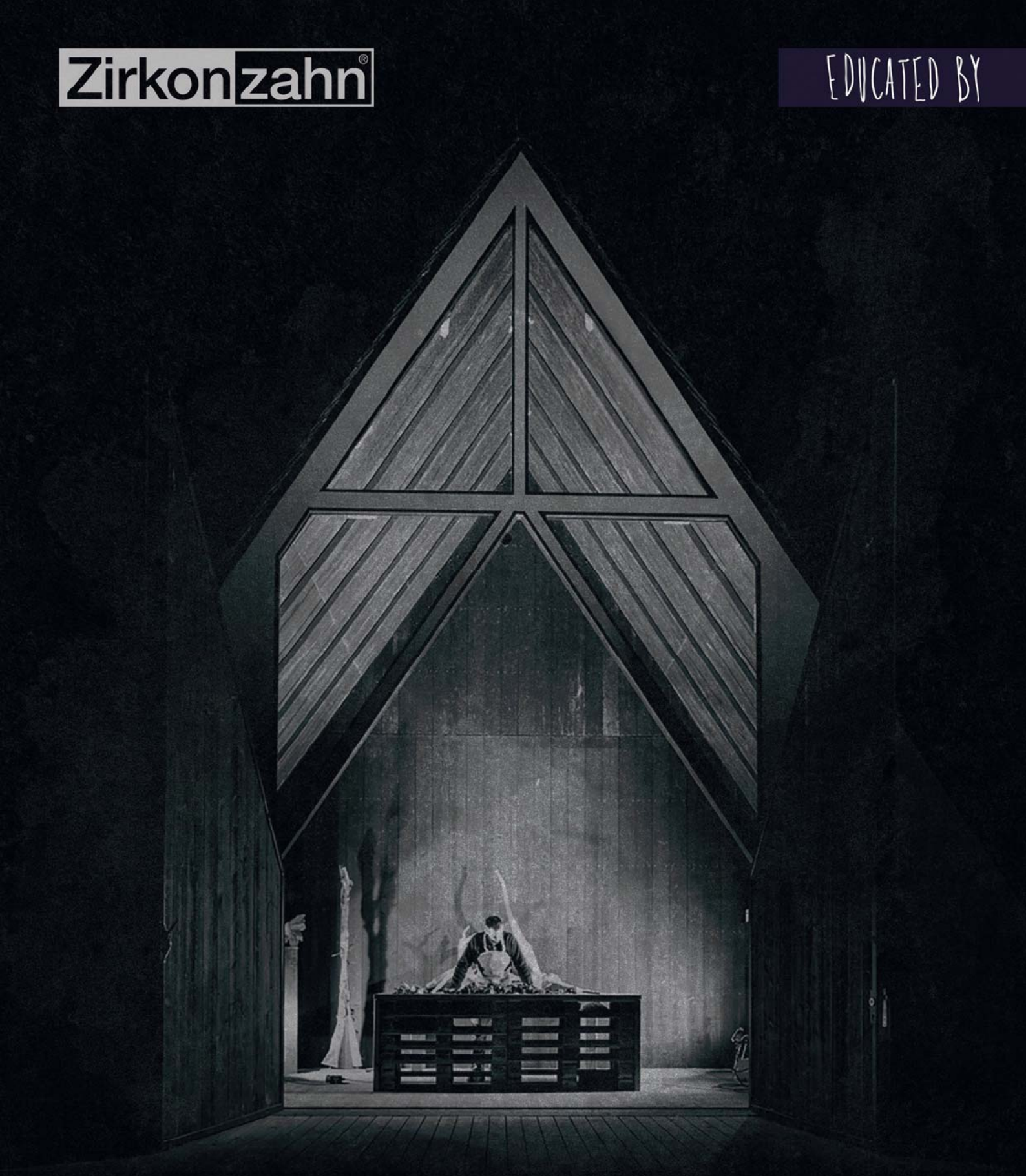

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