

Primeprint Collection Clinical Cases



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Dear Readers,

Fascination 3D printing: 3D printing has enriched many industries within the last years thanks to technological advances. Like dental laboratories, dental practices have also adopted this process for the production of dental applications. Dental 3D printing can be easily integrated into digital dentistry workflows, including intraoral scanners, CAD/CAM software, and milling units. 3D printing has matured from prototyping to the next dimension, offering new opportunities for practices and laboratories to work precisely and efficiently.

With Primeprint, Dentsply Sirona has launched an innovative 3D printing solution that includes not only 3D printing but also automated post-processing. In addition, intelligent software makes a wide range of applications accessible at the push of a button and offers users an extension of treatment and service offerings. The highly automated and intelligent interaction between software and hardware enables the production of biocompatible indications with accurate, reproducible, and medical results.

Experience a whole new dimension of 3D printing with Primeprint, which reduces manual handling to a minimum with a lot of safety and quality. We will take you on a journey through a technology that will wonderfully change your everyday life starting today.

The new Primeprint Collection will be a source of inspiration for you. Discover how 3D printing technology can simplify, accelerate, and delight your work. Using clinical cases, colleagues of yours demonstrate the added value of Primeprint in everyday practice and laboratory tasks. As a dentist, you will notice: Your patients are impressed by the modern technology and appreciate the experience of dentistry at the highest level. And: Dental technicians who use 3D printing technology can additionally indicate to their practice partners that their focus in the lab is on digital manufacturing.

We hope you enjoy discovering!

Yours Sincerely,

Swen Deussen
Vice President
Global Marketing DP&S

Laura Seibel
Global Marketing Manager
Primeprint

3D-printed guide for implantology

Case Description

A 62-year-old male presented himself to my practice with a fractured non-restorable tooth #10. He had mild hypertension and elevated cholesterol, but no contra indications to implant therapy.

We decided that the best course of treatment was an extraction and a fixed bridge from #9-11 or single implant at site #10, an abutment and crown, as well as an implant. We obtained a 10x11 field of view CBCT using Axeos and took a digital impression by using Primescan AC. The future prosthetic crown was planned with CEREC SW 5.2 and exported into Sicut 2.0 with the CBCT. This let us plan the implant in the most ideal position, in relation to the bony walls and the future crown. We also planned a 4.2x13 PrimeTaper implant by exporting it out of Sicut 2.0, and into the CEREC chairside software. The surgical guide was planned using Primeprint and Primeprint Guide resin. The designed CEREC Guide 3 was exported for manufacture into inLab CAM Software 22.1. We positioned the guide on the building platform with proper supports in just one click! It took us 40 minutes to print the surgical guide with Primeprint. We placed it into the Primeprint PPU to be washed in isopropanol

and for photopolymerization. We removed the supports from the guide and bonded a narrow diameter (ND) sleeve that was compatible with the PrimeTaper surgical guide. We used the same Primescan AC model to design a temporary 1 wing Maryland bridge. The design was exported to in Lab CAM SW 22.1 and printed on Primeprint using Primeprint Temp A2 resin. It took us 30 minutes to print this bridge and process it in the PPU, so that it was ready for delivery at the time of surgery. On the day we anesthetized the patient with artecaine and extracted his tooth. We took great care to maintain the buccal plate. We positioned the 3D-printed surgical guide and performed the osteotomy through it. The site was irrigated, and we placed a 4.2x13 PrimeTaper implant through the surgical guide. The site was grafted using a mix of Symbios cortico/cancellous to graft the buccal gap, and place sutures. We printed a 1 wing Maryland Bridge ahead of the procedure, using A2 temporary resin and bonded it into place after finishing surgery. Surgery was completed in 20 minutes (including taking photos), and it took us 10 minutes to bond the temporary bridge.

Discussion

When it comes to digital dentistry, Primescan AC and Primeprint are gamechangers. One of Primeprint's biggest advantages is that it can be used for single site or multiple site surgical guides. In this case, the surgical guide allowed for a placement that was seamless, stress-free and done with precision – even the patient was surprised at how quick the treatment was!



Dr. Dan Butterman
Centennial, USA



Before: Initial situation with a fractured non-restorable tooth #10



Usage: Placing the surgical guide with optimal fit



After: Placing the 3D-printed One-wing-Maryland Bridge with Primeprint Temp material as a temporary restoration

Case Description in Pictures



Fig. 1: Initial situation with a fractured non-restorable tooth #10

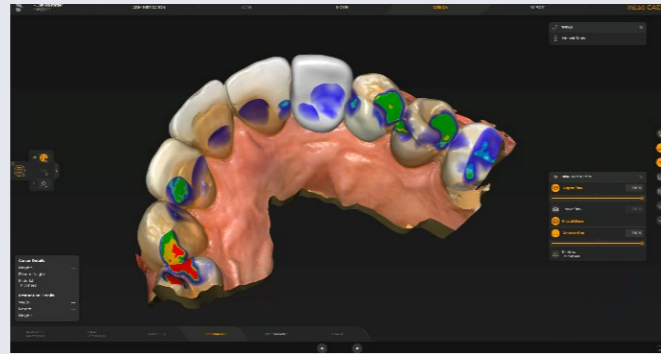


Fig. 2: Digital Model with prosthetic planning in inLab SW 22

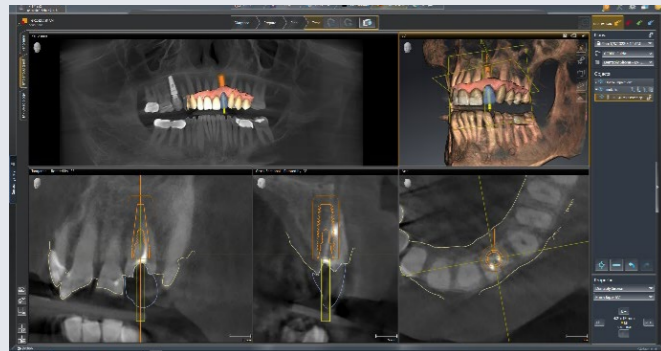


Fig. 3: Treatment planning in SICAT SW 2.0

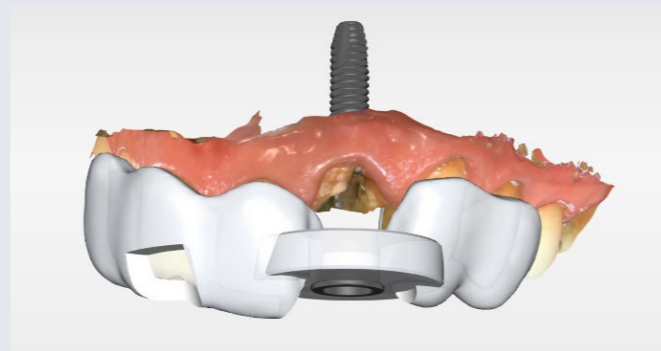


Fig. 4: Planning surgical guide CEREC Guide 3 in CEREC SW 5.2.3

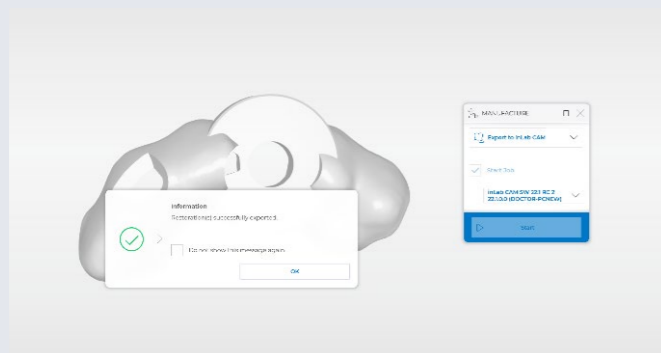


Fig. 5: Export of the file into the inLab CAM SW 22 for printing



Fig. 6: Splint positioned on Primeprint build plate with supports



Fig. 7: 3D-printed guide with supports with Primeprint Guide material

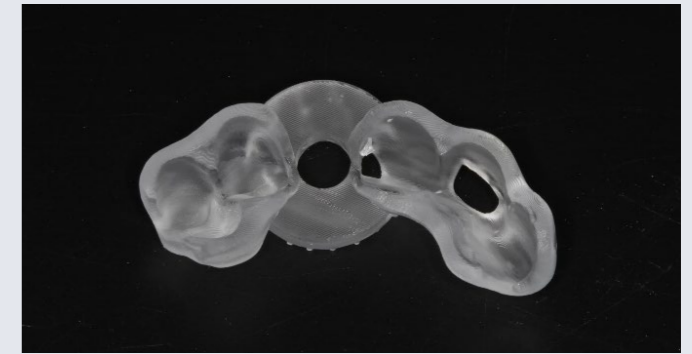


Fig. 8: The final 3D-printed surgical guide



Fig. 9: Placing the surgical guide with optimal fit



Fig. 10a: Osteotomy performed with guided surgical kit



Fig. 10b: 4.2 X 13 PrimeTaper implant placed through the surgical guide



Fig. 11: Placing the 3D-printed One-wing-Maryland Bridge with Primeprint Temp material as a temporary restoration



3D-printed model with ditched dies for anterior tooth renewal

Case Description

A 47-year-old female presented to my office with concerns about six anterior zirconia crowns recently done at another office. She felt they were poorly shaped and crooked to her face and described what we as dentist refer to as a reverse smile line and lack of flow. She also complained of tooth sensitivity and occlusion that was not even and bothered her on a daily basis.

After initial consultation, photographs and intraoral scans with Primescan AC were taken to perform a comprehensive consultation. Having the digital impressions and photographs help visually discuss her concerns and create value for pursuing treatment. After the plan was finalized, all scans and pictures were sent to our laboratory to create a virtual wax-up. After finalization, I 3D printed the wax-up with Primeprint and Primeprint Model resin. This physical model of the plan allowed me to present a preview of treatment to patient, create preparation guides, make proper temporaries, and use as a Biocopy for final restorations. To finalize the proposed plan, we transferred the wax-up to the mouth with bis-acryl material at the second appointment. She approved and was excited for treatment. On appointment three, I prepared full coverage

crowns on tooth #6-11 and veneers on tooth #5 and #12. We scanned the final preparations, opposing dentition, 3D printed diagnostic wax-up in the Biocopy Folder, and Buccal Bite with Primescan AC. After margination of the preparations in the CEREC 5.2.3 software, we sent case to inLab SW 22. This software allowed us to create a solid model (with ditched dies) and a working model with removable dies. This completed model data was sent to inLab CAM 22 and 3D printed with the Primeprint out of Primeprint Model resin. The efficiency and ease of use of the Primeprint Solution allows me to quickly print models on the same day of treatment. The automation allows me to continue with my design work without having to worry about monitoring the printing process, manually cleaning resin, or dealing with messy alcohol. It took approximately 50 minutes to print both the solid and working model and under 45 minutes to wash and cure. After final design, all restorations were produced out of glass ceramic with CEREC Primemill using the extra-fine mode. The restorations were then bonded into place using Calibra resin cement. The patient was delighted with the final result.

Discussion

Technology – like 3D printing – is rapidly changing the way dentists work. The beauty of 3D printing is that any last-minute changes to models, removable dies, wax-ups etc. can be made quickly and easily, just by 3D printing another one in a very short period of time. This agile way of working helps to streamline workflows, especially when executing cosmetic treatments. It ensures that restorations will need minimal to no functional or cosmetic adjustments when seated. Technology and equipment like Primescan AC, Primeprint Solution, inLab software were pivotal in helping me give the patient a healthy smile.



Dr. Mike Skramstad, DDS
Orono, USA



Before: Initial oral situation with significant asymmetry of the lips when smiling



Usage: 3D-printed model with ditched dies



After: Final restoration

Case Description in Pictures



Fig 1: Initial oral situation

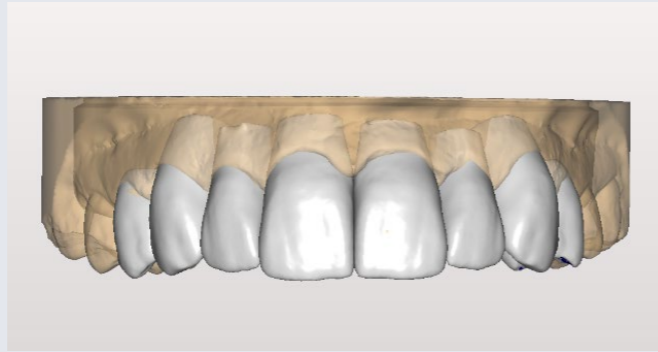


Fig 2: Digital Diagnostic Waxup in CEREC SW 5.2



Fig 3: Preparation margined

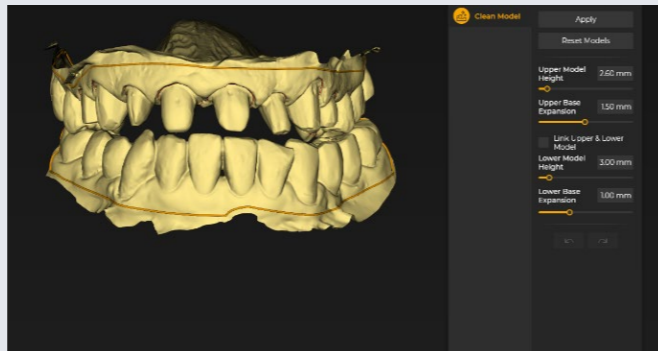


Fig 4: Models imported into inLab Model 22 to Clean

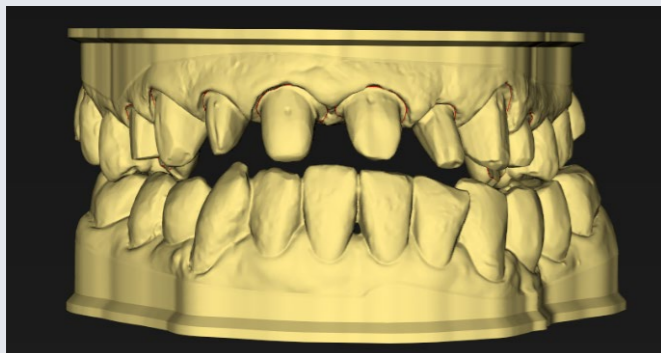


Fig 5: Models with bases



Fig 6: Solid working model ditched buccal

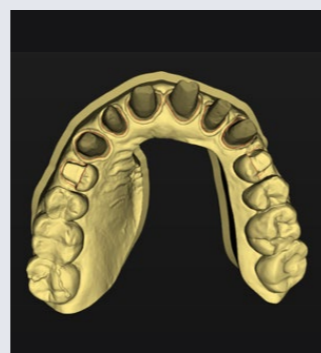


Fig 7: Solid working models ditched occlusal



Fig 8: Working models with dies buccal

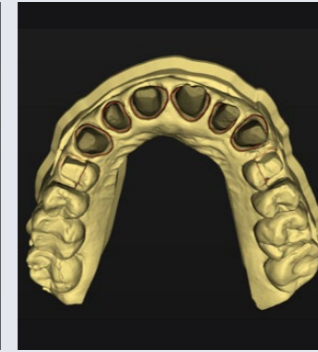


Fig 9: Working models with dies occlusal

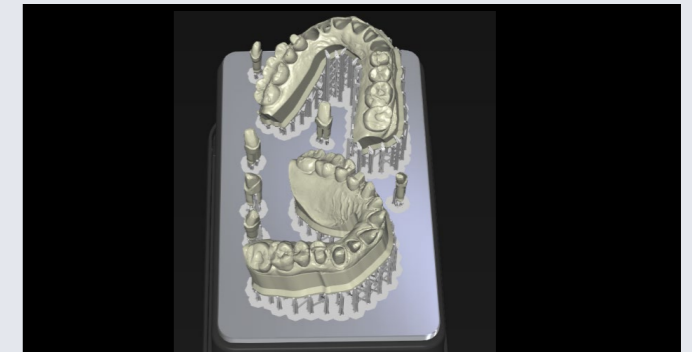


Fig 10: Models and dies on build plate inLab CAM 22



Fig 11: 3D-printed model with dies with Primeprint Model material



Fig 12: Preparation with Biocopy overlaid material



Fig 13: Final Design



Fig 14: Final restoration: immediate seat

3D-printed splint against nocturnal bruxism

Case Description

A male patient 34 years old presented himself to my practice, with symptoms of nocturnal bruxism and expressed experiencing muscle pain and soreness. We decided that wearing a removable mouth guard at night would minimize wear on his dentition.

We started with a full upper and lower jaw scan of the patient using Primescan AC and designed the splint with the Splint module in inLab SW 22. The scan was seamlessly integrated into inLab CAM 22 software, where the splint was then printed and processed using Primeprint Solution.

We captured the jaw relation bite using a leaf gauge to check if he was in a fully seated condylar position and to create adequate space for the future appliance. In CEREC SW, I selected 'Splint' as an indication. The software then automatically opened the Splint module to finalize the design. Then it was sent to the CAM software to optimize the positioning and supports for successful printing. We did all of this in just one click! Once the splint was finished in the Primeprint with Primeprint Splint material, my assistant

finalized the appliance by transferring the Primeprint Box to the Post Processing Unit. After giving the supports a quick polish using a carbide bur (that left a nice and smooth finish), the appliance was ready to be delivered.

Before Primeprint, I used several other printers, but their post-processing gave me cause for concern. It was quite messy, and I would often wonder if the appliance was safe for intraoral use. The Primeprint Post Processing Solution gives me confidence that the appliance has been thoroughly cleaned and cured as a medical device for use. I also found that it was easier to finish and polish with this acrylic—did not see any warping and distortion with temperature changes that I usually would with the competitor material.

It took us around 40 minutes to print and 45 minutes to post process, while the treatment itself was done in just under 2 hours: 10 minutes to scan and design, and one and a half hours to manufacture.

Discussion

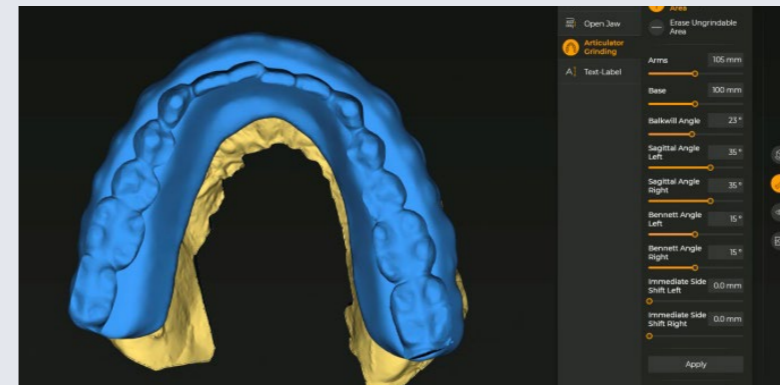
Dental devices like Primeprint Solution and Primescan AC can no longer be ignored or underestimated—they are dramatically changing our industry and setting a new standard for how high-quality dentistry should be done. It is simple, predictable, and automated enough for anyone to use—from seasoned users to brand-new team members. Patients regularly tell me how amazed they are by the speed and comfort of the appliances; its precision and snug, retentive fit create a premium impression. This particular patient experienced muscle pain and soreness. Primeprint allowed me to manufacture the appliance in 3 hours, so that he could leave my practice able to use it that very night.




Dr. Meena Barsoum
Arlington Heights, IL, USA



Before: Initial oral situation with symptoms of nocturnal bruxism



 New: order your nightguard / splint design from DS Core Create

Usage: Finalizing the object to be printed



After: Detachable 3D-printed splint with Primeprint Splint material

Case Description in Pictures



Fig 1: Initial oral situation. The patient presented with symptoms of nocturnal bruxism and should get a removable mouth guard

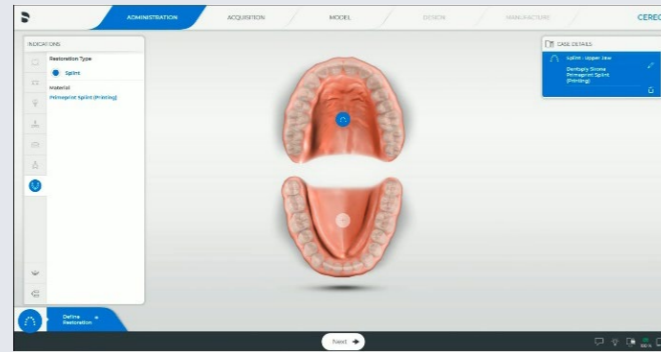


Fig 2: Scanning with Primescan after selecting "Splint" as an option in the CEREC Software

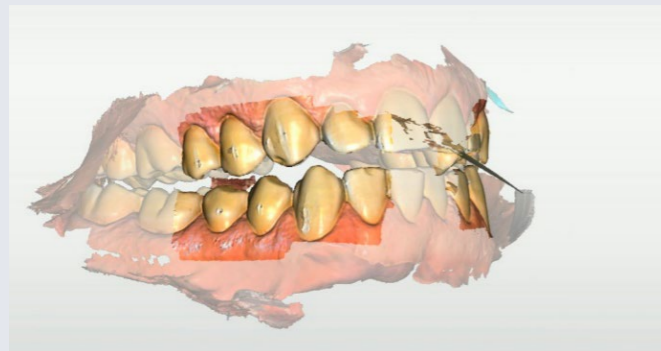


Fig 3: Capturing the jaw relation bite using a leaf gauge to check if he was in a fully seated condylar position



Fig 4: The model in the inLab CAD Software



Fig 5: inLab SW, "Splint" modul. The software supports the design and gives options to optimize the fitting

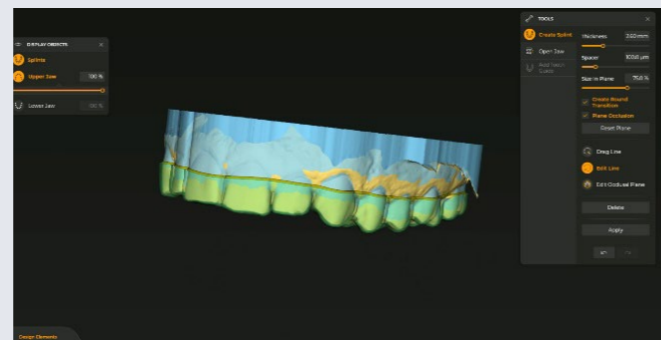


Fig 6: The suggestions of the software are optimized and above that, there is the possibility to customize manually

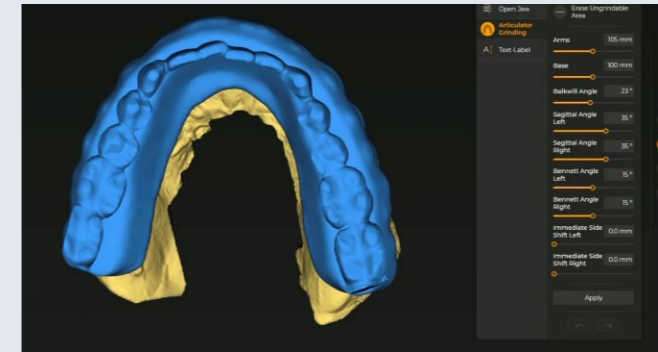


Fig 7: Finalizing the object to be printed

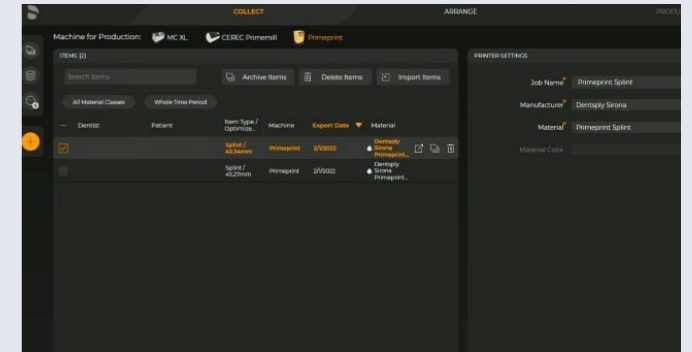


Fig 8: Selection of the Splint print jobs in the queue – one splint for each jaw

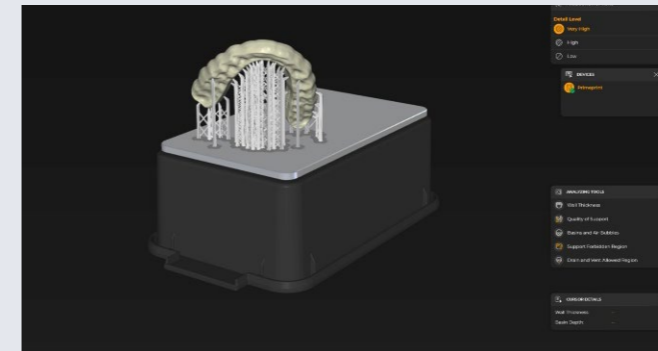


Fig 9: Positioning of the printed object in the inLab CAM software

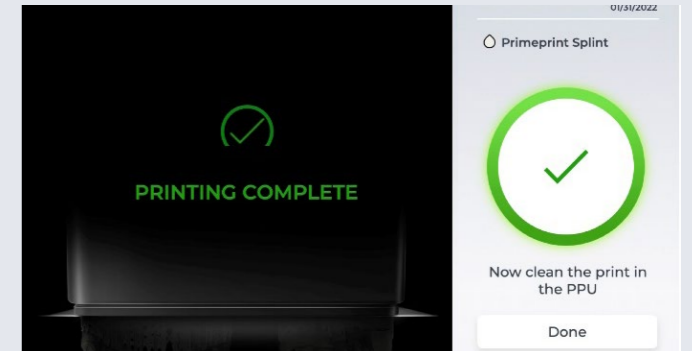


Fig 10: The software reports when the print job is finished and ready for post-processing



Fig 11: The 3D-printed splint after removal of the supports, cleaned and cured as a medical device for use



Fig 12: The mouth guard after in situ. In the lower jaw, the partially abraded teeth are clearly visible. They are now protected by the splint

3D-printed surgical guide for implantology and 3D-printed temporary restoration

Case Description

A 58-year-old male patient presented himself to my practice with a missing tooth #30 to restore the natural chewing function while preserving healthy tooth structure. The gap was to be restored with an implant and a ceramic crown (Cercon HT + XT). For the highest possible predictability of the clinical outcome and safety during implementation, I planned and implemented the treatment digitally (Backward Planning).

We started with a low-dose DVT of the right mandible that had a radiation exposure of about 6 μ Sv (30% of an OPG). It was created for this purpose using the Orthophos SL 3D. We also took digital impressions of both jaws with the Primescan AC. After selecting the "Implant planning" workflow in the CEREC software, we calculated a functionally adapted virtual crown. The treatment planning itself was carried out in the SICAT Implant 2.0 software (SICAT, Bonn). Firstly, the scan data and the virtual restoration from the CEREC software were overlaid with the DVT and the course of the alveolar nerve was visualized. Based on this diagnostic information, it was possible to correctly plan the implant prosthetically, considering the anatomical structures. The

surgical guide required for guided implant placement was designed in accordance with the planning in CEREC SW 5.2. The design was completed in about three minutes with the transfer to the inLab 22 CAM software.

The preparing of the production via 3D printing with Primeprint was fully automated and was done in a few clicks. The guide was created with Primeprint Guide material in the Primeprint Solution, the 3D-printer and the Post Processing Unit (PPU). After printing, the object was manually transferred with the Primeprint Box from the 3D-printer to the PPU, where it received its final properties through post-processing (washing, drying, curing). In total, the process took about 80 minutes.

The implant was guided through the template and inserted with minimal invasiveness, without complications and as planned. Before wound closure, the implant position was digitally captured using Primescan AC so that the definitive denture, which had been fabricated in the meantime, could be placed during re-entry, three months later, in accordance with the Munich implant concept.

Discussion

I have had an excellent experience with digital implant planning for over ten years, especially due to the precise implementation with a surgical guide. Guides produced by 3D printing have a very high accuracy of fit, are cost-effective and can be sterilized. Patients are very impressed with the digital technology and smooth processes. They feel well taken care of and have no post-operative complaints.



Dr. Gerd Frahsek
Velbert, Germany



Before: Initial oral situation



Usage: 3D-printed surgical guide with
Primeprint Guide material



After: 3D-printed temporary restoration
with Primeprint Temp material (left) and
final restoration (right)

Case Description in Pictures

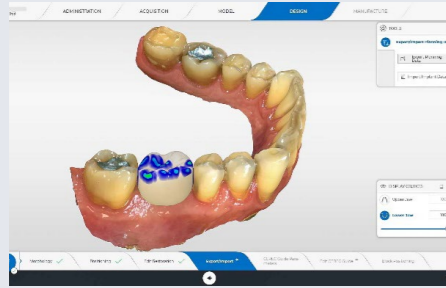


Fig 1: Impression with Primescan, 3D model including prosthetic proposal for restoration of tooth #30 in CEREC SW 5.2.

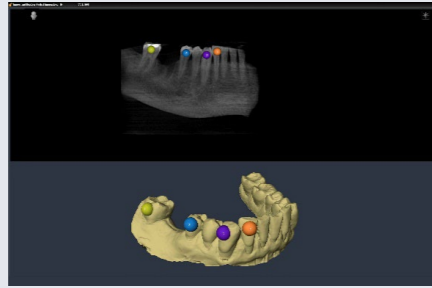


Fig. 2: Matching of model data and CBCT in the SICAT SW



Fig. 3: Treatment planning including selection of the implant



Fig 10: Design of the final restoration in the inLab SW 22



Fig. 11: Abutment made of Cercon ht ML und crown made of Cercon xt ML

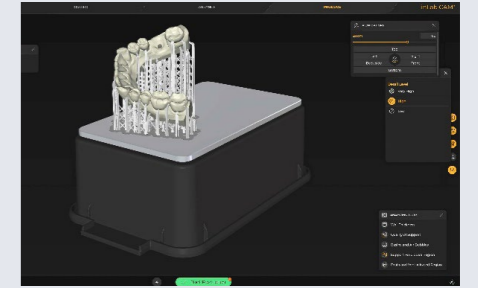


Fig 12: Preparation of printing the model with Primeprint Solution in inLab CAM 22

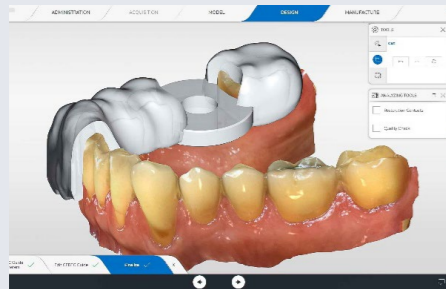


Fig. 4: Design of the surgical guide in CEREC SW 5.2



Fig 5: Printed surgical guide with inspection window



Fig 6: Accurate fit of the surgical guide on the teeth for stabilization



Fig 13: Final crown after bonding of abutment and TiBase on printed model

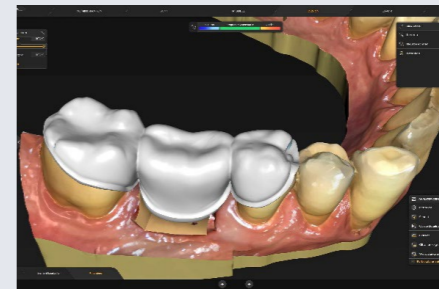


Fig 14: Design of the insertion tool for the abutment



Fig 15: Preparation of the print job of the insertion tool and a temporary crown (copy of the final crown from Fig. 13) in inLab CAM 22

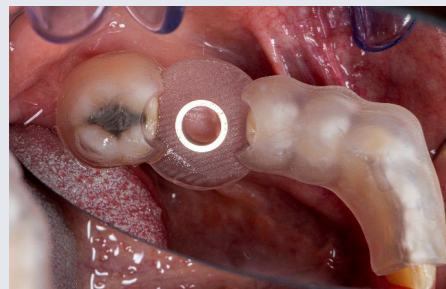


Fig. 7: Mirror image of the occlusal view of the surgical guide

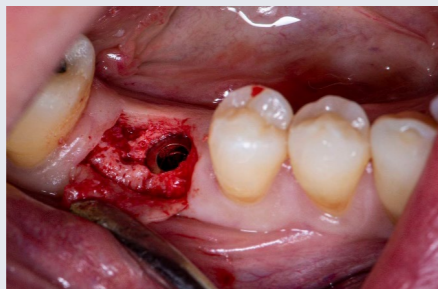


Fig. 8: Accurate drilling and implantation by using the printed surgical guide in the inLab CAM SW 22



Fig 9: Intraoperative digital impression of the implant

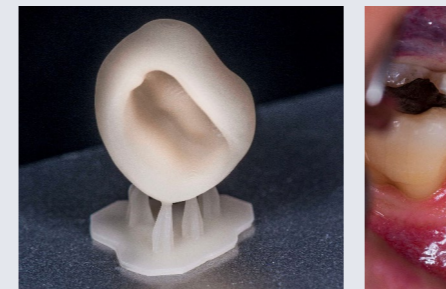


Fig 16: Temporary crown after 3D printing and post-processing for implant uncover restoration



Fig 17: Insertion of the abutment during uncover



Fig. 18: Restoration with 3D-printed temporary crown until the soft tissue heals



Fig. 19: Situation after incorporating the final restoration

3D-printed individual impression tray

Case Description

A highly esthetic, removable denture without visible retaining elements was to be made for a 73-year-old female patient with few remaining teeth who previously wore a cast model denture. She felt unhappy with conventional impressions so far and wanted to avoid them.

The task was to reduce the impressions required to a minimum. The dentist wanted to map the manufacturing process digitally. In this way, both the fabrication of a situation model for the tray and a saw model for the fabrication of the primary telescopes could be avoided.

It was not ideal to complete the entire denture based on the first impression without an intermediate try-in. We needed to a transfer impression over the primary telescopes with an impression tray. Both primaries at #22, #21, #27, #28, #29 and the impression tray could be fabricated using an intraoral scan with the Primescan AC and without the need for a model. The first physical model was already the master model after transfer impression taking.

In this case, we produced the impression tray using the Primeprint 3D printing solution. I received the intraoral scan data via the Connect Case Center, which formed the basis for the impression tray's design in the inLab SW 22. We chose the Primeprint Tray material from Dentsply Sirona to print it. It is currently the only material available on the market, that can be processed via the manufacturing process in the Primeprint Solution, to create a medical product that meets the strict requirements of the German Medical Devices Act (MPG). Primeprint then leads through the complete manufacturing process. This runs almost completely automatically; the few manual operations on the 3D printer itself are simple and safe thanks to the closed Primeprint Box and integrated activated carbon filters. The entire 3D printing process, including post-processing in the Primeprint Post Processing Unit, took just over an hour.

An individual impression tray was produced for the clinician and his patient, in which both names were imprinted to avoid any confusion. This personalized the tray and was characterized by a consistent distance to the gingiva, which allowed for better dosing of the impression material.



Before: Initial situation of a digital model of the patient's mandible



Usage: 3D-printed impression tray on a 3D-printed model, printed with Primeprint Tray and Primeprint Model material

Discussion

The impression tray for the transfer impression could have been conventionally produced with a light-curing material. In this case, the digital solution with Primeprint saved two work steps (situation and saw model production) and cost-effective. With 3D printing technology, we as dental technicians are additionally indicating to our partners in practices that we are focusing on digital manufacturing techniques.



Christian Schuchmann
Darmstadt, Germany

Case Description in Pictures



Fig. 1: Initial situation of a digital model of the patient's mandible

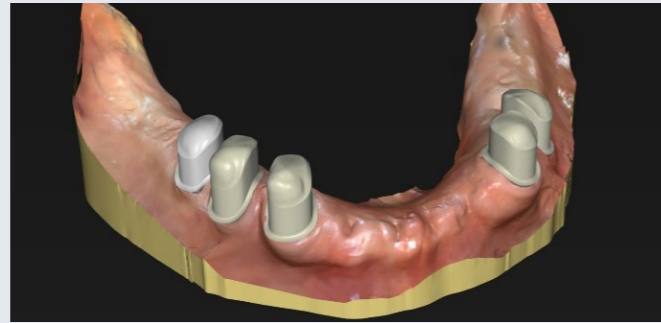


Fig. 2: Finished primary telescopes

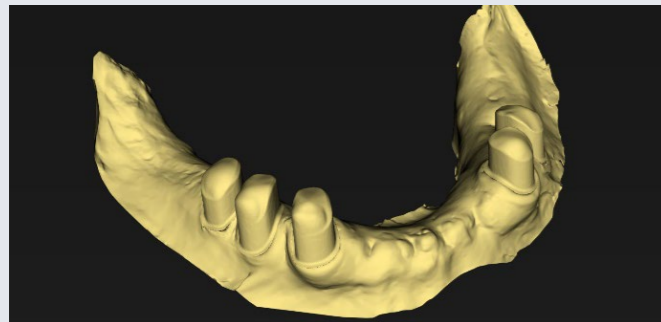


Fig. 3: In order to be able to continue working directly without another scan, the primary telescopes are inserted virtually in inLab CAD.

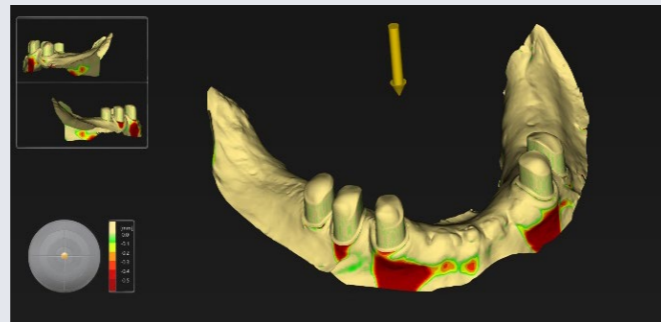


Fig. 4: Defining the insertion direction for the customized tray

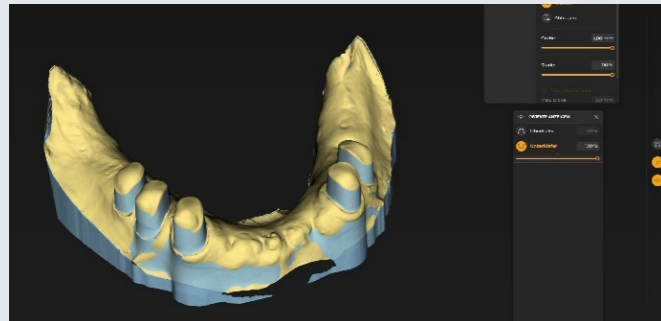


Fig. 5: View of the blocked-out undercuts

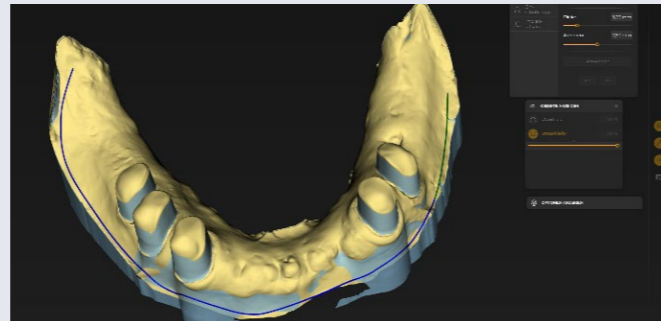


Fig. 6: Drawing of the extension of the impression tray

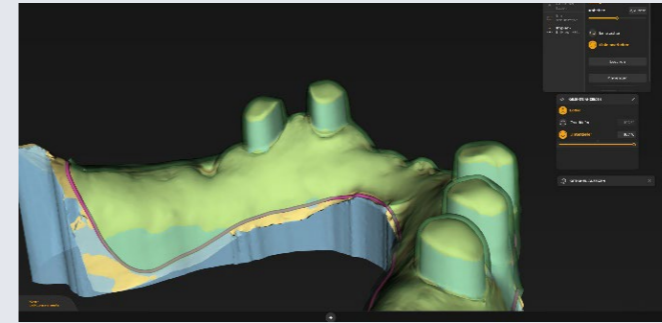


Fig. 7: The distance between the tray and the gingiva or telescopes is set to a minimum. In this way, impression material can be decreased later on.

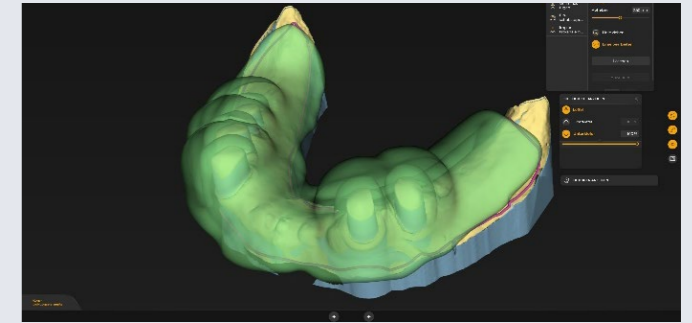


Fig. 8: Initial suggestion of the impression tray



Fig. 9: Positioning the handle

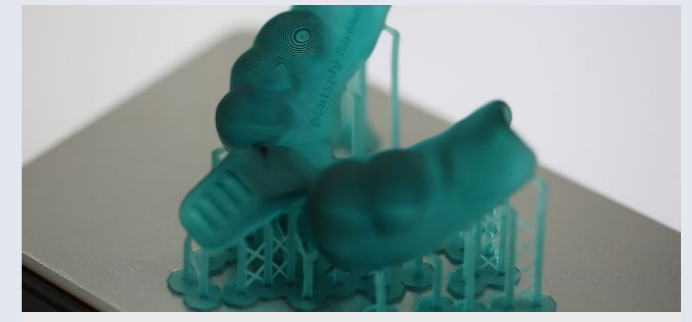


Fig. 10: Print result: customized impression tray after a printing time of only 30 minutes. Post-processing was completed after additional 45 minutes.



Fig. 11a and 11b: Ready-to-use impression tray on the printed model

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