

# 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.



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## Case Description in Pictures



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

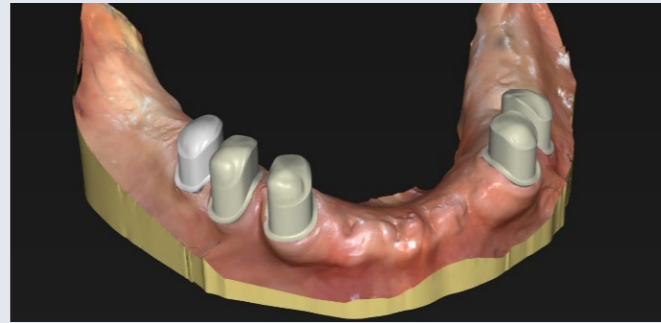


Fig. 2: Finished primary telescopes

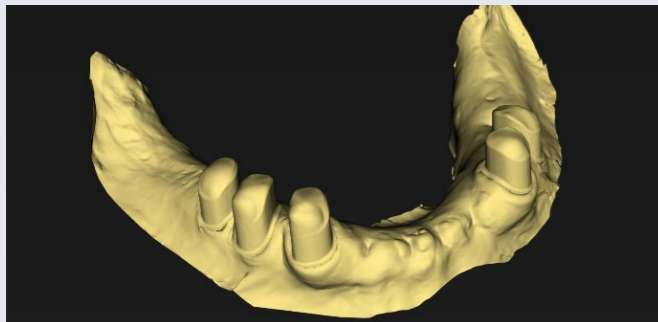


Fig. 3: In order to be able to continue working directly without another scan, the primary telescopes are inserted virtually in inLab CAD.

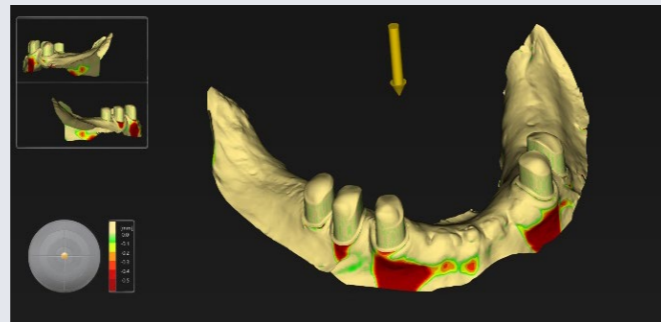


Fig. 4: Defining the insertion direction for the customized tray

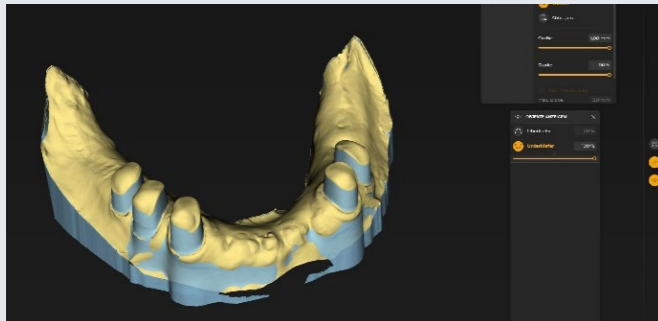


Fig. 5: View of the blocked-out undercuts

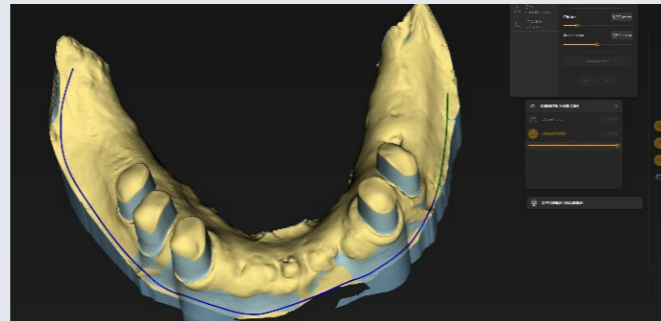


Fig. 6: Drawing of the extension of the impression tray

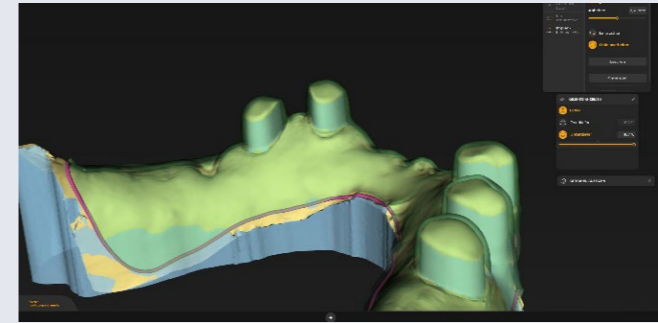


Fig. 7: The distance between the tray and the gingiva or telescopes is set to a minimum. In this way, impression material can be decreased later on.

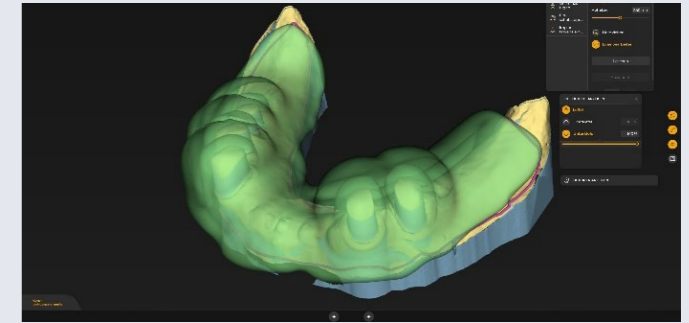


Fig. 8: Initial suggestion of the impression tray



Fig. 9: Positioning the handle

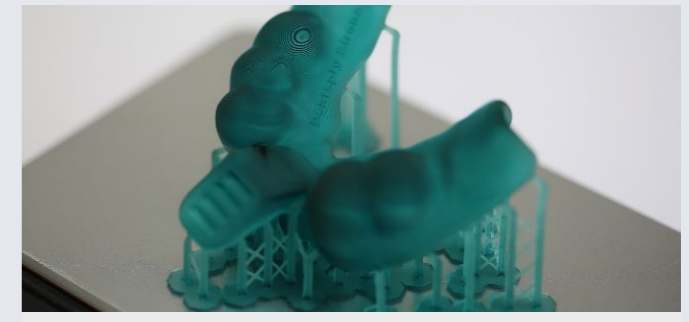


Fig. 10: Print result: customized impression tray after a printing time of only 30 minutes. Post-processing was completed after additional 45 minutes.



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