



The Digital Work-Flow and Model 3D printing in the Production Process of Permanent Restorations on Natural Teeth and Implants.

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Permanent Restorations on Natural Teeth and Implants

Abstract

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Case Report

The patient is a 65-year old woman willing to replace an old crown in metal ceramic on tooth 1.7 and to position a tooth on an implant on 1.6, element she lost due to a caries. In position 1.6 a Zimmer Screw-Vent TSV 3,7-10 mm implant was positioned with a slight sinus lift and with the contextual application of a transmucosal healing cap.

After four months the definitive impression was taken with a 3Shape Color intraoral scanner, by using the correspondent Elos Medtech scan abutment, Accurate 5A-A; at first, impression of the superior and inferior quarter was scanned in standard resolution, lately improved in high resolution on natural 1.7 die and scan abutment in position 1.6. Then the impression was digitally transferred to dental laboratory Digilab in Rome, a 3Shape certified laboratory.

Digilab's dental technicians, Alessio Marsili and Flavio Lico, designed the model (CAD phase) in 3Shape Model Builder software, and produced its master model physically in the Stereolithographic 3D printer by DWS, DW020D, in resin DWS Precisa RD097, specific for highly accurate models.

The model was made with a removable die on 1.7 and with a hole suitable for a digital analog correspondent to Zimmer implant by Medtech Elos Accurate: Model Analog MA-ZSV35-1.

The following prosthetic components were milled: two crowns in integral Zirconia, two PMMA provisional crowns and a Titanium customized abutment.



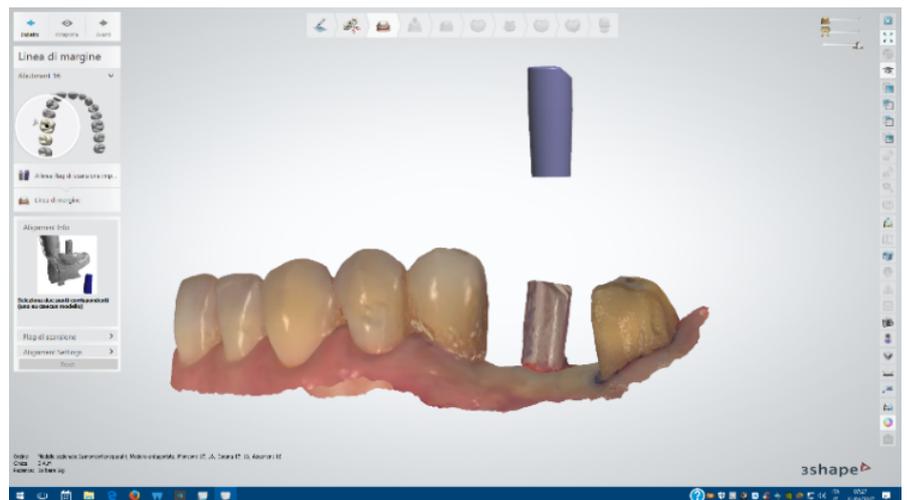
Picture 1: Initial situation, vestibular view.



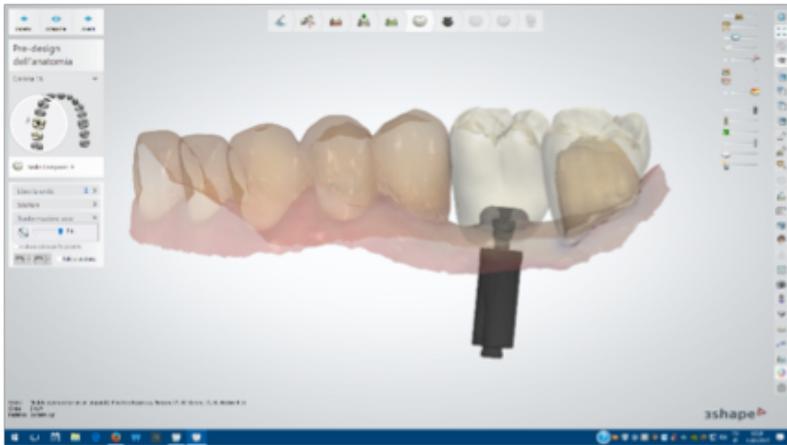
Picture 2: Initial situation, palatal view.



Picture 3: Trios Color File in 3Shape Model Builder CAD software with healing screw cap.

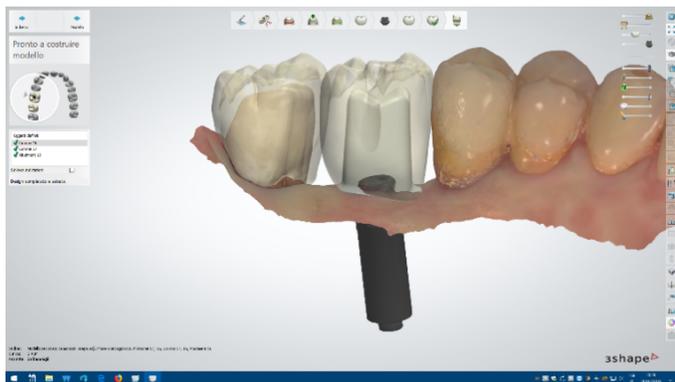


Picture 4: Trios Color File in 3Shape Model Builder CAD software identifying Elos Medtech scan abutment.



Picture 5: Positioning of Elos digital analog for Zimmer Screw-Vent 3,7 in 3Shape Model Builder CAD software.

Picture 6: Medtech Elos MA-ZSV35-1 digital analog to be positioned in the model.



Picture 7: On CAD, dental technician contemporarily designed the customized abutment and the two models to be printed.



Picture 8: CAD allowed the view of the different components of the project, in accordance with the requirements. In this picture, dental technician made the impression scanned by the dentist invisible.



Picture 9: Superior and inferior quarter printed with DWS PRECISA RD097, specific for highly accurate models and in 3D printer DWS DW020D.



Picture 10: Detail of the inserted digital analog and of the already positioned removable die.



Picture 11: Detail of the superior quarter with the removed die.



Picture 12: Job completed at the laboratory.



Picture 13: Finished job with restorations applied, vestibular view.



Picture 14: Finished job with restorations applied, palatal view.

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Conclusions

The use of a high quality and highly precise 3D printer and of specific resins allowed the operators to overcome those that are deemed to be the major difficulties of this technology, that is getting, at the same time, a stable and reproducible die and digital analog inside the respective sites, together with the possibility to repeatedly remove both the die and the analog without deforming them.

Thanks to DWS proprietary softwares, Nauta Plus and Fictor, operators have the possibility to widely customize production parameters of the models' components: the removable dies and the holes for the dies and for the digital analogs. This allows adapting the production of the 3D printers to the files obtained by different intraoral scanners by different producers.

The pictures of the mouth of the patient show a loyal correspondence of the prototyped model to clinic reality with a complete satisfaction of both the dentist and the patient.

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Materials

- 3Shape Color Intraoral Scanner
- Zimmer Screw-Vent Implant
- Elos Medtech Accurate 5A-A Scan Abutment
- Elos Medtech MA-ZSV35-1 Digital Analog
- DWS 3D Printer - DW020D
- Resin DWS - PRECISA RD097
- Provisional Crowns in PMMA
- Permanent Crowns in Integral Zirconia

Contacts and Websites

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3Shape	www.3shape.com
Elos Medtech	www.elosmedtech.com
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