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Full-arch **monolithic restoration** on six implants using a completely digital approach



Solutions featured:

3Shape TRIOS® 3 intraoral scanner
3Shape Implant Studio

Case information

The 45-year old patient described in this report had his maxilla restored previously with a full-arch metal-ceramic bridge on 6 implants using a completely digital approach. The restoration of the patient's mandible is presented in the current report.

This report for the patient's maxilla case can be found at - <https://www.3shape.com/en/case-studies>



Fig. 1

Treatment Plan

The initial situation twelve months following completion of the maxillary restoration is shown in figure 1.

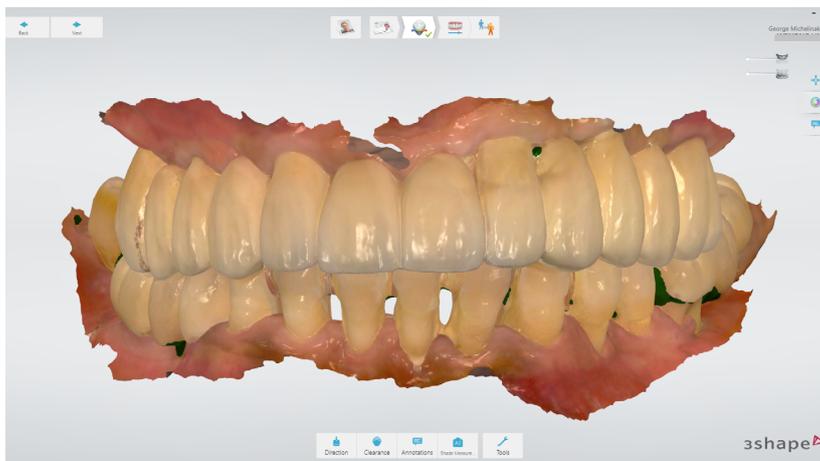


Fig. 2

At consultation, the patient underwent an initial scan with the 3Shape TRIOS 3 intraoral scanner (figure 2).

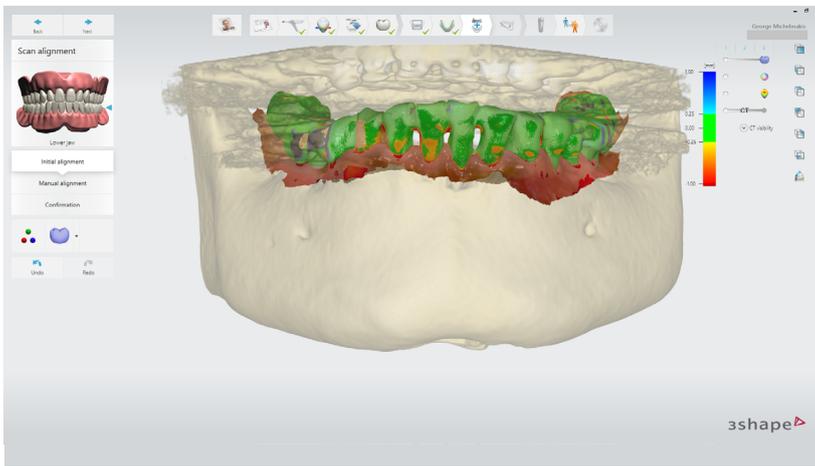
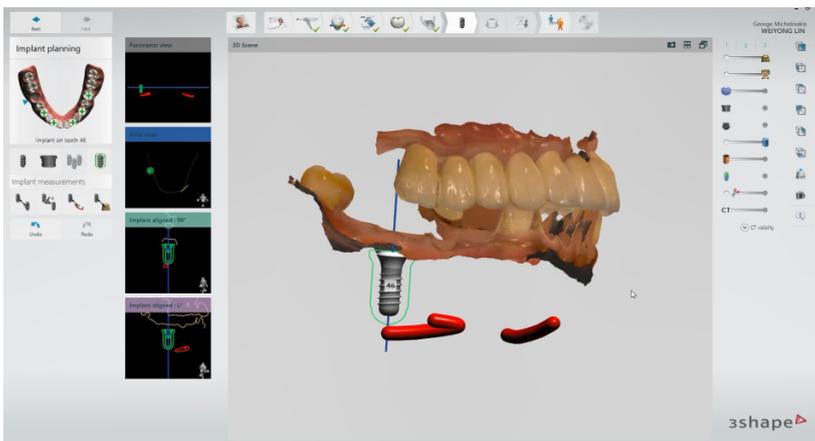


Fig. 3a

The maxillary and mandibular full-arch scans were inserted into 3Shape Implant Studio (implant planning software) and accurately merged with the patient's CBCT scan (figure 3a).



Following careful evaluation, hopeless teeth were virtually extracted using the software's appropriate function and four strategic teeth were maintained to support a provisional restoration.

At this stage, implant placement was also planned (figures 3b and 3c).

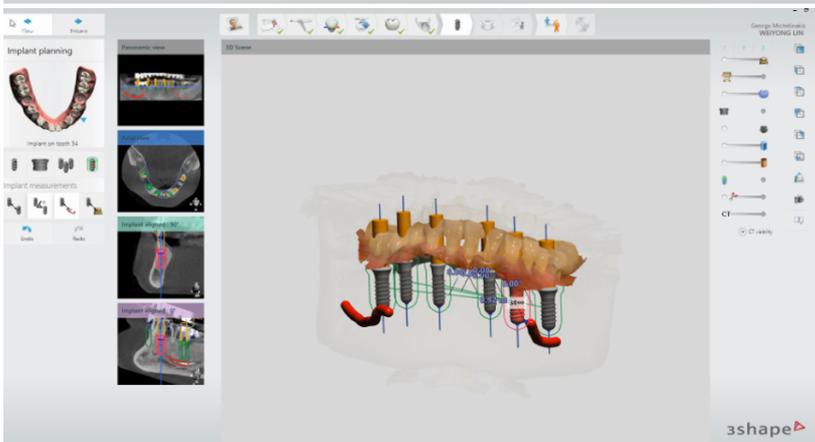


Fig. 3b

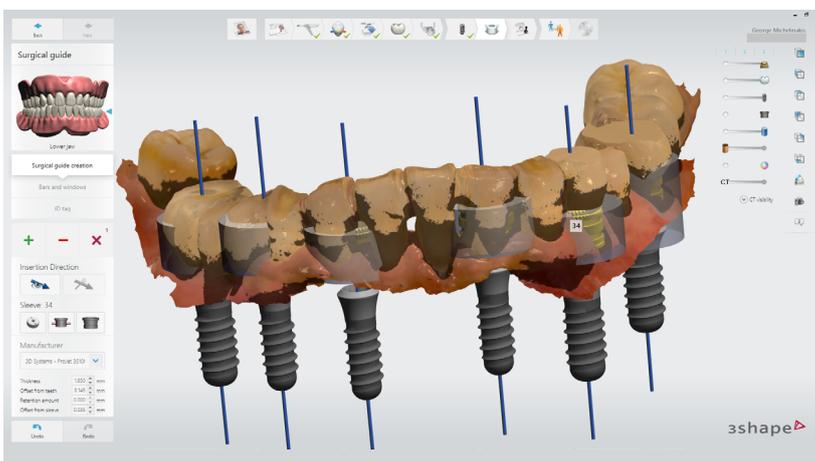


Fig. 3c

Full-arch monolithic restoration on six implants using a completely digital approach



Fig. 4

A PMMA prototype was designed and milled (figure 4).



Fig. 5

Next, hopeless teeth were extracted and the strategically kept canines and third molars bilaterally were prepared and the prototype was relined and fitted (figure 5).



Fig. 6

Following socket healing, a tooth-supported surgical stent was designed according to the virtual implant positions and another PMMA prototype was prepared and milled for immediate implant loading (figure 6).



Fig. 7

Six Straumann RN TL 4.1x10mm implants were inserted (figure 7). Titanium temporary cylinders were secured onto the implants and the prototype was connected to them with flow resin (figure 8).



Fig. 8



Fig. 9

Healing progressed uneventfully. Figure 9 shows the PMMA prototype in situ 2 weeks post-placement.



Fig. 10

Figure 10 depicts a panoramic x-ray at 3 months after implant placement. The PMMA prototype was removed and excellent soft tissue healing was verified.

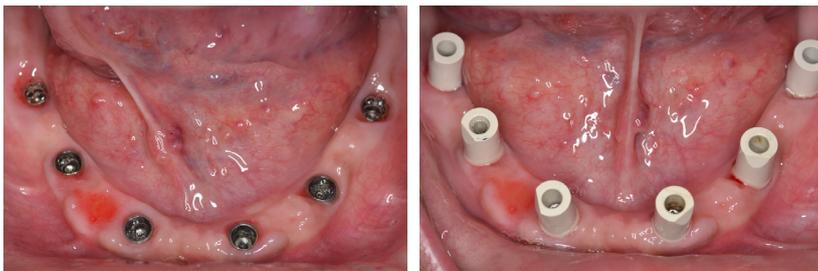


Fig. 11

Implant scan bodies (Straumann Cares Mono) were hand-screwed onto the implants (figure 11).



Fig. 12

A full-arch digital intraoral scan was performed using the TRIOS 3 intraoral scanner (figure 12).

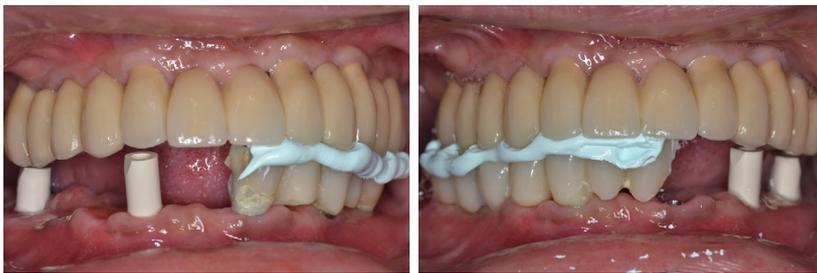


Fig. 13

The PMMA prototype was sectioned in half and the bilateral digital centric occlusion was obtained as shown in figure 13.

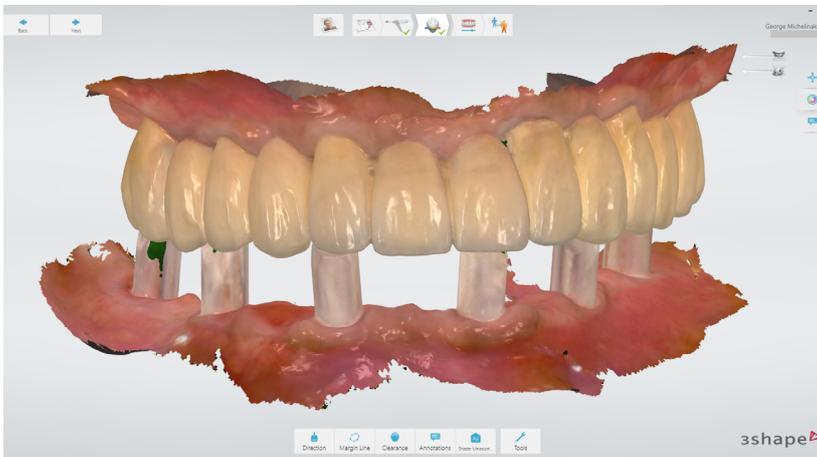


Fig. 14

Finalized digital articulation of the maxilla and mandible is shown in figure 14.

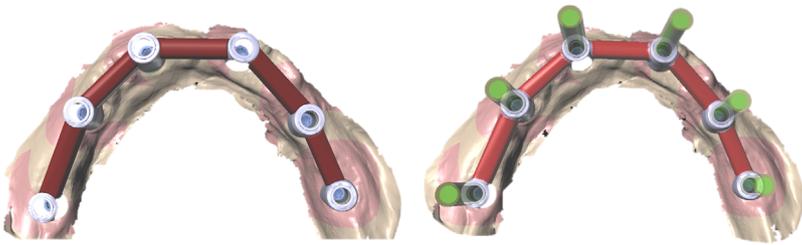


Fig. 15

To verify the accuracy of the intraoral impression, a trial bar on the six implants was designed (figure 15) and 3d-printed in Co-Cr alloy using Selective Laser Melting (SLM) technique.

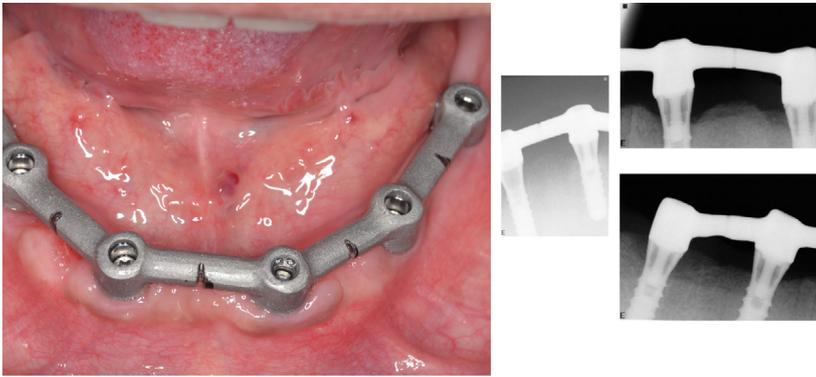


Fig. 16

The bar was secured onto the implants and perfect fit was verified radiographically (figure 16).



Fig. 17

Following this, a final PMMA prototype was this time 3d-printed (figure 17). This prototype served to verify functional and aesthetic parameters and also allow for any adjustments prior to the fabrication of the final restoration.

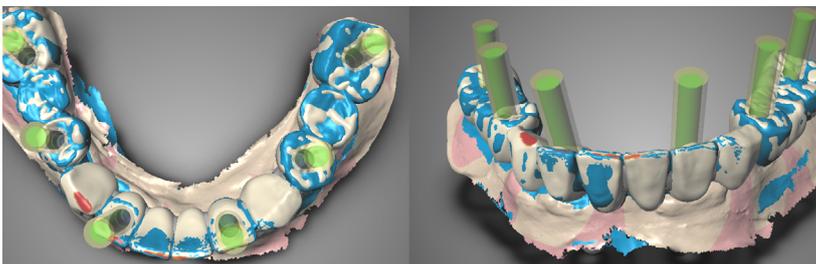


Fig. 18

The finalized prototype was then scanned intraorally and merged with the initial implant digital impression in the laboratory software to produce the design for the final monolithic restoration (figure 18).



Fig. 19

A zirconia monolithic full-arch restoration was milled from a disk and stained and Straumann Variobase cylindrical abutments were cemented (figure 19).



Fig. 20

Figure 20 shows the final panoramic x-ray view verifying the perfect fit of the prosthesis onto the implants.



Fig. 21

The final result (figure 21).

Conclusion

The clinical benefit of this fully digital approach was that the patient did not undergo any time consuming and uncomfortable conventional impression procedures and was fitted with a series of pre-prepared PMMA fixed restorations (transition solution) designed digitally and readily available to the clinician before each clinical step.

The benefit for the patient was the final result was a monolithic high-strength, aesthetic zirconia restoration with excellent clinical fit due to the high accuracy intraoral scanning procedure using the 3Shape TRIOS 3 intraoral scanner.

Finally, the benefit of this fully digital (model-free) approach for the laboratory was time efficiency and accuracy of fit for the prepared restoration.

About Dr. George Michelinakis

Dr. Michelinakis was awarded the Degree of Dental Science (DDS) by the National and Kapodistrian University of Athens, Faculty of Dentistry in 1999. He completed his 3-year training programme in the specialty of Prosthodontics at the University of Manchester Dental School and Hospital UK (2001-2004) and was awarded an MSc (2003) and an MPhil (2005) in Fixed and Removable Prosthodontics.

Since 2004 he maintains a private practice in Heraklion, Crete specializing in Prosthodontics and Implant Dentistry.

He is a recognized specialist in Prosthodontics by the European Prosthodontic Association. He has published in both English and Greek peer-reviewed dental journals and has lectured in numerous national and international conferences.

His awards include third place in the 2008 NHS North West innovation awards for the Implant Recognition System and a best oral presentation award at the 2018 conference of the European Prosthodontic Association for his research on intraoral digital impression systems.

About 3Shape

3Shape is changing dentistry together with dental professionals across the world by developing innovations that provide superior dental care for patients. Our portfolio of 3D scanners and CAD/CAM software solutions for the dental industry includes the multiple award-winning 3Shape TRIOS® intraoral scanner, the upcoming 3Shape X1® CBCT scanner, as well as market-leading scanning and design software solutions for both dental practices and labs.

Two graduate students founded 3Shape in Denmark's capital in the year 2000. Today, 3Shape has over 1,500 employees serving customers in over 100 countries from 3Shape offices around the world. 3Shape's products and innovations continue to challenge traditional methods, enabling dental professionals to treat more patients more effectively. www.3shape.com

Let's change dentistry together

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