Dr. George Michelinakis, DDS, MSc, MPhil, cert (Pros)
Heraklion, Crete, Greece

Maxillary restoration with full arch fixed prosthesis on six implants

Solutions featured:

3Shape TRIOS 3 intraoral scanner

3shape

Fig. 1

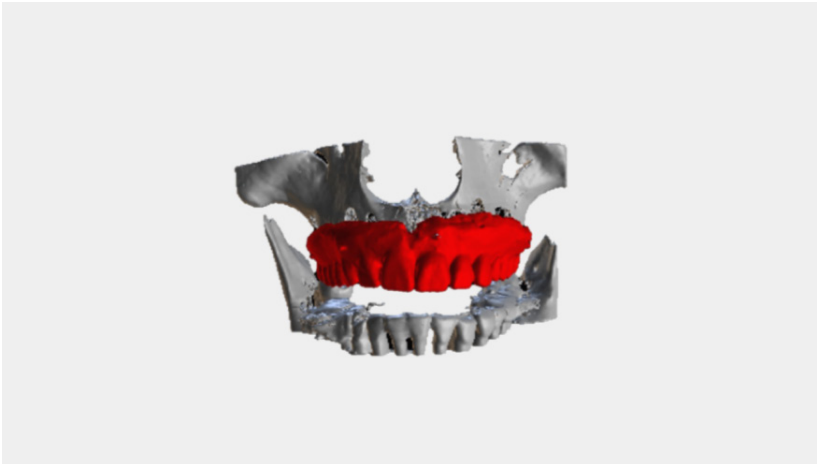

Fig. 2

Case information

A 44-year old male patient, described in this report, had previously undergone extraction of all upper teeth and was restored with an immediate full denture at the correct OVD and occlusal relation. His mandible was fully dentate and all the remaining teeth had undergone non-surgical periodontal treatment and were periodontally stable. Following the appropriate healing period, a decision to restore the maxilla with a full-arch fixed prosthesis on six implants was taken. Radiolucent cone beam markers were attached to the patient's existing complete upper denture which was then scanned with a ProMax 3D Mid CBCT appliance. The patient was also scanned in the same CBCT appliance with the denture in situ. The denture scan was aligned to the maxillary CBCT scan to allow for prosthetically driven implant planning. (Fig. 1 and 2)

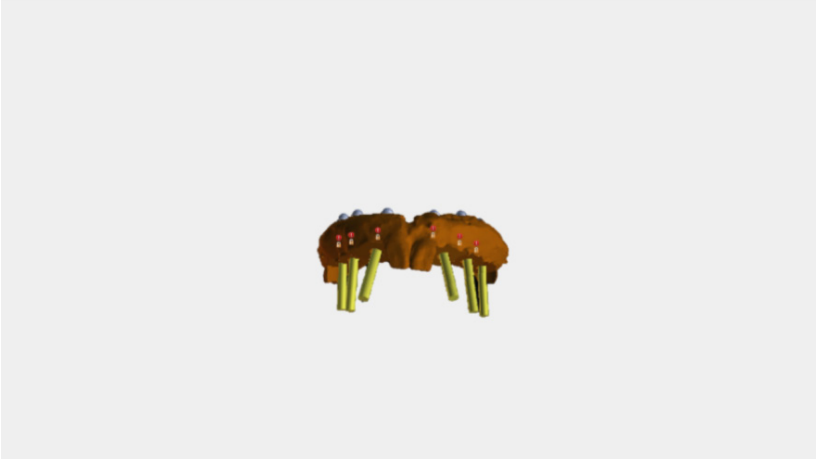

Fig. 3

Implant placement simulation was carried out in the software and a pilot-guide surgical stent was designed and printed in a desktop 3D printer using PolyLite PLA material. (Fig. 3)

Fig. 4

In order to facilitate correct implant placement, all teeth were removed from the surgical guide during the design process with the exception of the 2 central incisors and the 2 first molars. (Fig. 4) These 4 teeth were strategically kept to maintain the established OVD at closure.

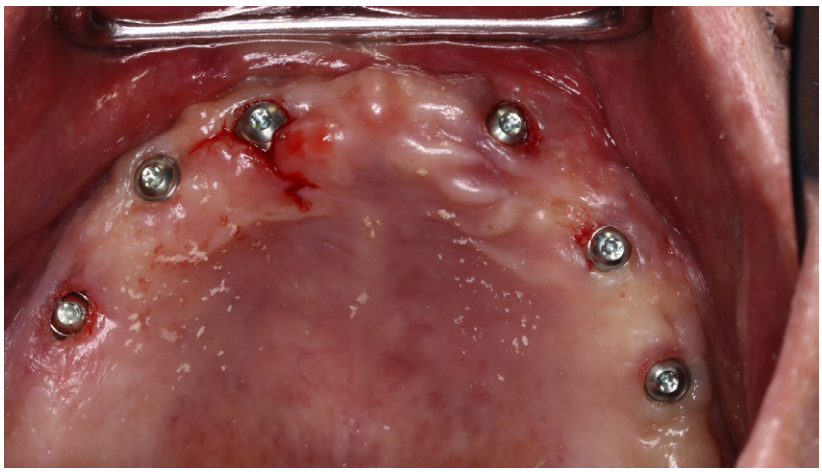

Fig. 5

Following surgical stent fabrication, six Straumann STL RN implants were inserted in the maxilla using a flapless approach. (Fig. 5)

Fig. 6

During the procedure, the surgical guide was firmly stabilized with finger pressure on the palate. After implant placement, the maxillary denture was relined with Viscogel and delivered back to the patient with instructions on oral hygiene and diet. (Fig. 6)

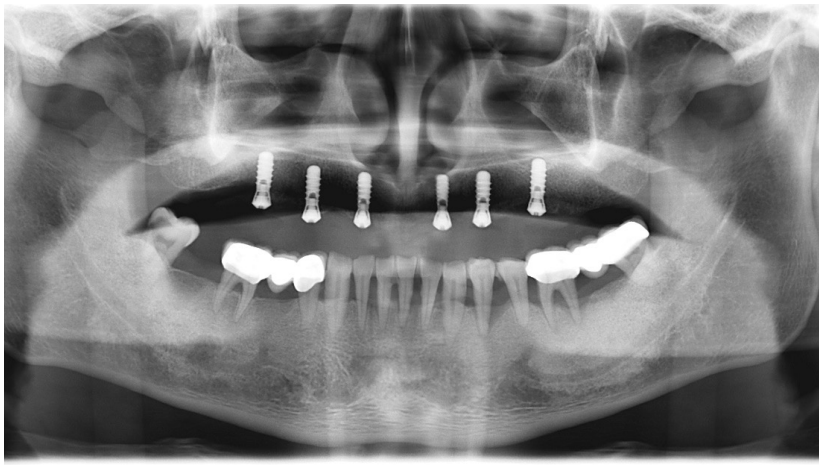

Fig. 7

A post-surgical panoramic x-ray was obtained. (Fig. 7)

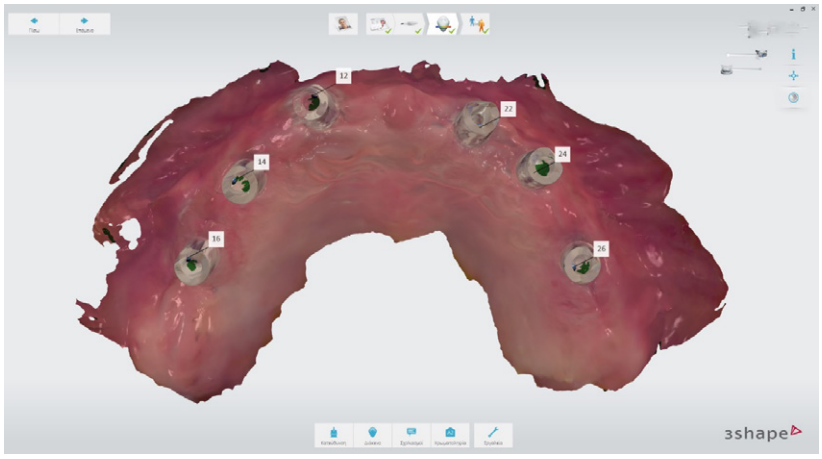

Fig. 8

Following 4 months of healing, intraoral scan bodies (Straumann CARES Mono) were hand-tightened on the implants with the angled surfaces facing buccally according to manufacturer's instructions and an intraoral digital impression of the maxillary arch was acquired using the 3Shape TRIOS 3 intraoral scanner following the official scan strategy as suggested by the manufacturer. A mandibular digital impression was also obtained. (Fig. 8)

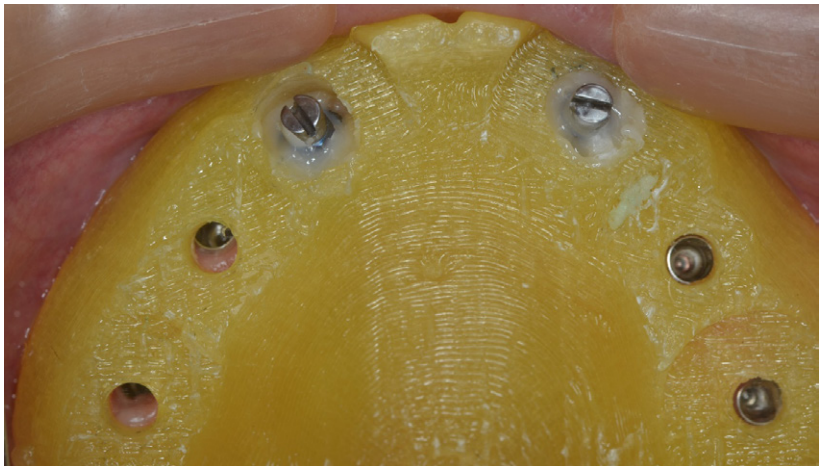

Fig. 9

To register the OVD already established with the immediate denture, the metal inserts were removed from the stent and the surgical guide was secured on the mesial implants using modified implant carriers and flow resin. (Fig. 9)

Fig. 10

The preserved central incisors on the stent served as anterior stoppage for the correct anterior-posterior position of the mandible and the first molars on the stent helped reproduce the established vertical dimension of occlusion. Although the mesial portion of the molars had been removed from the stent to facilitate implant placement, the distal portion of the teeth was adequate in preserving the correct OVD. To aid in this process, bite registration material (Prestige Bite, Vanini, Italy) was used to further stabilize the centric relation (CR) at the established OVD. (Fig. 10)

Fig. 11

Fig. 12

Following OVD recording, the guide was sectioned in half along the midline. Each half was firmly kept in place with the aid of the corresponding implant carrier and bite registration material in closure and used interchangeably together with the scanbodies of the contralateral side to register the bite using the intraoral scanner's bite registration module and the scan strategy suggested by 3Shape. (Fig. 11 and 12)

Fig. 13

The complete digital bite registration was finalized in the IOS software (Fig. 13) and the case was inserted in a CAD design software. (Fig. 14)

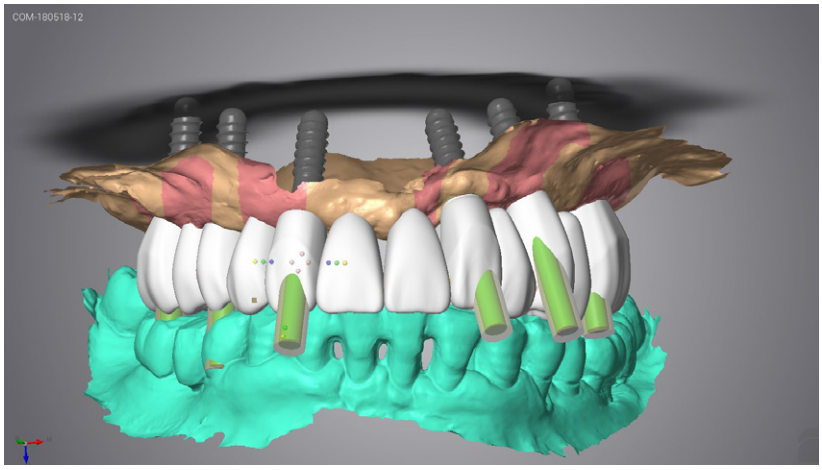

Fig. 14

Fig. 15

A milled PMMA prototype was constructed and used for the verification of anterior aesthetics and the minor adjustments in the established OVD and CR were finalized using a bite registration material. (Fig. 15)

Fig. 16

A full-arch cement retained metal-ceramic restoration on Straumann synOcta abutments was finally fitted. (Fig. 16)

Conclusion

The clinical benefits from this approach was that the patient did not undergo a full arch conventional impression in the maxilla or the mandible and also his occlusal parameters were digitally registered in high accuracy. Digital impression and bite registration were completed in only one appointment, one of IOS's great merits, shortening the treatment time by at least 2 clinical sessions.

The benefit for the patient himself was that the digital scan of the maxillary implants was both accurate and comfortable and also there was no use of rigid impression material in the lower jaw that could have resulted in tooth engagement or movement of the periodontally compromised mandibular dentition.

Finally, the lab was able to digitally design the final prosthesis in detail, leading to a predictable and both functional and esthetic result.

This case can also be found in the International Journal of Implant Dentistry.

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 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 employees serve 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.

Let's change dentistry together

www.3shape.com

3shape