

Dr. Anthony Mak
W Dental

3Shape TRIOS Implant Scanning



Solutions featured:

3Shape TRIOS
3Shape scan bodies
3Shape Dental System

Background

Digital technologies in the field of implantology have paved the way for simplified and predictable protocols for the treatment planning, surgical placement and prosthetic implant rehabilitation in an interdisciplinary approach.

In this case study, we highlight how we can use the TRIOS intraoral scanner and 3Shape scan bodies to provide a fast, easy and accurate acquisition of the digital fixture level impression. And after, seamlessly transfer the digital data/information to 3Shape Dental System software for the design process of the final restoration.

Case Information

This case study describes a prosthodontic restoration of the lower right first premolar (#44) with a screw-retained implant supported crown. Planning was driven by TRIOS implant scanning, software and 3Shape scan bodies.



Fig. 1

Clinical Phase of Treatment (master digital fixture level impression)

Upon completion of the 8-12 week post-surgery healing phase and the integration of the fixture, a master digital impression using the TRIOS implant scan strategy was performed.

In this scan strategy, the following sequence of digital scans were taken:

1. A pre-preparation scan with the healing abutment in situ.
2. An emergence profile scan which was taken immediately after the healing abutment was removed to record gingival contours around the implant before any collapse of the tissues.
3. The scan body scan.

Shade image prior to intraoral 3Shape TRIOS surface scan. (Fig. 1)



Fig. 2 (i)

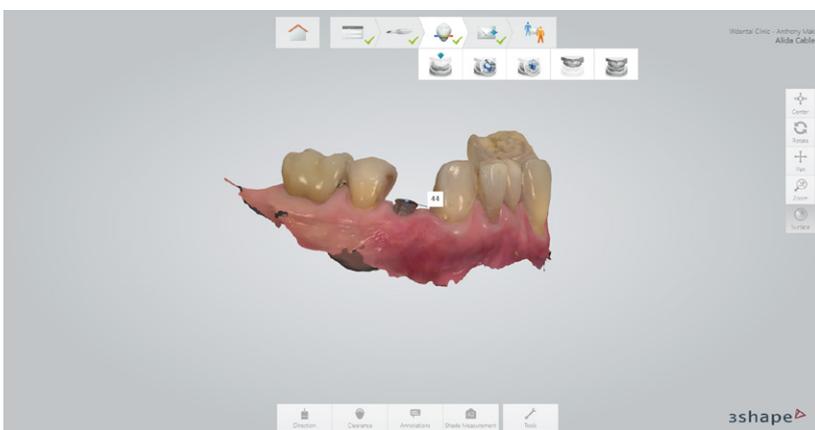


Fig. 2 (ii)

Pre-preparation scan with healing abutment in situ. (Fig. 2 i-ii)



Fig. 3 (i)

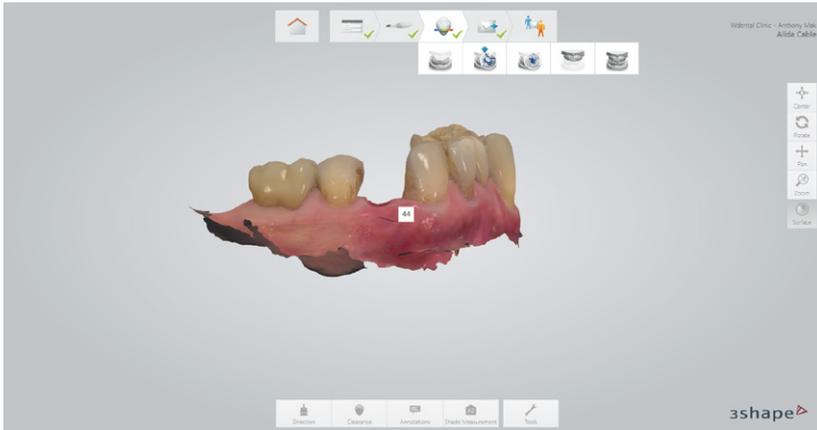


Fig. 3 (ii)

An emergence profile scan which was taken immediately after the healing abutment was removed to record gingival contour around the implant before any collapse of the tissues. (Fig. 3 i-ii)



Fig. 4 (i)

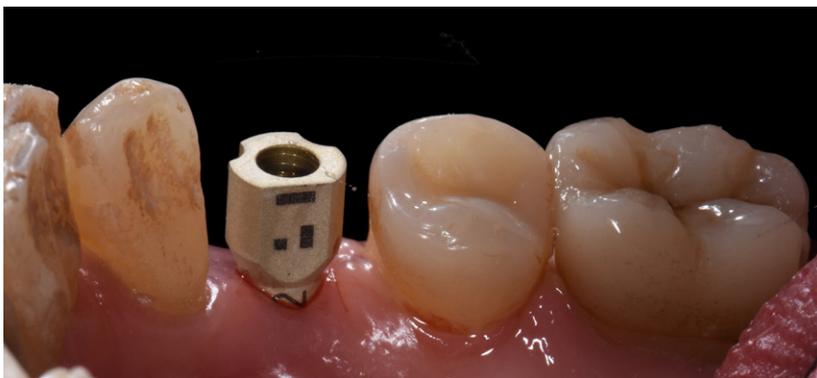


Fig. 4 (ii)

3Shape scan body positioned and screwed into position. Fig. (Fig. 4 i-iii)



Fig. 4 (iii)

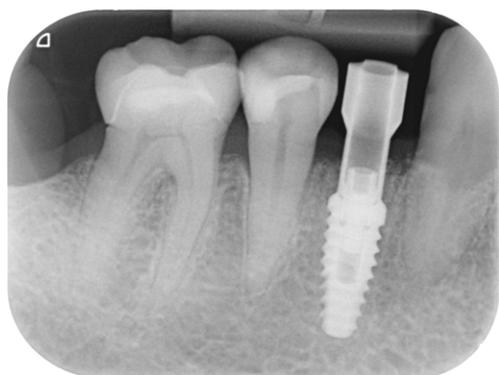


Fig. 5

Periapical radiograph confirming the seat of the scan body. (Fig. 5)



Fig. 6 (i)

The scan body scan digitally capturing the position and orientation of the implant fixture. (Fig. 6 i-v)



Fig. 6 (ii)



Fig. 6 (iii)



Fig. 6 (iv)



Fig. 6 (v)

All other prosthodontic records including the bite registration and the opposing arch were also captured with the intraoral scanner. All the digital data was then sent to the ceramist through the 3Shape Communicate portal for the fabrication of the screw-retained crown.



Fig. 7



Fig. 8



Fig. 9 (i)



Fig. 9 (ii)

Laboratory fabrication of the final prosthesis

A direct access screw-retained crown (Lithium Disilicate crown to a zirconia abutment with a titanium interface) was then fabricated and the contact and occlusion verified by means of printed models.

The completed prosthesis was then sent back for the restoration to be inserted.

Laboratory fabrication of the final prosthesis

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The completed prosthesis was then sent back for the restoration to be inserted.

Final screw-retained restoration inserted.
(Fig. 9 i-ii)



Final peri-apical radiograph of completed implant retained restoration on the lower right first premolar (tooth 44). (Fig. 10)

Fig. 10

Conclusions

Digital Implant Scans

Digital implant impressions constitute a major role in the development of the full digital workflow for fixed implant prosthetic restorations (Christensen 2009).

Intraoral scan bodies have been developed for most major implant brands that facilitate the transfer of the implant specifics, position and alignment by scanning and transfer of this information to the laboratory CAD software.

Once received in the CAD software, 3Shape Dental System, the corresponding abutment library is matched to allow the dental technician to design the implant prosthesis and manufacture the abutment and crown.

However, traditionally each company manufactures a specific scan body for their own digital library and this has on many occasions created problems between the clinical team and the dental laboratory fabricating the implant prosthesis.

The common problem is when dentists and technicians are not in harmony and do not have the same clinical and laboratory parts and information to put the digital pieces of the puzzle together.

An example is when a dentist scans an implant fixture with one type of scan body and then sends it to a laboratory that may not have all the information, parts (e.g. implant analog) or access to the library of that scan body.

This has been challenging and has made clear communication with the dental technician prior to implant scanning of a case crucial. Especially in the final design and manufacture of the prosthesis.

3Shape has solved this with their universal scan body that will marry up all original and third-party implant libraries that they collaborate with. This has allowed for much simpler system, whereby one scan body can be used with multiple implant abutment libraries in the laboratory lab software 3Shape Dental System.

This is a world first that has eliminated many of the limitations and boundaries for both the clinical and laboratory team in this field of dentistry.

Most importantly, it has made digital implant prosthetics more "Open Sourced" as the libraries in 3Shape Dental System is available at no additional cost to the user.



Fig. 11 (i)



Fig. 11 (ii)

The benefits of 3Shape scan bodies according to Dr. Mak

3Shape Scan Bodies provide the following benefits in simplifying the digital implant impression process:

- **Auto-recognition of implant system and connection.**

The new 3Shape scan bodies feature a unique ID code to determine the implant system and connection. When scanned with the 3Shape TRIOS intraoral scanner, the software will detect and read the ID code on the scan body and automatically fill out the order form with the correct implant system and connection.

This feature is currently in beta and will be released with a TRIOS upgrade in 2019.

- **The scan bodies are manufactured from titanium, highly durable and autoclavable.**

Scan bodies can be used up to 100 times if proper care and cleaning has been maintained between each use. Since they are made from titanium, the 3Shape scan bodies will not bend or deform if you over-tighten the screw. Most other scan bodies are made from PEEK, which is a softer material that can be more prone to bending. Once a scan body is bent, the alignment will be off, which will result in errors in the final restoration design.

- **Visible in clinical X-rays to confirm fit to implant.**

It is vital to be able to see the implant scan body connecting accurately with the implant fixture

- **One piece, one material manufacture**

Allows for optimal accuracy and minimizes tolerance issues if different materials are used and need to be “assembled” together in a scan body.

This article was co-written with Dr Andrew Chio, Melbourne Australia. Many thanks for his support and input.

About Dr. Anthony Mak

Dr Anthony Mak graduated with multiple awards from the University of Sydney in 2002. He then went on to complete his Post Graduate Diploma in Clinical Dentistry (Oral Implants).

Dr Mak is a much sought-after speaker, especially in the field of digital and restorative dentistry. He has lectured extensively in Australia, New Zealand and across Asia; and his hands-on workshops have gained such popularity that they are almost always booked out soon after registrations open. He is also gaining great popularity on the International circuit.

Anthony is the author of two compelling compendiums detailing direct composite and indirect ceramic restorations, the clinical photography and documentations can only be described as exceptional. He has published numerous case studies and articles for local and international dental bodies and associations.

Anthony's interest lies in dental technologies, advances in materials and techniques; and he has a unique understanding of CAD-CAM digital dentistry.

Anthony runs two practices in metropolitan Sydney, focusing on quality modern comprehensive care, including implant dentistry. He is also a clinical consultant and key opinion leader for several global dental companies focusing on development of new dental technologies.

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

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