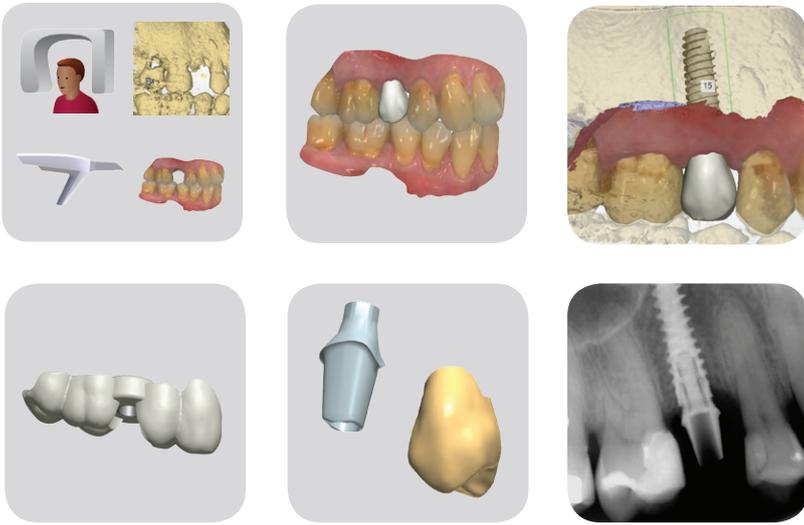


Benefits of guided surgery and the digital workflow



Solutions featured:

3Shape TRIOS
3Shape Dental System
3Shape Implant Studio



Case information

Dr. Tan presents three different types of cases. Each case uses 3Shape Implant Studio and TRIOS intraoral color scans for the implant planning and surgical guide design. The cases range from case no. 1, a replacement of an upper lateral incisor, to case no. 2, a replacement of the upper central incisor teeth and finally, case no. 3, a replacement of teeth #46 and 47.

Each case presented its own inherent challenges while at the same time effectively illustrated the importance of driving the planning and accurate control of the implant planning process using Implant Studio, the TRIOS intraoral scanner, and a CBCT scanner.



The digital implant workflow for Dr. Tan

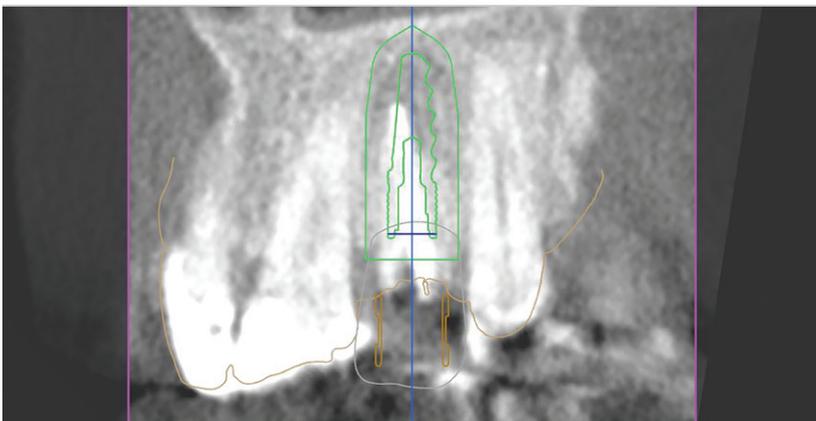
Implant Studio® is used in the following fashion. Initially patient information is entered into the system, then the TRIOS® surface scan and CBCT scan are loaded. The teeth of interest are selected for planning the final restoration shape and corresponding implant location. A surgical guide is designed and fabricated for use at time of surgery and lastly a custom abutment and crown can be made if desired.

Patient 1

Upper lateral incisor replacement

The patient presented to the practice having snapped her upper left lateral incisor (tooth 22) the previous day. The remaining tooth structure had a poor prognosis so it was planned to be placed with an implant supported crown.

A TRIOS 3D surface scan was obtained of the patient and combined in the Implant Studio software to determine the correct implant placement relative to the final crown design.





A surgical guide was then designed and used in the drilling sequence for the dental implant. Accurate guidance allowed for the surgery to be done without raising a flap.



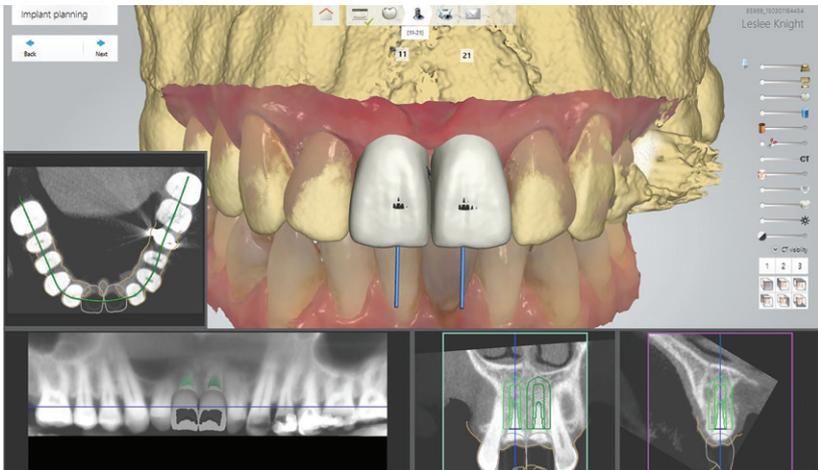
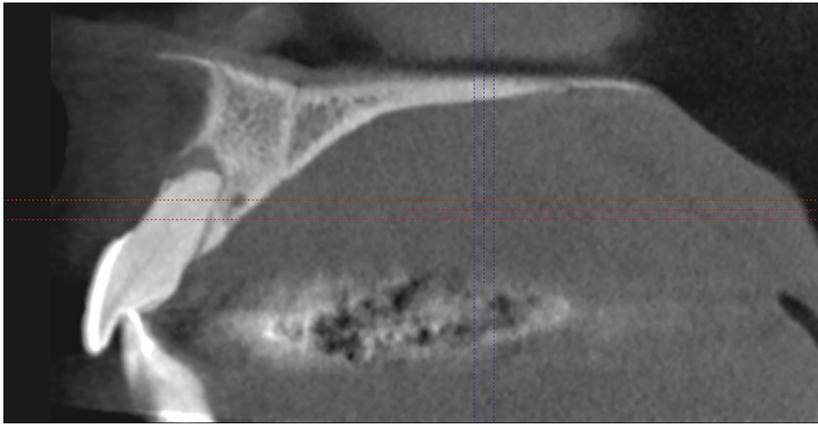
After healing of the hard and soft tissues was complete, an impression was made of the implant and a final restoration was made using a CAD/CAM technology to construct a custom titanium abutment and zirconia based crown.

Given the implant was placed in the correct location and was performed with a minimally invasive manner, the restoration could be made to blend in with the rest of the dentition as well as meet the structural requirements and be retrievable with an abutment screw channel located on the lingual of the restoration.



Patient 2
Upper central incisor teeth replacement

The patient presented with compromised upper central incisor teeth. The teeth had been traumatised over 30 years prior and finally succumbed to pulp necrosis and abscess formation.



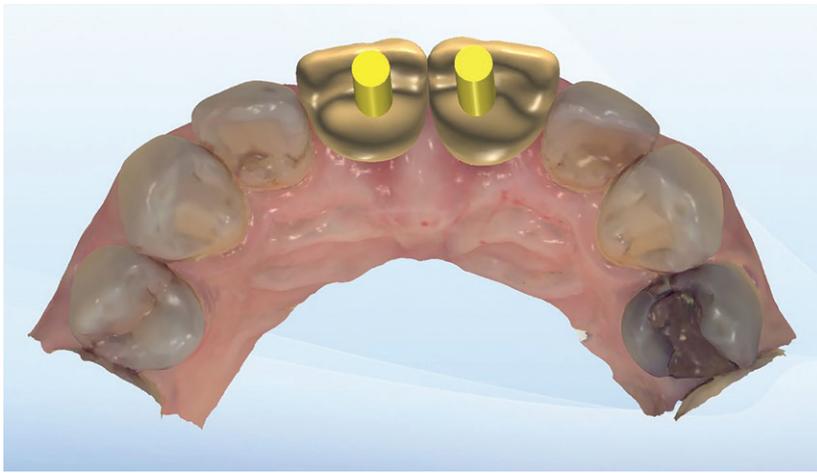
Due to the significant bone loss and presence of a peri-apical infection it was decided to manage the tooth replacement in a staged approach. The teeth were removed and the area debrided before bone grafting was carried out. Only once the bone graft has healed was the a TRIOS scan obtained along with the CBCT. From there the final restoration design was accomplished and used as the reference for appropriate implant placement.



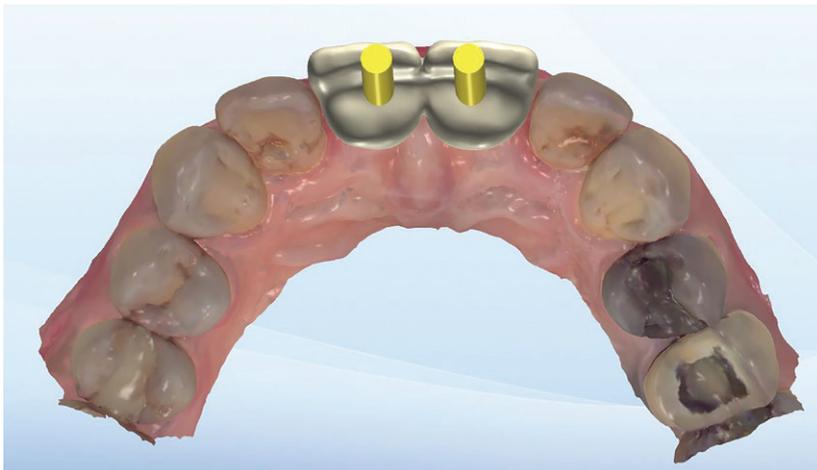
The plan showed that narrow implants were required to each of the 11 and 21 sites and could be angulated to allow for an abutment screw channel on the lingual of the crowns. The surgical guide was fabricated to accept the guided surgery sleeves from Straumann to control all aspects of drilling and implant placement.



Once bony healing was complete restorations were initially made in a provisional material to aid in the sculpture of the soft tissue.



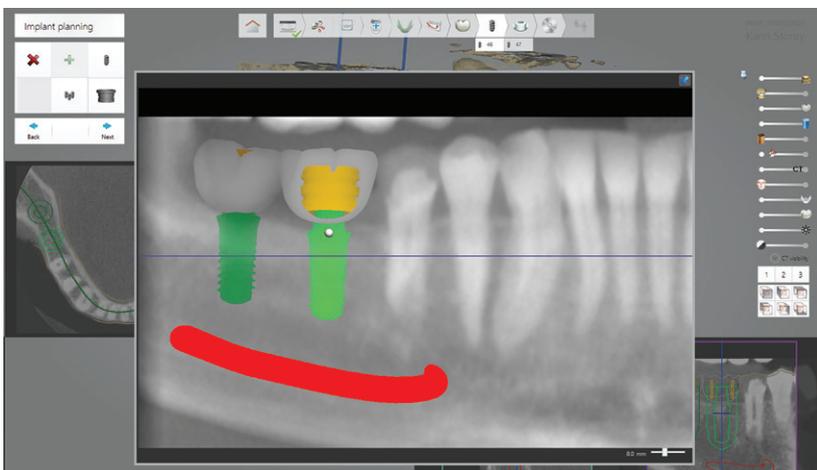
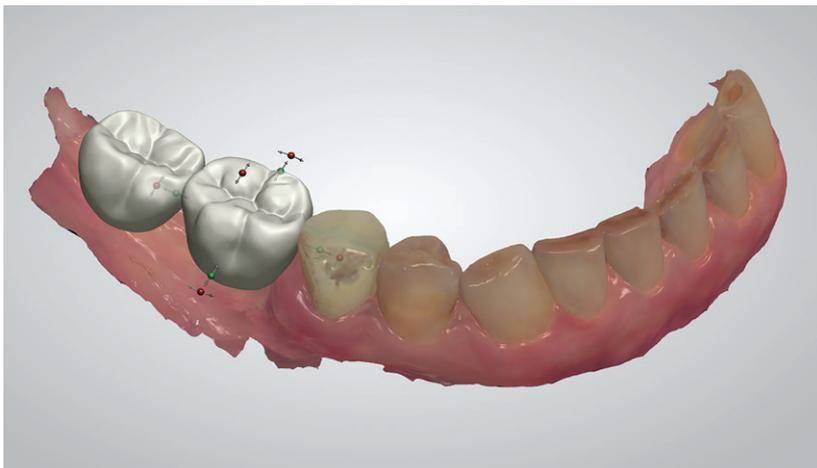
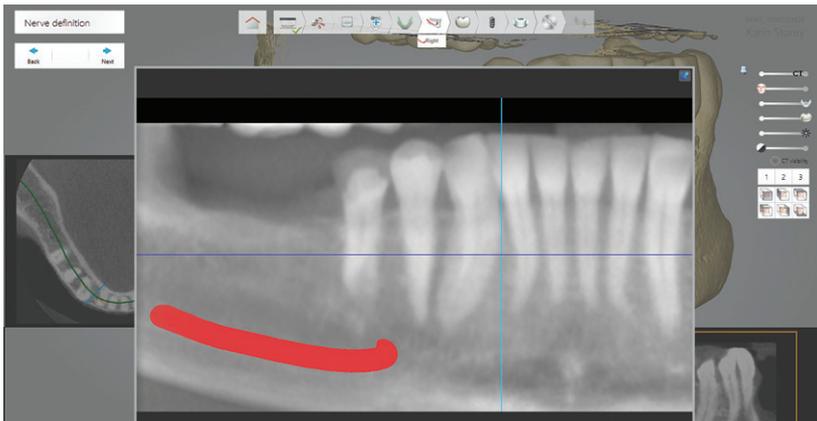
Comparison of the proposed implant placement compared with the actual implant placement shows remarkable similarities between the location of the abutment screw channels.

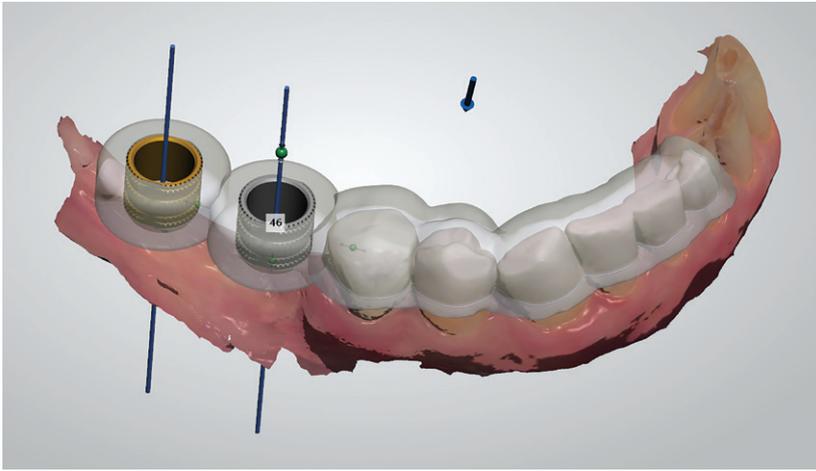




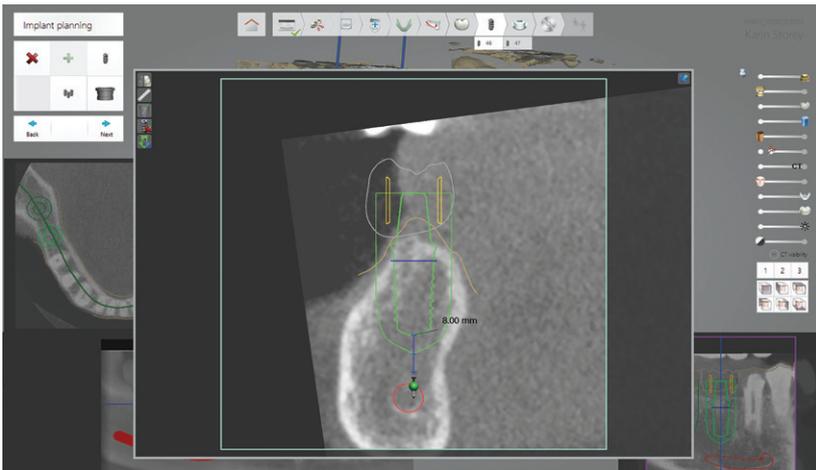
Patient 3

This patient presented requesting the replacement of teeth 46 and 47. Complicating matters was a significant metal allergy which precluded the placement of conventional titanium implants. The alternative treatment selected by the patient was for the use of solid zirconia implants (Straumann PURE). The challenge of these implants is the technique sensitive nature due of placement due to the one piece construction with integrated abutment. Not only does the implant platform have to be placed in the correct mesio-distal, bucco-lingual position and angle, there is the matter of correct depth placement for the restorative shoulder and correct abutment height selection. Use of the Implant Studio software is invaluable to allow for complete planning and accurate control of the implant planning process.





The surgical guide was designed and made to facilitate the guided drilling for Straumann PURE RNI implants. The 46 with the 5.5 mm abutment height and the 47 with the 4.0 mm abutment.



Final implant placement can be seen on the OPG showing parallel placement, correct depth and abutment selection.

About Dr. Philip Tan

Dr. Tan graduated from University of Melbourne with his dental degree, then worked full time in private practice for 2 years before going on to further education. He received his Prosthodontic training and degree in the USA. He worked in America for several years before returning to Melbourne to practice here. Dr. Tan's expertise and attention to detail is also recognised throughout the international dental community. He is the recipient of multiple prestigious awards including the Pierre Fauchard Academy Award, the University of Melbourne Prosthodontics Award, and The American Academy of Fixed Prosthodontics Tylman Award. Dr. Tan's articles have been published in multiple scientific journals and he is a reviewer in several Prosthodontic Journals. He is an internationally sought-after lecturer on the topic of aesthetics and the use of implants and technology in restorative dentistry.

Implant Studio benefits according to Dr. Tan

1. Reduction in the number of patient visits as there is no longer a separate scan for radiographic templates
2. Shorter surgical visits
3. Surgeon able to better focus on the patient rather than the position of the implant
4. Excellent outcomes due to simplified restoration construction with correct contours and structure
5. Ability to construct provisionals prior to implant placement or the construction custom healing abutments for control of soft tissue contours from the time of implant placement due to Dental System integration
6. Consistent data transfer between 3Shape software modules without loss of information flapless reflection

The benefits of digital technology for Dr. Tan and his patients

A foundational component to implant treatment is the creation of restorations that are indistinguishable from teeth, can be maintained by the patient, last as long as possible and amenable to retreatment if necessary. The best way to achieve these goals is through proper planning.

Without proper identification of the pertinent issues avoidable mistakes are made and treatment is compromised. The advent of digital technologies has been able to improve the planning process and bring enhanced visualisation to the planning process as well as improving preparation for the final restoration.

There are many implant planning software packages available however they have issues with poor surgical guide fit, high cost centralised manufacturing, a lack of integration with CAD/CAM resto-ration manufacture, limited implant library selections and limited support/approval from implant companies.

One contemporary implant planning software that is proving to be successful is Implant Studio by 3Shape. Apart from the accuracy provided by the system, it offers a wide range of implant systems that have the approval from the implant manufacturers as a validated workflow. The system also allows for local production of the guides and importantly complete integration into a mature and well established CAD/CAM restorative package. The latter appointment is particularly important as it allows the treating practitioner to move beyond just planning an implant location but also to the construction of custom implant components prior to surgery

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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