

Professor in New York City College of Technology Restorative Dentistry
Daniel Alter, CDT

Screw retained bridge design protocol



Solutions featured:

3Shape Dental System



Fig. 1

Background

Professor and CDT, Daniel Alter, shares his protocol for creating a full-contour abutment.

The set-up

To begin the workflow, the setup of the order form in the software is essential. Setting up the order form dictates the digital workflow.

In this example, Full-contour Abutment is selected.

The pontic site with full-contour pontic is then selected (from the anatomy icon)

All involved teeth should then be highlighted and the bridge icon selected. (Fig. 1, 2)

Pro tip – When doing custom abutments, select to group them so that there is a passive path of insertion. (Fig. 3)

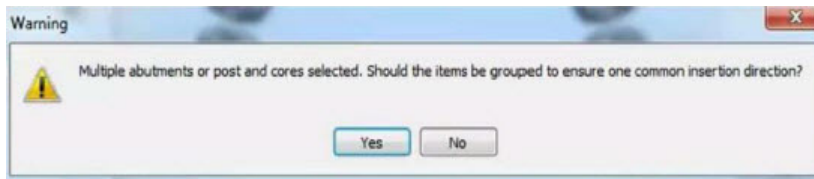


Fig. 2

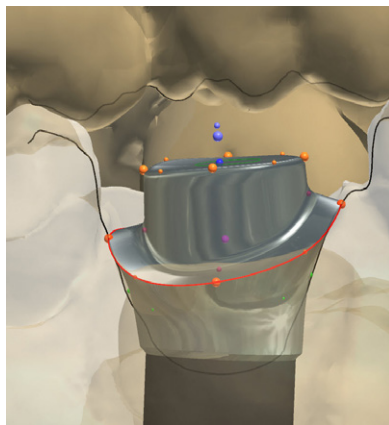


Fig. 3

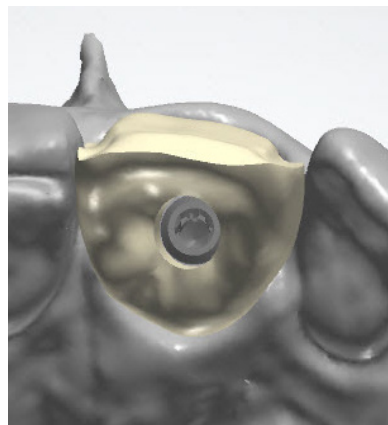


Fig. 4

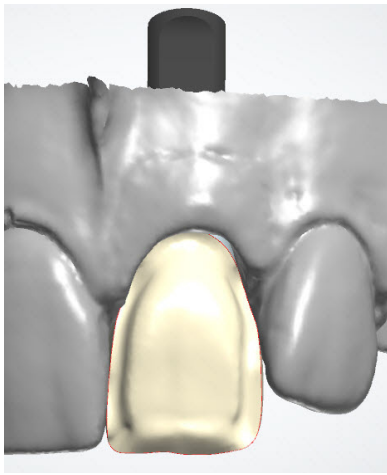


Fig. 5

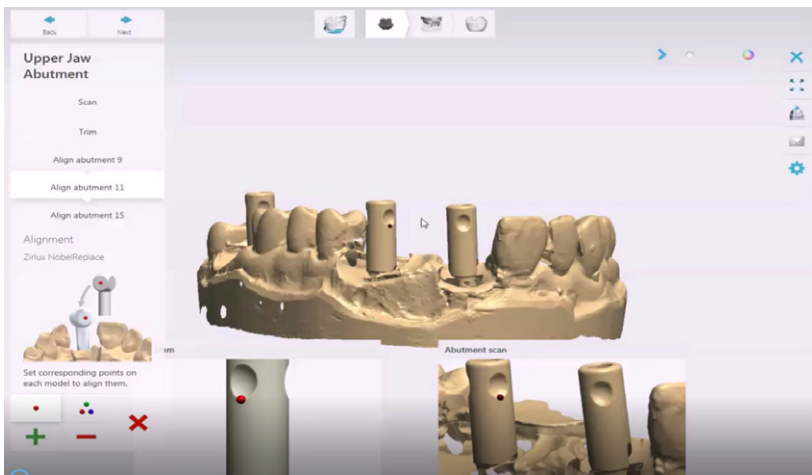


Fig. 6

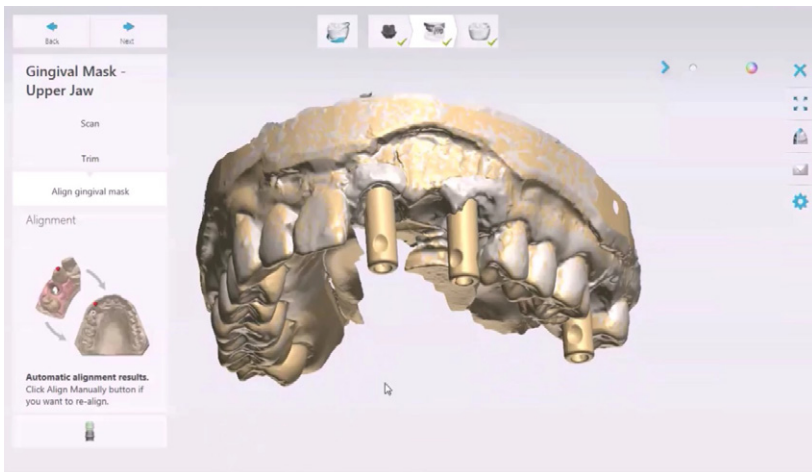


Fig. 7

The scanning workflow

Scanning the implant model using geometric specific scan flags* (Fig. 5)

1. Scan model without gingival mask with scan flags. Libraries are available in the 3Shape Dental System software. Alternatively, 3Shape scan bodies for manufacturers are being rolled out.
2. Align scan flags using either a one or three-dot orientation. When aligning digital surfaces look for the most complex geometry – cusp tips and rounded or irregular surfaces have a larger concentration of small triangles. Scanning technology uses triangulating geometry to create 3D rendering. Complex geometric surfaces make it easier for the software to recognize with precision and align properly. (Fig. 6)
3. Scan model once more. This time with the gingival mask restored on the model.

This workflow ensures that the implant orientation and angulation is correct, while taking into account soft tissue contours.

Virtually preparing the model and pre-designing

1. Annotate the sites that correspond with the order form selections. For implant sites, you will see a beacon in a yellow color that resembles a heartbeat. Left click on the buccal/labial area on the tissue closest to the crest. Placing the annotation in the wrong area (i.e., inside the implant site) will propose initial tooth design in an improper orientation. Pontics are annotated on the sulcus area.
2. The software will propose the initial design. The user can change the library selection to best fit the oral environment, followed by using 3Shape design tools to achieve optimal contours. (Fig. 7) It is suggested to perform the Pre-design function as close to final contours as possible, because the proceeding steps will be most efficient and allow for accurate design of the intaglio surfaces.

Establishing proper intaglio surfaces to promote healthy blood flow and integration

Establishing proper intaglio surfaces can mean the difference between a successful implant restoration and a failed one.

The intaglio surface needs to be slightly concave, while stimulating the tissue. This design will stimulate proper blood flow and allow the tissue to heal or appropriately surround the implant restoration.

1. Place the orange handles at the crest of the gingival line. Then use the “snap to gingiva” feature to fill in any voids. Option-Snap to anatomy will make the intaglio side conform to your pre-design. Use of this feature should be determined by the stage in healing. New sites-snap to anatomy is best desired because gingiva will heal to the restoration providing a natural emergence. Old sites-snap to gingiva is best used to appropriately adapt to existing gingival environment.
2. Place your cursor over one of the handles and using the scroll on your mouse to change the contour from convex to concave, as well as moving or adding more handles to achieve best contour for overall health.

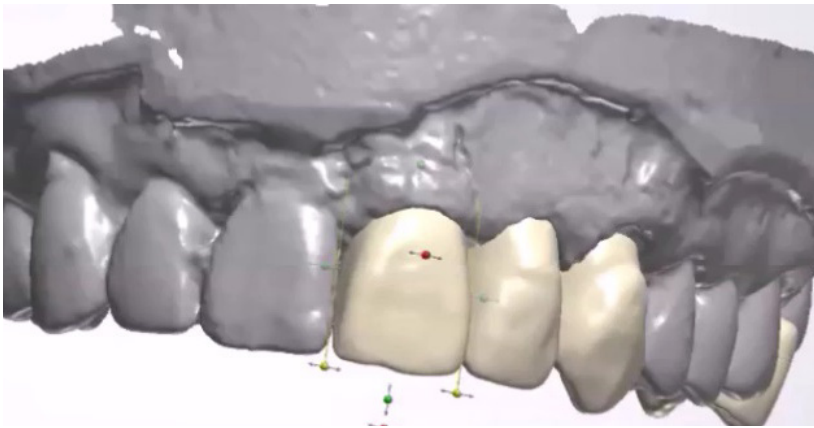


Fig. 8

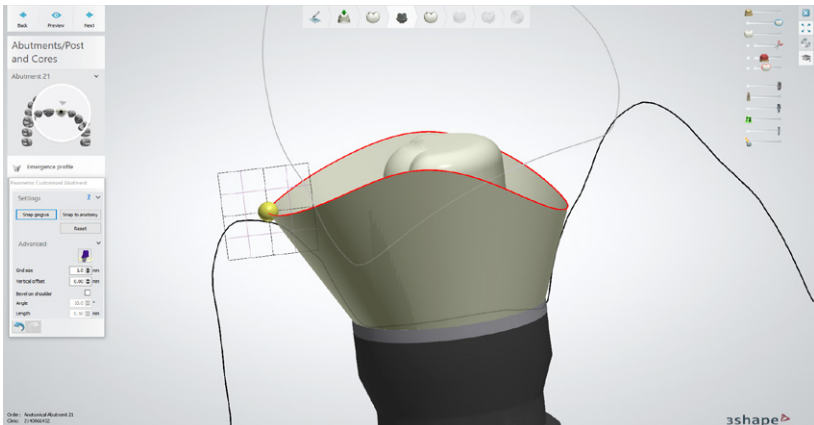


Fig. 9



Fig. 10

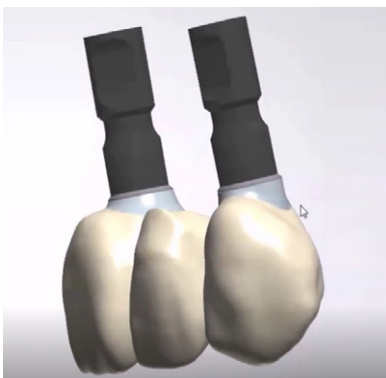


Fig. 11

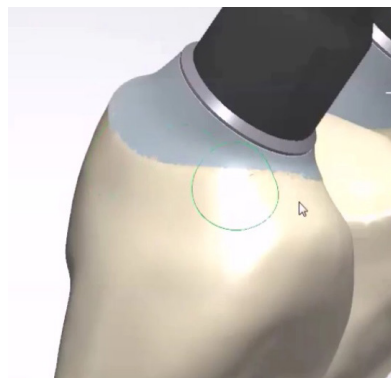


Fig. 12

Finishing the design

Once the intaglio surfaces are the designed, the software deems them as protected areas and allows the user to continue designing without making any changes to the intaglio surfaces. (Fig. 9, 10)

With 3Shape software, if angulation is a factor where the access hole emerges in an un-esthetic location, the user can angulate the access hole/chimney. (Fig. 11)

- Caution: careful attention needs to be given to these changes to ensure that screws can be easily places, retrieved and screwed down once engaged.
- Some implant manufacturers do not allow this feature. Check with your implant vendor prior to using this feature.

Esthetic Implant Outcomes

Whichever implant restoration choice you or your dental client make, using a proven protocol with 3Shape software will produce an esthetic outcome for you and your patients. (Fig. 12)

About Dr. Daniel Alter, MSc MDT, CDT

Daniel Alter's experience and repertoire is comprised of 20 years in the dental profession; over ten years of owning and operating a successful mid-sized dental laboratory, coupled with a Master's degree in Business Management and Organizational Leadership, and a respected stellar educating record as a Professor of Restorative Dentistry at the City University of New York. Daniel is a recognized published Author and Presenter on various relevant subjects, and is continually active in learning and sharing his knowledge with like-minded professionals.

Daniel holds the designation of a Master Dental Technologist (MDT), as well as a Certified Dental Technician (CDT) in two disciplines. His expertise involves Tooth Morphology and Gnathology, CAD/CAM, Implants, and Ceramics; while continued research is emphasized on CAD/CAM, Implantology and all its modalities, including innovative advancements for the Dental Laboratory Technology profession. Daniel provides comprehensive knowledge and expertise for any business and organization. He has been providing valuable consultation services for businesses large and small, ranging from start-ups to global multi-national enterprises. He is considered to be a true problem solver with critical thinking skills and a keen eye to the industry's emerging trends and needs. Daniel's constant pursuit and commitment to education keeps him at the forefront of Dental Technology innovation and advances.

Special thanks to ZAHN DENTAL, CAP (Custom Automated Prosthetics) – Henry Schein companies, CMC (CUSTOM MILLING CENTER) and Daniel Alter for generously sharing this case with 3Shape. The originally posted case can be downloaded from the CAP website [here](#).

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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