

Six-unit bridge using a digital workflow, despite patient limitations



Solutions featured:

3Shape TRIOS®

3Shape Dental System

3Shape Communicate desktop version

3Shape Communicate mobile app



Fig. 1



Fig. 2

Background

Virtually all patients appreciate the digital scan process so that they can forego the conventional analog impression material. However, as dentists, we must be ever mindful of patients' wishes and do our best to comply. In a strange case, this specific patient did not prefer having the intraoral scanner in her mouth. Yet, thankfully, we were still able to take full advantage of a digital workflow by scanning the patient's stone models chairside. The lab was then able to easily receive her scans over the Internet, overlay them with her full-face photo (Fig. 1, 2) to capture the position of her maxilla (this takes the place of the traditional face-bow), and create the digital design for the provisional, and eventually the final bridge, on 3Shape Dental System CAD software.

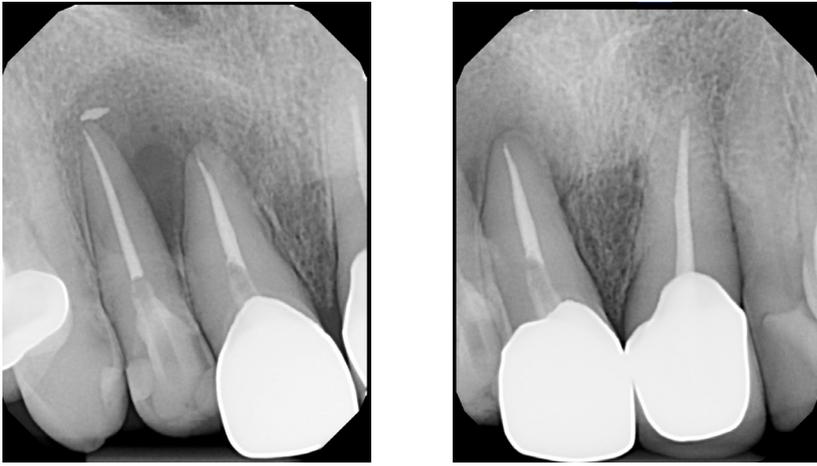


Fig. 3, 4. Radiograph showing the periapical radiolucency and fractures associated with teeth #7, 8 and 9

Case Information

An 80-year old female was referred to Dr. Thomas by the endodontist for a second restorative opinion. She had been having pain and persistent swelling in the anterior maxilla. An examination revealed CI II mobility, deep probing depths, #7, 8 and 9 (Fig. 3, 4) had prior endodontic therapy with recurrent infection, and root fractures of #8 and 9. CBCT confirmed the vertical root fractures and also that there was a four-wall bony defect; thus, grafting and implants were not an option. The patient's health history was unremarkable. (Fig. 5)



Fig. 5. Pre-op

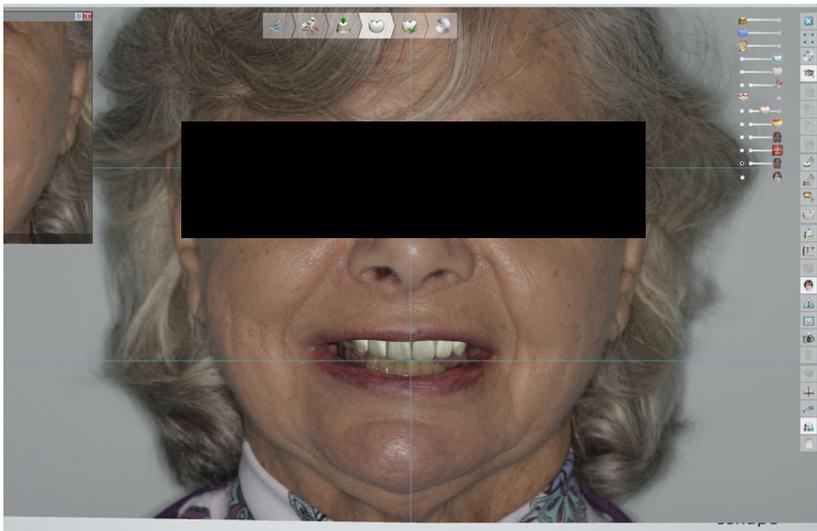


Fig. 6. Digital Design

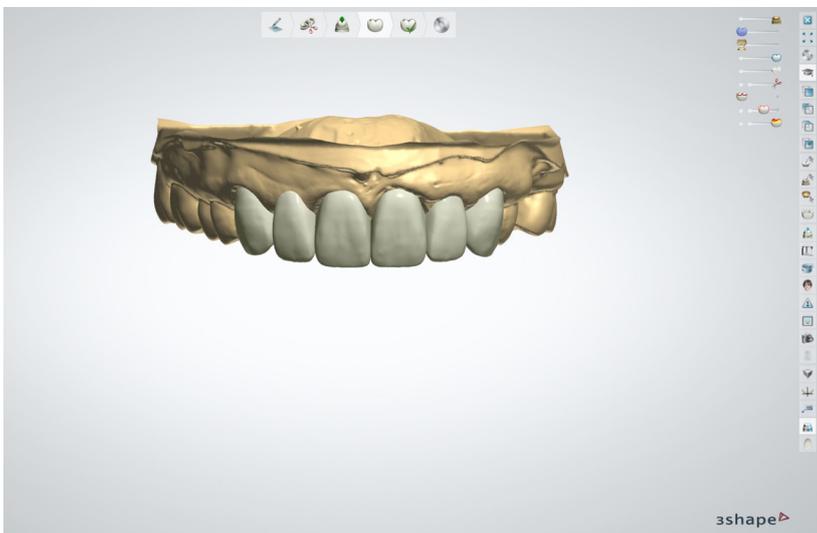


Fig. 7

Lab - Digital Design

CMR lab in Idaho Falls, Idaho, used 3Shape Dental System CAD software and Smile Design to create the patient's digital design or "wax up". (Fig. 6, 7)

They then uploaded this design into the mobile app, 3Shape Communicate, where Dr. Thomas could rotate and manipulate the models to make sure the digital design met all of her expectations.

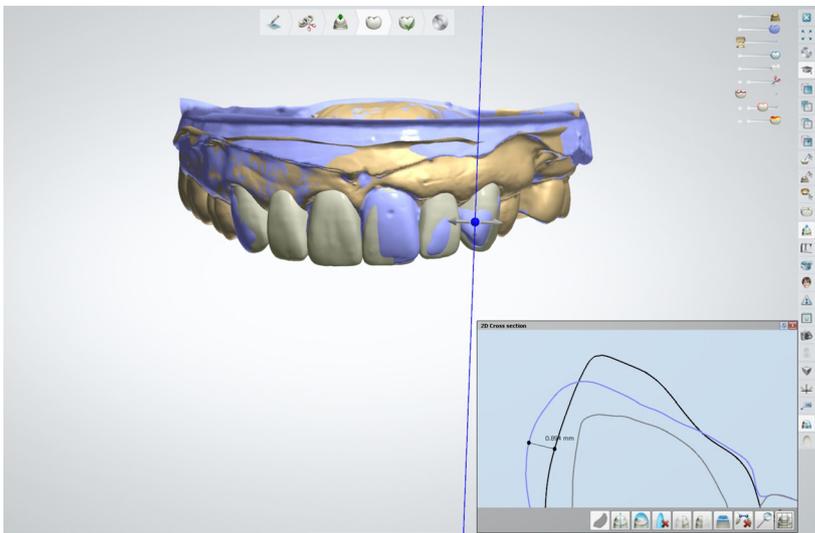


Fig. 8. Digital Design over-laid pre-op model; reduction guide cross-section displayed

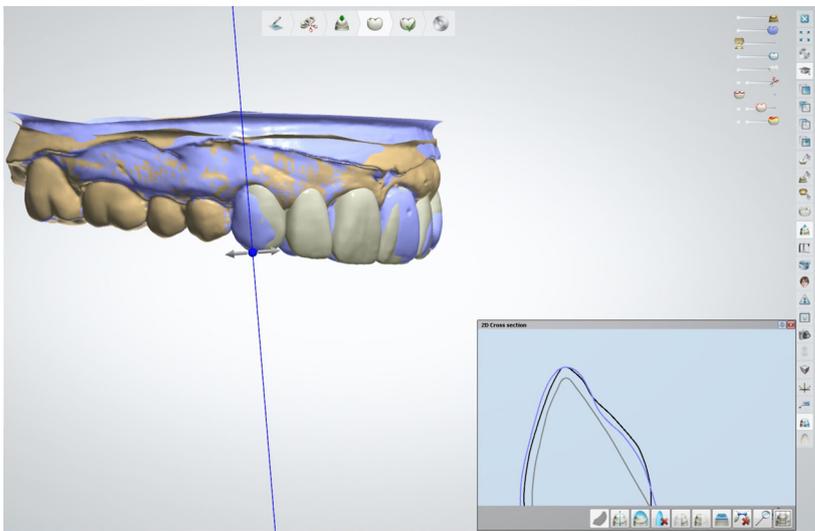


Fig. 9

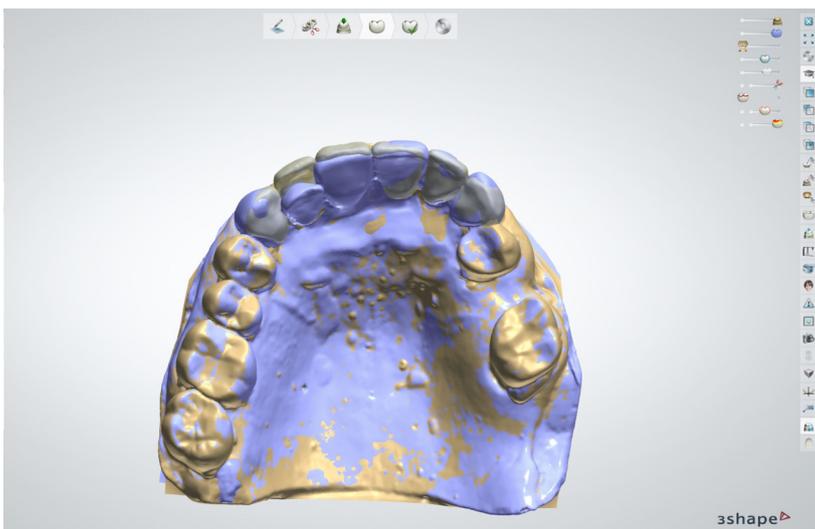


Fig. 10

Dr. Thomas wanted to see a few changes, so CMR lab then connected to her laptop via 3Shape Communicate desktop version where she could actually see, in real time, the technician making the requested changes while speaking on the phone to them at the same time. (Fig. 8 - 10)

Once the final design was approved by Dr. Thomas, CMR lab printed the models and also made a silicone lined putty matrix of the design so it would be a seamless and accurate process for her to make the provisional bridge the day of surgery.



Fig. 11. Post preps and oral surgery



Fig. 12. Provisional bridge



Fig. 13

Treatment description

Dr. Thomas prepped teeth #6, 10 and 11. (Fig. 11)
She then sectioned the crowns off of #7, 8 and 9 at the level of the alveolar ridge to allow the temporary bridge to be pulled and trimmed so as not to have to work in a heme-filled post-surgical field. Provisional bridge made from Dentsply Sirona Integrity using the lab-provided putty matrix. (Fig. 12 - 15)

The patient then went across the street to the oral surgeon to have teeth #7, 8 and 9 extracted and a large bone graft placed in this area. She then came back to Dr. Thomas to have the already made temporary bridge cemented, which the patient wore for 4 months as the site healed. The bone graft did not heal as favorably as the surgeon and Dr. Thomas would have liked, so the option of a second augmentation surgery vs. pink porcelain to mimic gingiva was presented to the patient.



Fig. 14



Fig. 15

The thought of having pink porcelain was not a concern to the patient, as she has a low smile line. Dr. Thomas then used the 3Shape TRIOS to scan the stone models of the patient's provisional bridge and took many photos, including the full face, teeth-slightly-apart photo the lab would then use in final bridge fabrication.



Fig. 16. Provisional Full Face needed for aligning scan

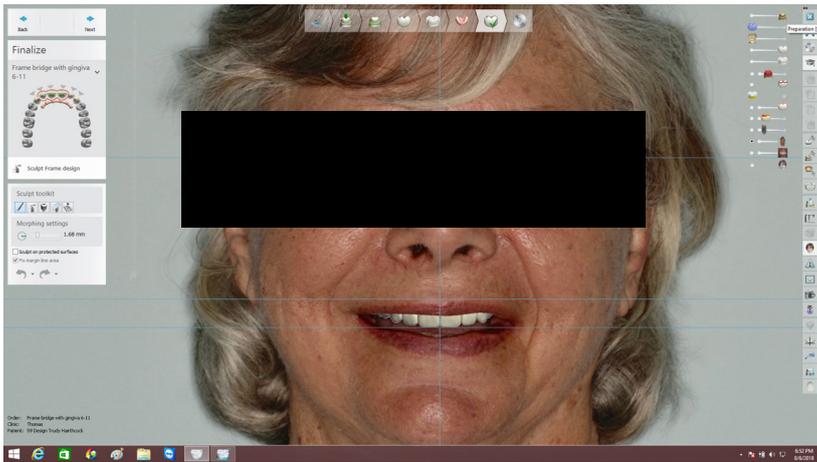


Fig. 17

Lab - Final Bridge Fabrication

CMR lab received the provisional scan and used the scanned bite record and full-face photo to align everything in the context of the patient's face. (Fig. 16, 17) They then used the provisional, which had been adjusted and idealized to the patient's occlusion, as a template for the design of the final prosthesis.

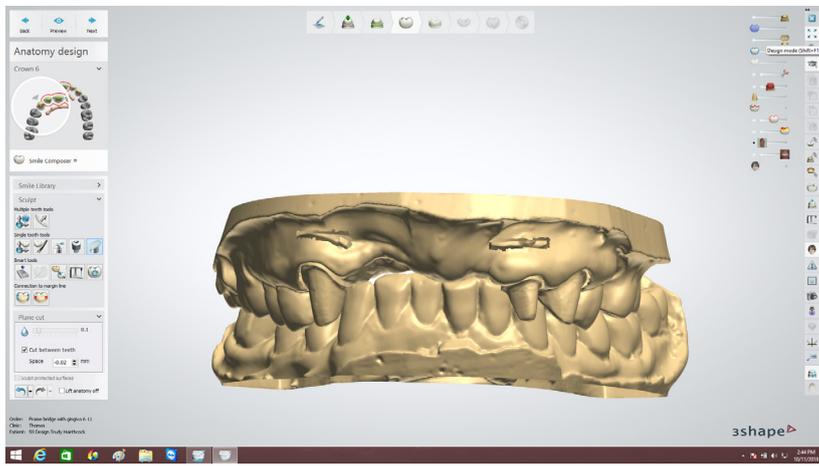


Fig. 18

Scanned models and centric occlusion bite showing the deep bite. (Fig. 18, 19)



Fig. 19

Prep model scan. (Fig. 20 - 24)



Fig. 20

Prep model scan overlaid with provisional model scan. (Fig. 21)

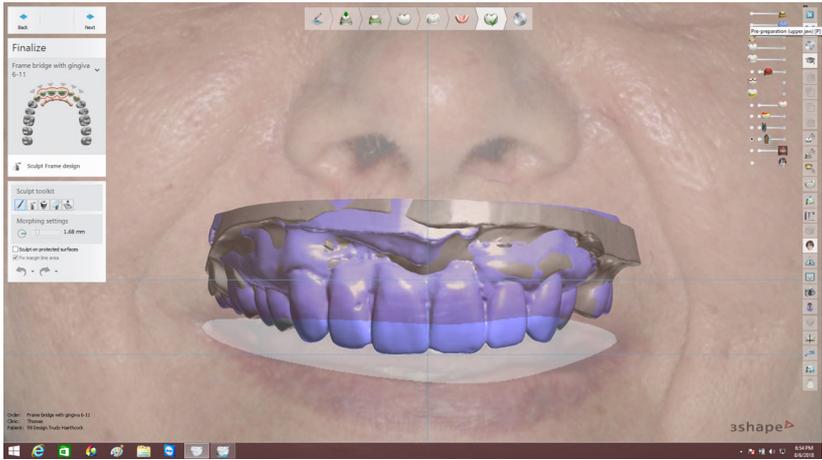


Fig. 21

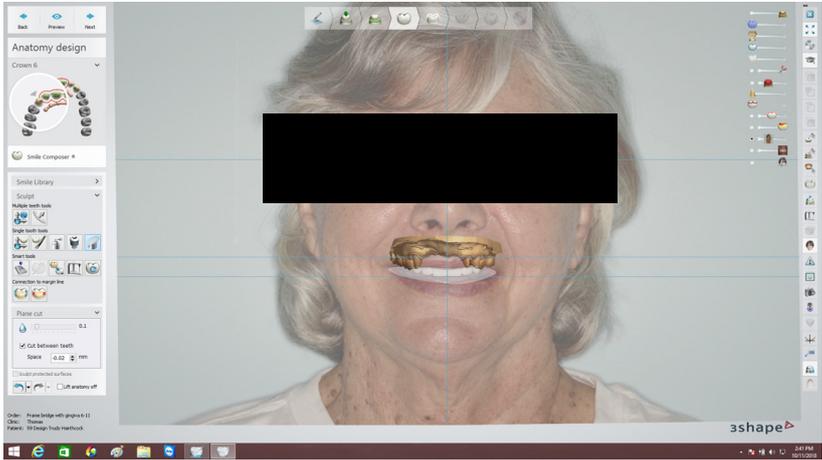


Fig. 22

Final design with soft tissue. (Fig.23)

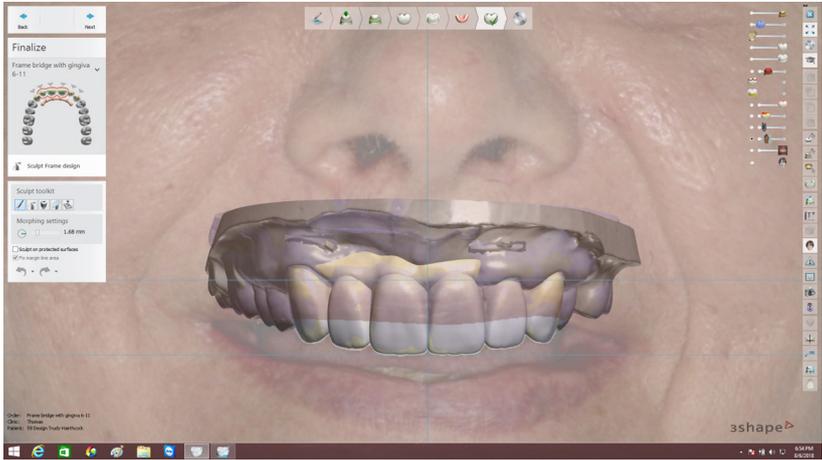


Fig. 23

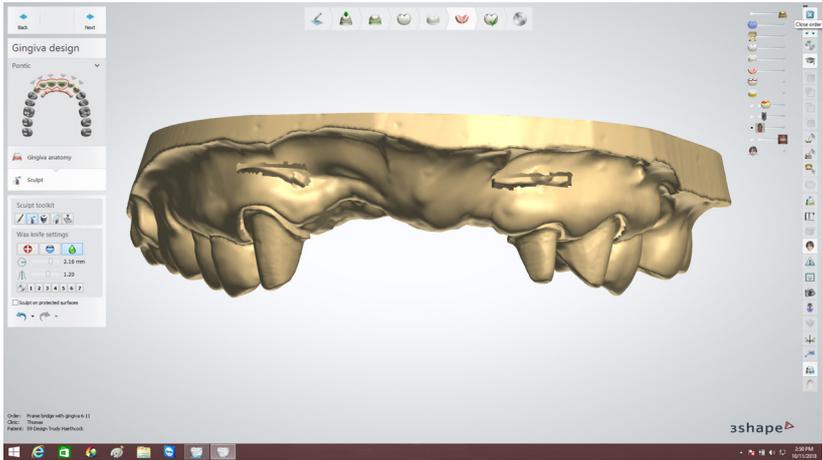


Fig. 24

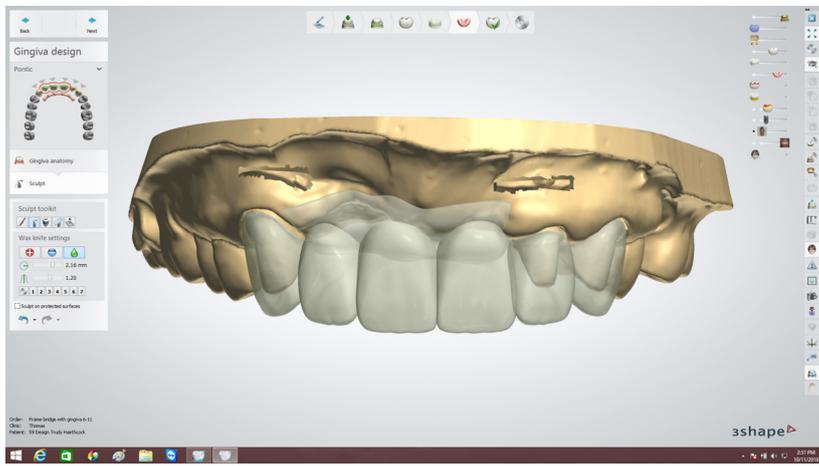


Fig. 25

Prep model scan overlaid with provisional model scan.
(Fig. 25, 26)

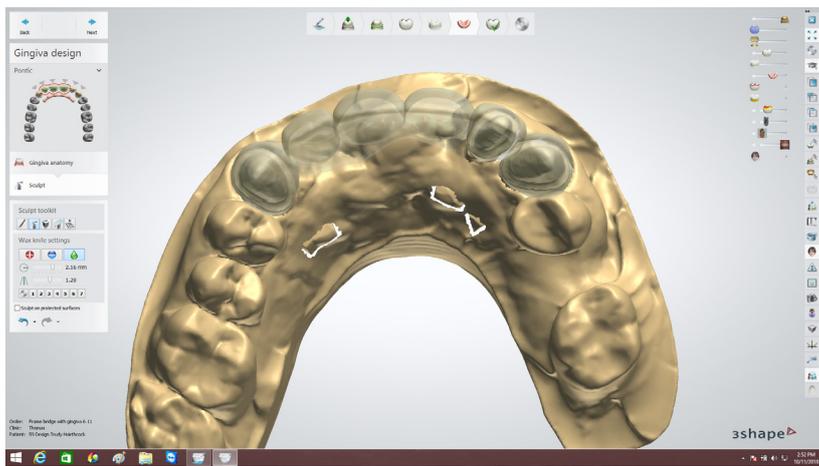


Fig. 26

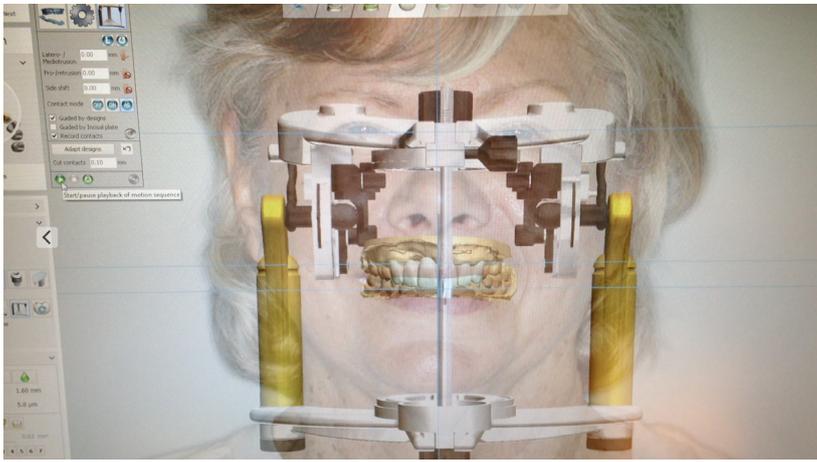


Fig. 27

Delivery

The final zirconia bridge with strategic facial layering was tried in to verify fit, function, and esthetics. The occlusion needed no adjustment due to being fabricated from duplicating the provisional scan, in which the bite and excursive movements had been previously worked out. The lab using 3Shape Dental System, which has a digital articulator feature, was also very helpful in verifying no functional interferences were present. (Fig. 27, 28)



Fig. 28



Fig. 29



Fig. 30



Fig. 31

Super Floss was used to make sure the patient could easily and repeatably floss under the prosthesis to keep it clean. The shade of both the bridge and the pink porcelain was approved by both the patient and Dr. Thomas to be a pleasing shade which blending well with the surrounding dentition and gingiva. Ivoclean by IvoclarVivadent was used to clean out the internal surface of the abutments and the final bridge was cemented to place using Relyx Luting Plus by 3M. (Fig. 29 - 36)



Fig. 32



Fig. 33



Fig. 34



Fig. 35



Fig. 36

About Dr. Caroline Thomas

A native of Hartsville, SC, Dr. Thomas has had a passion for dentistry since she set her mind on it in the third grade. Dr. Thomas received her Bachelor of Science from Clemson University and her Doctorate of Dental Medicine from MUSC in Charleston, SC. She furthered her training in St. Petersburg, FL, by completing a one-year residency program where she gained invaluable experience with cosmetic and implant dentistry, as well as comprehensive restorative dental care. A member of many local and national dental societies and study clubs, Dr. Thomas greatly values the importance of continually learning the best and most modern dental techniques. She has had the privilege to complete an intensive one-year implant training course, Implant Educators, and continues to pursue many hours of post-graduate dental education at the highly respected Kois Center, Dawson Academy, Spear Institute, and L.D. Pankey Institute.

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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