Quality Dental
Dr. Luke Cronin

Replacement of existing 6 porcelain veneers with 10 all-ceramic veneers with digital workflow

Solutions featured:

3Shape TRIOS
3Shape Smile Design
3Shape Dental Designer

Case Information

Patient is a 26-year old female that presented with 6 existing, 3-year old porcelain veneers and was unhappy with the appearance. They were too labially placed with a significant midline cant and the canines were flared giving the overall appearance of teeth that were too large.

3shape

Treatment plan

In consultation with the patient, the decision was made to replace the existing 6 porcelain veneers with 10 all ceramic veneers. Addition of veneers for the first premolars and first molars (second premolars extracted) both broadens the smile and allows a more harmonious appearance, particularly when viewed at the social angles (45 degrees from the facial aspect).

As the treatment required was reductive i.e., the final position of the veneers was to be more palatal, a three-stage smile design process was necessary. Initially a two-dimensional design was created using 3Shape Smile Design to determine the new outlines of the veneers from the facial view. Secondly, the two-dimensional design was overlaid on the 3Shape TRIOS 3 .stl file using 3Shape Realview to create an additive motivational mock-up for the patient to sign off on; and finally, an ideal mock-up was created using 3Shape Dental Designer for use as a preparation guide and temporary veneers.

Photographic Protocol

Precise digital photography is necessary to fully understand the current situation and in turn, create an appropriate treatment plan to address patient's concerns. In this case the following photos were taken: facial smiling, facial retracted, facial repose, retracted occlusal, 12 o'clock and retracted lateral and facial views. (Fig. 1-8)

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

The above photos illustrate clearly the encroachment on the wet-dry lip line particularly in the central incisors and canines. The facial repose and 12 o'clock views, in particular, clearly highlight the problem.

Fig. 9

Fig. 10

Fig. 11

Fig. 12

3Shape Smile Design

3Shape Smile Design was used as a communication tool for both the patient and laboratory (Race Dental). 3Shape Smile Design utilizes live mock-up capabilities in two dimensions to illustrate the appearance of the teeth from the facial aspect. This is powerful for the patient as it is a simple tool for visualization of a possible final outcome. The 3Shape Smile Design also doubles as a communication tool for the laboratory simplifying the description of the proposed final aesthetics determined with the patient chairside. (Fig. 9-12)

Fig. 13

3Shape TRIOS 3 scan

Following the completion of the two-dimensional smile design, a three-dimension image of the dentition is required to proceed to the three-dimensional smile design components. 3Shape TRIOS 3 scan was used to capture this information. (Fig. 13)

3Shape RealView smile design

3Shape RealView enables the technician to incorporate the two-dimensional photos, the 3Shape Smile Design and the 3Shape TRIOS scan .stl file in the same software. This simplifies the transfer of the information from two-dimensions to three dimensions and creates both predictability and repeatability within the software platforms. This technology also provides reassurance for the clinician that the final outcome delivered will match exactly what was viewed by the patient.

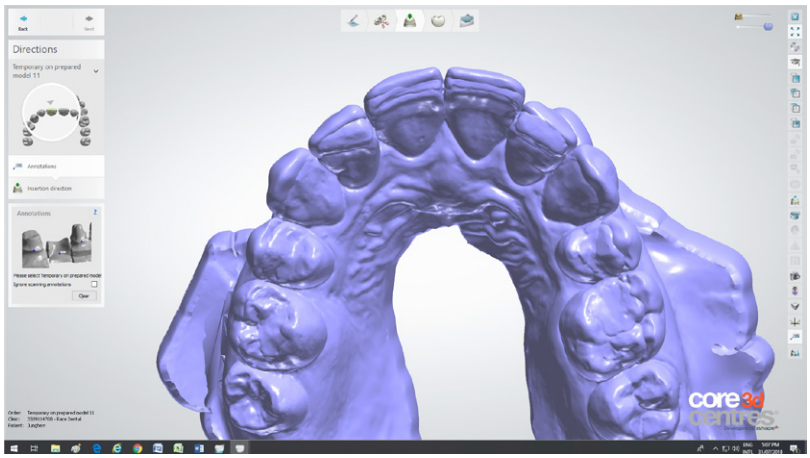

Fig. 14

Additive mock-up

In this case, we needed to show the patient the three-dimensional result using a bis-acrylic temporary mock-up over the existing unprepared dentition which required the first design to be entirely additive. (Fig. 14)

Fig. 15

When showing the patient an additive mock-up in a reductive case, it is imperative that the patient only views the mock-up from a full facial photo and not in real time, up close, or from other angles due to the labial placement of the teeth in the motivational mock-up. Failure to only show the two-dimensional facial photograph will result in the patient losing confidence in the treatment and feeling their teeth "are sticking out". This is still an essential part of the treatment as it is the only stage in a reductive case where you are able to show the patient a live cosmetic smile trial without performing an irreversible procedure. (Fig. 15)

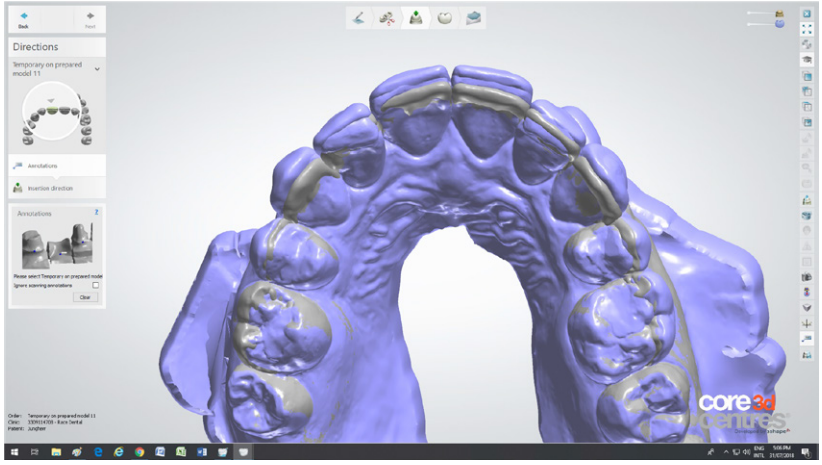

Fig. 16

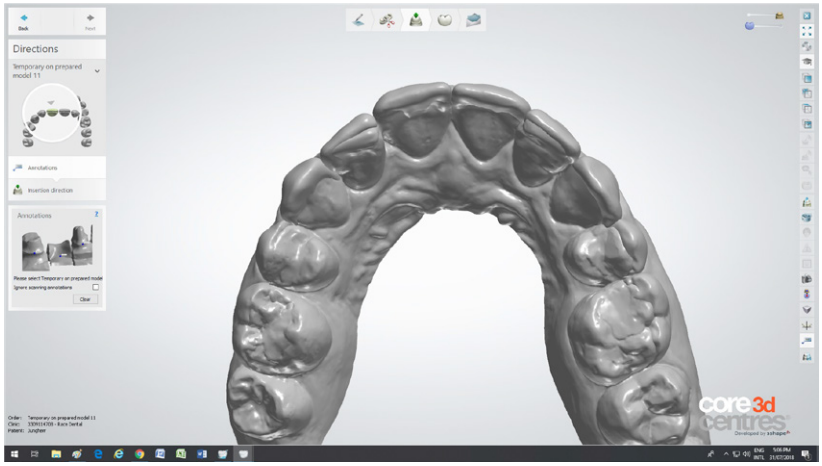

Fig. 17

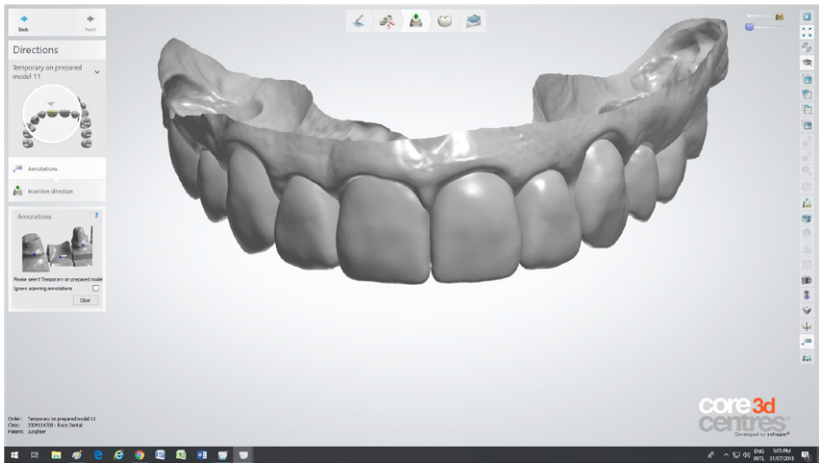

Fig. 18

Ideal mock-up

Following the sign-off of the additive mockup by the patient an ideal mock-up was created. This was done in the laboratory using 3Shape Dental Design. The existing additive mockup was repositioned palatally in the correct position of the final restorations. The new final tooth position model was 3d printed and a preparation guide was made to ensure exact reduction for minimal thickness lithium disilicate veneers. This model is also used to make the key for the temporary veneers. (Fig. 16-18)

Veneer removal, tooth preparation and temporization

Following anesthetic administration, the existing veneers were removed using a diamond bur and handpiece. After assessment, the existing porcelain and resin was removed and the ideal mock-up putty key was checked for a passive seat and filled with Expertemp (Ultradent). The key was then removed following curing and the final position of the veneers assessed. 0.5mm was removed in the A, B and C planes through the Expertemp to ensure minimal thickness of the glass ceramic. Particular attention must be paid to the C plane to ensure adequate reduction in the incisal area preventing flaring of the final restorations. The remaining Expertemp was then removed. (Fig. 19)

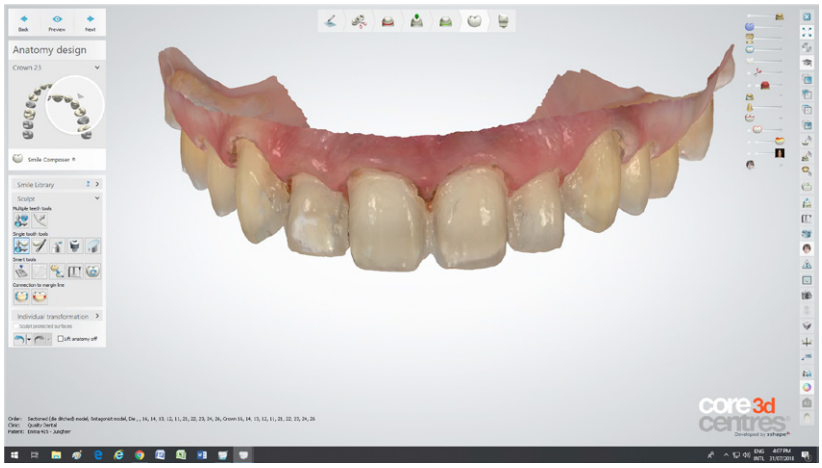

Fig. 19

Gingivectomy was required on the central and lateral incisors. This was performed at the time of preparation using the Gemini dual wavelength diode laser (Ultradent). The height of the gingivectomy was defined by the gingival position on the ideal mock-up created in the lab, using 3Shape Dental Design. The cutting and cauterizing characteristics of the super pulsed diode laser enables precise and predictable gingival removal, preventing the need for second stage surgery. Additionally, the diode laser will disinfect the gingival sulcus and improve tissue health which was essential for this patient.

Following accurate assessment of the gingivectomy, laser troughing was performed to create a defined margin prior to the 3Shape TRIOS 3 scan. The preparations were then scanned and uploaded to Race Dental using 3Shape Communicate for same day merging with the pre-preparation (ideal mock-up) in the laboratory. The teeth were then temporized using the ideal mock-up putty key and Expertemp. (Fig. 20)

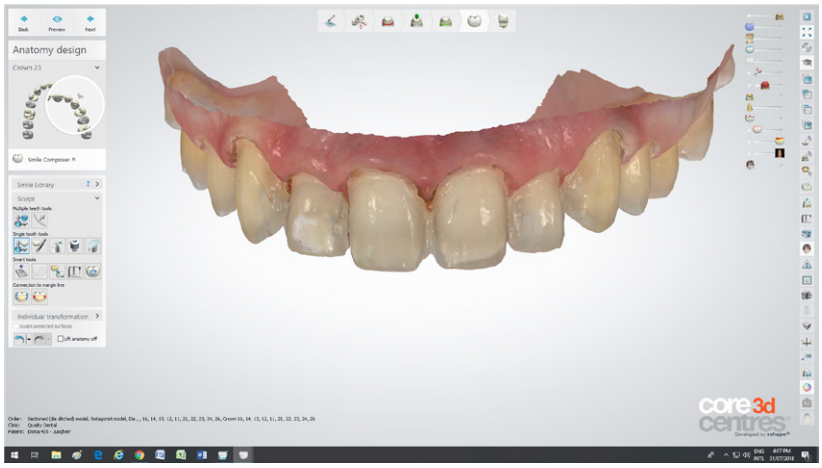

Fig. 20

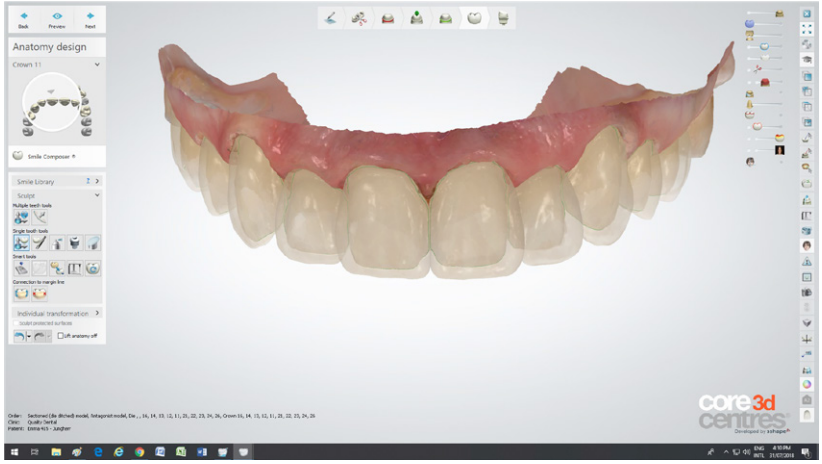

Fig. 21

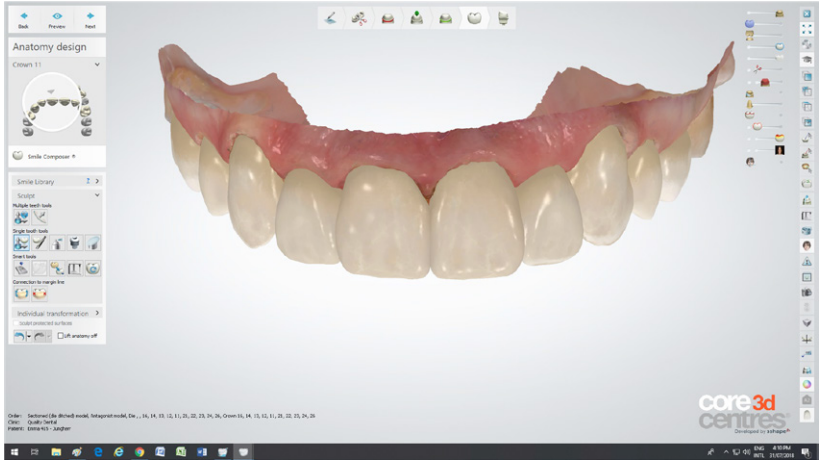

Fig. 22

CAD and Milling

The ideal mock-up and digital 3Shape TRIOS 3 scan were uploaded into 3Shape Dental Design to create the individual CAD files ahead of milling. Using this software integration enables the predictable replication of the design as shown to the patient and the clinician throughout the planning process. This repeatability and predictability showcases the power of a fully digital workflow. (Fig. 21-22)

Fig. 23

Fig. 24

High translucency bleach shade lithium disilicate blocks coupled with consistent tooth reduction provide lifelike aesthetics when milled as a monolithic restoration. Utilizing monolithic restorations also maintains the maximum strength of the material and reduces the introduction of errors in the design through an optional layering process. (Fig. 23-24)

Fig. 25

The 10 veneers were milled by Race Dental using Roland DWX-4W Wet Dental mills. The advanced technology within Race Dental creates a flawless fit making it easier for their technicians to accomplish a perfect and predictable cosmetic result. (Fig. 25-26)

Fig. 26

Fig. 27

Following manufacture and delivery of the milled restorations the patient was again anesthetized and the temporary veneers removed. The veneers were checked for fit and aesthetics using shade B0.5 3M Veneer try-in paste. The patient was given an opportunity to assess their final veneers prior to cementation, however this is difficult due the anesthetic and demonstrates the importance of the very specific digital planning regime outlined above. (Fig. 27)

Following assessment of the fit and aesthetics of the restorations, the veneers were removed, and a decision was made to cement all 10 veneers simultaneously. The veneers were etched with hydrofluoric acid; cleaned, dried and silanated for 60 seconds. The teeth were isolated using a Kerr retractor and cleaned and phosphoric acid etched for 20 seconds. 3M Single Bond was then applied to both the restorations and the tooth surfaces for 60 seconds and air dried. (Fig 28) 3M shade B0.5 Veneer cement was placed individually on the restorations starting from the central incisors, moving from left to right and from central to molar in an alternating pattern. Seating of the restorations was confirmed and the resin tack cured. The excess resin was then removed and final cure achieved. The interproximal contacts were separated using a serrated edge and all cement interproximally removed. The cement margin on the palatal surface was polished and the occlusion checked for interferences. The patient was discharged and rebooked for review in two weeks.

Review

During review the restorations were checked for excess cement, good oral hygiene and correct occlusal function. 'After' photos were taken showing the final position of the new restorations. (Fig. 28-32)

Fig. 28

Fig. 29

Fig. 30

Fig. 31

Fig. 32

Conclusion

Utilizing a complete digital workflow with the integrated 3Shape hardware and software solutions allows clinicians to deliver extremely predictable and repeatable outcomes. The digital workflow enables the patient to be engaged in the smile design process and ultimate acceptance of the final cosmetic outcome. Clinicians should be aware of the importance of using a high-tech, well-resourced digital laboratory with experience in both dental aesthetics and complete digital workflows to ensure successful outcomes.

About Dr. Luke Cronin,

BDSc.(Qld) GradDipClinDent(Syd) MIPH(Qld)

Dr. Luke Cronin is a leading Sydney-based cosmetic dentist specializing in stunning smile transformations. His cosmetic work has attracted a global following with cutting edge cosmetic dental techniques and technology delivering flawless results. Dr. Cronin has a specific interest in porcelain veneers, clear aligner therapy and teeth whitening.

Dr. Cronin's passion for designing beautiful, natural looking smiles has attracted models, actors, fitness personalities and patients across Sydney, inter-state and internationally. Offering first class treatments and patient care, Dr Cronin provides a refreshingly modern and sophisticated approach to customer service at his lower north shore practice, Quality Dental.

Dr. Cronin is an international speaker and a key opinion leader for 3Shape TRIOS, Ultradent Gemini laser and Philips Zoom Whitening.

About Mr. Matthew Race

Matthew Race is the Chief Operating Officer of Race Dental Laboratory. He is an L.V.I. Master Technician and was the first 3M ESPE Lava trainer and demonstrator for Australasia.

He was the first Key Opinion Leader on the Wieland Zirconia System in Australia & New Zealand; a lecturer and demonstrator for the Heraeus Kulzer Academy, and an ongoing lecturer for the Australian Institute of Implant Dentistry. After registering in 1994 he studied extensively throughout Europe and the U.S. gaining accolades at the Vita Factory in Germany, Schottlander Factory in England and studied Neuromuscular Dentistry at the Las Vegas Institute for Advanced Dental Studies.

In 2003, he founded the accredited implant study course "Simplicity with Implants" and became a global Digital Smile Design (DSD) member in 2015. As a specialist Crown, Bridge and Implant technician he is currently one of the senior technical advisors for Core3dcentres International and contributed to leading dental magazines and journals.

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 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 1,400 employees serving customers in over 100 countries from an ever-growing number of 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

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