

# Enhancing synergy between digital and artisanal dentistry

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**I**n this age of digital dentistry, the production of restorations can be fully automated. Adoption of digital workflow enables a fast, accurate and labour-saving production process. However, even with the latest software and newest model of digital equipment, it is still challenging to achieve high-level aesthetics without human intervention and artistry.

Dentistry today is a true synergy of digital and analogue components where human experience and creativity are needed to complement the digitally manufactured restorations. Individual perspectives, manual skills and an understanding of the complexities of the natural tooth are instrumental in creating natural, life-like final restorations.

Despite the wide array of options available in the market, the high costs involved has limited universal adoption of digital dentistry. Dental labs and ceramists, keen to adapt to the wave of digitalisation and increase productivity, are often faced with challenges due to the lack of immediate return on investment, especially with the high costs involved in purchasing new digital assets.

In the next decade, adoption of digital dentistry is expected to become more mainstream and an integral part of everyday dentistry as the demand generated would make digital assets more affordable.

This article illustrates how synergy can be created between the digital and conventional workflows to fabricate highly aesthetic veneers in the anterior aesthetic zone.

## PATIENT CASE

A female patient, 35, requested to replace the chipped and broken old composite restorations on her upper front teeth that were malaligned.

After detailed intraoral examination and assessment of the most suitable treatment options, the patient agreed to restore teeth 11 and 21 with lithium disilicate veneers to achieve the desired aesthetic and long-term outcomes (Figs. 1-2).



Fig. 1a



Fig. 1b



Fig. 1c



Fig. 2a



Fig. 2b



Fig. 2c



Fig. 3



Fig. 4

Fig. 1a-c: Initial condition – front, right and left views  
Fig. 2a-c: Initial condition retracted – front, right and left views

Fig. 3 Mock-up placed in the patient's mouth  
Fig. 4: Pencil markings on the preparation guide

**RESTORATIVE APPROACH**

To manage the patient's expectation, a composite mock-up was placed to assess occlusion and gain patient's approval on the proposed modifications on tooth morphology (Fig. 3). The composite mock-up was also used as a guide for accurate tooth preparation (Fig. 4). A putty index was prepared to evaluate the length and thickness of preparation so as to ensure sufficient space was created for the final indirect restoration (Figs. 5-6).

After the tooth preparation, the teeth were rehydrated before assessing the accurate shade. Shade A1 was selected as the most suitable shade and it was observed that the dentin had no discolouration (Fig. 7).

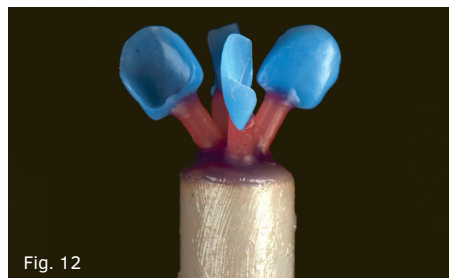
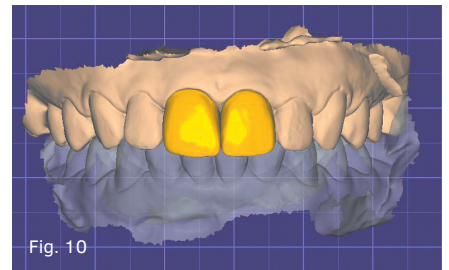
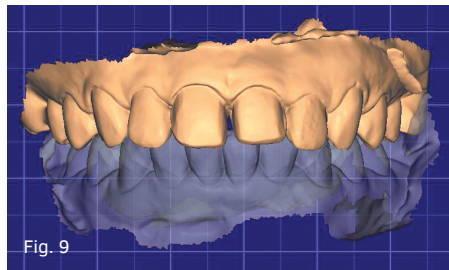
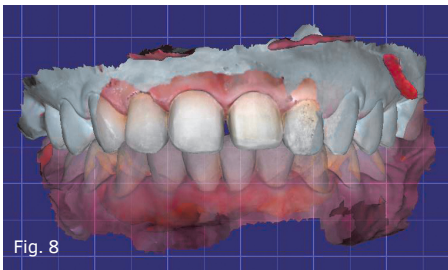
A digital impression, which is considered a critical component of the

digital workflow, was taken using Medit intraoral scanner. The STL files were shared with ceramist Dr. Kelvin Tantono at Zirmon Dental Atelier. The digital scanner proved to be an efficient and effective communication tool that enables predictable indirect restorations.

**FABRICATION OF LITHIUM DISILICATE VENEERS**

The scan results were received and processed with exocad software for the design of lithium disilicate veneers based on the morphology of the mock-up (Fig. 8-10).

After completing the digital design phase, the jaw scans were 3D printed into models to confirm the fit of the milled wax laminate veneers (Fig. 11). The milled wax restorations were invested with Shofu Ceravety and then pressed with Shofu Vintage LD ingot shade T1 (Figs. 12-13).



Figs. 5-6: Putty index prepared to check length and thickness of the tooth preparation  
 Fig. 7: Confirmation of the final shade: A1  
 Fig. 8: Scan result received and processed with exocad  
 Fig. 9: File used without colour for accurate design  
 Fig. 10: Final design based on mock-up  
 Fig. 11: Milled wax laminate veneers were fitted on 3D printed model  
 Fig. 12: Milled wax laminates were invested with Shofu Ceravety  
 Fig. 13: Press result after using Zeros manual press

# User Report

After the investment had set completely, it was pressed using Zeros manual press. The lithium disilicate ingot selected for this case was Shofu Vintage LD shade TI based on the following factors:

- Dentin shade showed no discolouration
- Enamel of adjacent teeth were bright and translucent (higher value)
- The final shade of restoration was A1 which is brighter and higher in value

After sandblasting and cleaning of the pressed lithium disilicate veneers, they were placed on the 3D printed model to ensure fit and marginal adaptation. The incisal third of the veneers were then manually trimmed to create space for minimal porcelain layering to achieve the desired shade and natural aesthetics (Fig. 14).

Minimum porcelain build-up was done with Shofu Vintage LD porcelain according to the sequence listed below (Figs. 15-20). It is important to note that indirect veneers with lithium disilicate Vintage LD were fabricated with translucent T1 ingot and corresponding layering porcelain to permit the dentin shade of the abutment teeth to show through, replacing the enamel only (Fig. 21).

- First bake
  - Vintage LD BT (blue-translucent), A2B, Opal SL (opal superlucent)
  - Vintage LD Opal T (opal translucent)
- Second bake
  - Vintage LD Opal T (opal translucent)
  - Final stain and glaze



Fig. 14: Lithium disilicate veneers were fitted on 3D printed model and incisal third manually trimmed for porcelain layering  
Fig. 15: Shofu Vintage LD Porcelain and ingot used in this case  
Fig. 16: First bake after adding Shofu Vintage LD BT (blue-translucent), A2B and Opal SL (opal superlucent)

Fig. 17: First bake after adding Shofu Vintage LD Opal T (opal translucent)  
Fig. 18: Second bake after adding Shofu Vintage LD Opal T (opal translucent)  
Fig. 19: After completing the second bake  
Fig. 20: Completed restoration after final stain and glaze  
Fig. 21: Final check of the fit and marginal adaptation of the veneers on 3D model

## CLINICAL PHASE FOR TRY-IN AND FINAL PLACEMENT





Fig. 22: Intraoral try-in of the lithium disilicate veneers  
 Fig. 23: Insertion and final cementation completed under rubber dam isolation  
 Fig. 24: Immediately after final cementation  
 Fig. 25a-c: One-week recall visit where visible signs of good gingival healing and adaptation were observed – front, right and left views  
 Fig. 26a-c: Final restoration after one week – front, right and left views

**CONCLUSION**

Incorporating digital dentistry in the workflow provides flexibility as the details remain constant and reproducible, eliminating the need to restart the process if adjustments are required. Designs can be viewed and modified easily, and the wax laminate can be reproduced when required.

However, a balance with artisanal dentistry plays a vital role when fabricating indirect veneers with true-to-nature aesthetics that

match the adjacent teeth and meet the aesthetic demands of the patient.

The ceramist's perspective and skill become the secret recipe to success for indirect veneer restorations where characterisation, surface texture and intricate details are created by careful selection of the most suitable shade of ingot, understanding the capabilities of the layering porcelain and intricate use of stains. **DA**

**About the Authors**



**Dr Kelvin Tantono** graduated from Trisakti University in Jakarta, Indonesia, in 2012 and gained clinical experience in Jakarta and Binjai before setting up his own private practice in Medan. After more than five years of clinical practice, he decided to follow his heart and pursue the field of dental ceramics.

With a keen interest in enhancing his skills and knowledge, Dr Tantono continues to attend international courses and has graduated from Osaka Ceramic Training Centre in Japan in 2018. Dr Tantono has conducted lectures and workshops in the region and serves as key opinion leader for Shofu.



**Dr Ivan Hadiutomo** graduated from Trisakti University in Jakarta, Indonesia, in January 2014. Currently, Dr Hadiutomo is a dentist partner in Indo Dental Center, one of the biggest dental clinics in Jakarta. He has been mentored by Dr Leonard Nelwan since 2011.

Passionate about aesthetic and cosmetic dentistry, Dr Hadiutomo has pursued higher training from the best in the field. He has completed the New York University post-graduate programme in aesthetic dentistry and is seeking to be the next dental cosmetician.