Exploring Novel Technologies for Improved Efficiency & Sustainability

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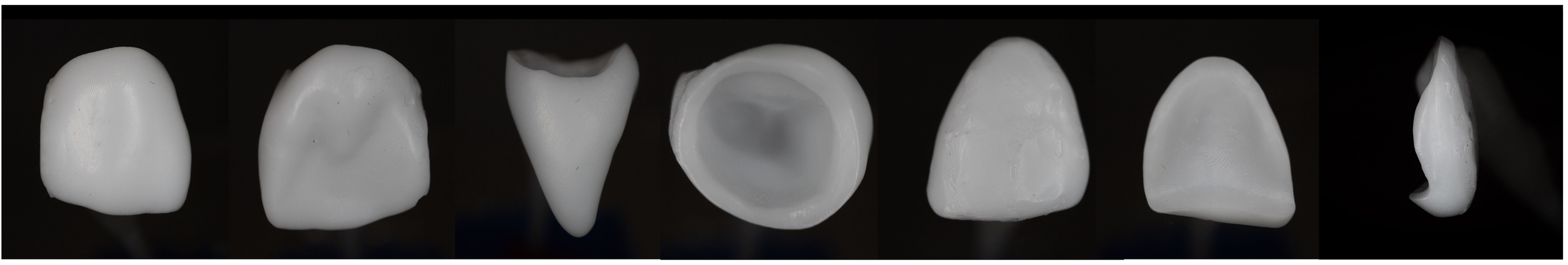
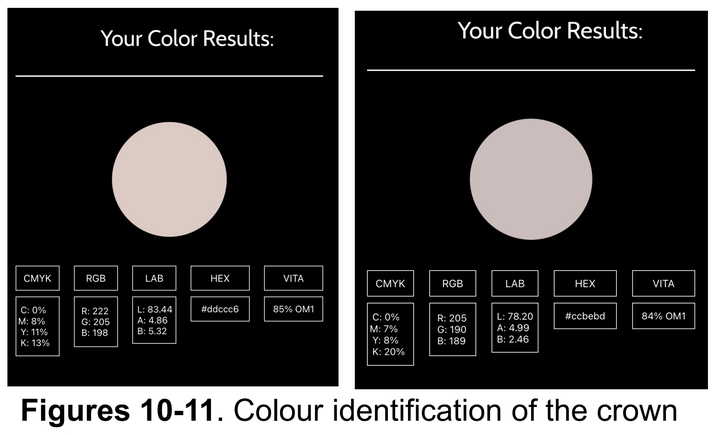


Figures 1-4. Anterior crown in the facial, lingual, proximal and internal view.

Figures 5-7. The veneer in the facial, lingual, and proximal view.

Figure 8. Digital application.

Figure 9. Wireless Bluetooth sensor connected to SmileShade software contacts surface of the crown and veneer.



Figures 10-11. Colour identification of the crown and veneer.

Project Name: Veneer Shade

Hex: #ccbebd

RGB: R: 205 G: 190 B: 189

CMYK: C: 0% M: 7% Y: 8% K: 20%

Lab: L: 78.20 A: 4.99 B: 2.46

Vita: 84% OM1

Date: 27 - 12 - 2022

Tooth: FDI 22

Tooth Location: Entire tooth

Treatment: Pre-Treatment

Lesion:

Whitening: (null)

Prothesis: Veneer

Note:

Project Name: Crown shade

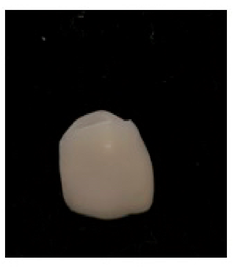
Hex: #ddccc6

RGB: R: 222 G: 205 B: 198

CMYK: C: 0% M: 8% Y: 11% K: 13%

Lab: L: 83.44 A: 4.86 B: 5.32

Vita: 85% OM1



Date: 27 - 12 - 2022

Tooth: FDI 11

Tooth Location: Entire tooth

Treatment: Pre-Treatment

Lesion:

Whitening: (null)

Prothesis: Crown

Note:

Figures 12-13. Data for color communication of the crown and veneer.

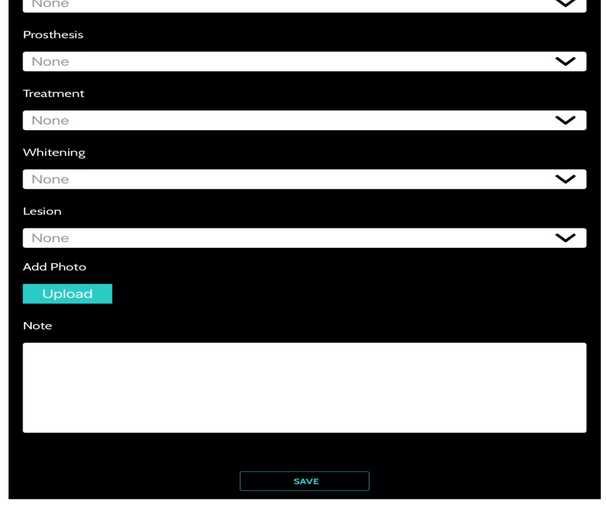


Figure 14. Data inputs.

Figure 15. QR code for application.

Figure 16. 3D printed zirconia overdenture bar.

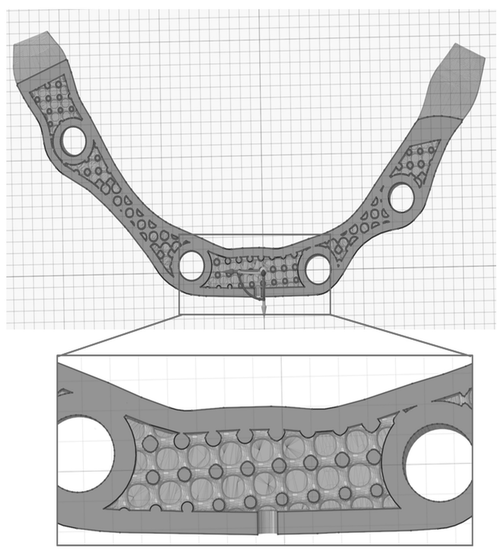


Figure 17. Lattice structure bar.

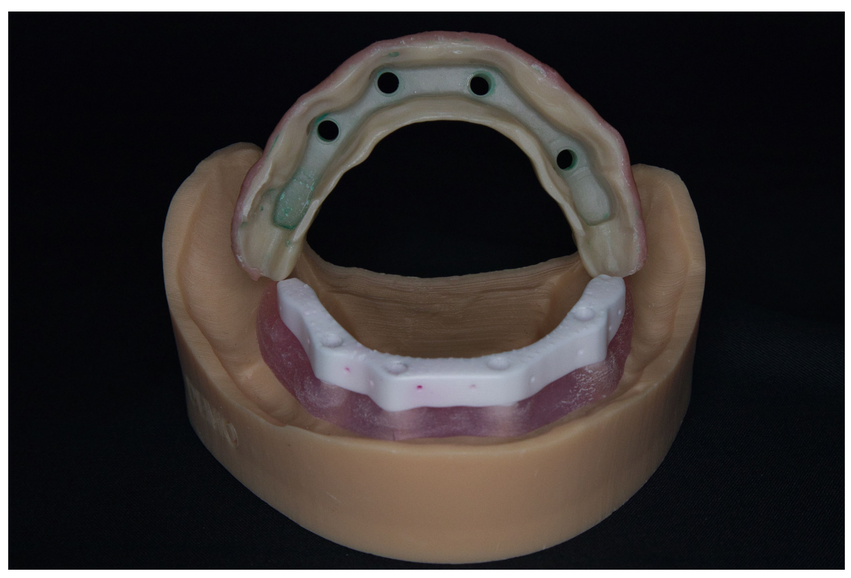


Figure 18. Soft tissue implant model with Ivotion denture.

INTRODUCTION

- Digital dentistry continues to evolve, making it possible to maintain or elevate the standard of patient care.
- Technologies may provide superior accuracy, improved efficiency and an enhanced experience for the clinician and patient.
- Digital workflows have demonstrated a reduced environmental impact.

METHODS & MATERIAL

3D Printed Zirconia

- 3D printing, or additive manufacturing, can be used for the fabrication of indirect restorations, such as anterior crowns and veneers (Figures 1-7).
- Dental software (Exocad) was used to digitally design the prostheses.
- Prosthetic units were printed in LithaCon 3Y 210 ceramic using lithography-based ceramic technology (Lithoz) and underwent debinding and sintering.

Colour Identification and Communication Application

- A novel digital workflow (Figure 8) was used to identify and communicate the colour of the printed prostheses.
- The software (SmileShade) was activated on an iPad and paired with the Bluetooth sensor, which contacted the surface of the crown and veneer (Figure 9), recorded the colour and transmitted objective information.
- The colour or shade was expressed as CMYK, RGB, LAB and HEX & Vita (Figures 10-13), had input options (Figure 14). Figure 15 provides the app.

3D Printed Zirconia Lattice Implant Bar

- 3D printed zirconia may be employed for the fabrication of implant overdenture bars (Figure 16 & 18).
- A lattice structure, (Figure 17) was incorporated, to save material, time, cost, and provide improved efficiency and sustainability.
- Physical testing of the bars has indicated favourable results.

RESULTS

- The zirconia 3D printed bar now offers patients a non-metal alternative.
- 3D printing or AM has undergone significant advances, and provides advantages, in terms of material used, fabrication time, efficiency and cost.
- Digital dentistry provides a virtual workflow that saves time and cost, and provides an improved experience for the clinician and patient with a more sustainable approach.

CONCLUSION

- Technological tools not only maintain the standard of care, but improve accuracy and efficiency, elevate the dental experience and may have a positive impact on sustainability.
- Clinicians and technicians should be open-minded to explore and assess these technologies and consider how their clinical workflow may be modified.

Presented at the 99th Annual Session of the Greater New York Dental Meeting in 2023.