

Initial presentation

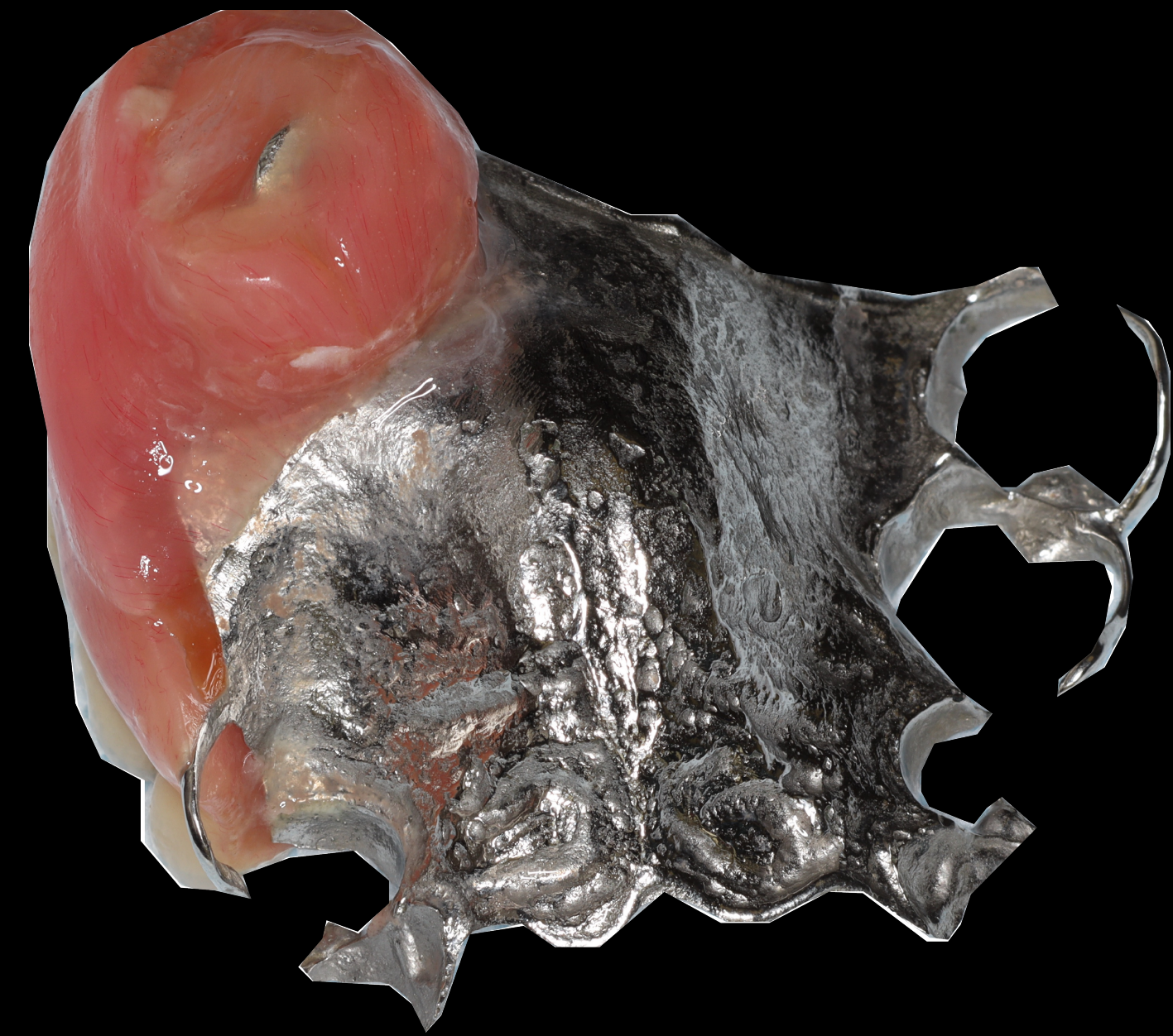


Figure 1. The original obturator was conventionally designed and processed 10 years back. Patient noted leaking in the bulb area, necessitating a hard reline or remake of the current obturator

Figure 2. Lateral view of obturator. Under-extension of acrylic on bulb anteriorly limited ability to predictably relined prosthesis to improve seal.



Digital workflow

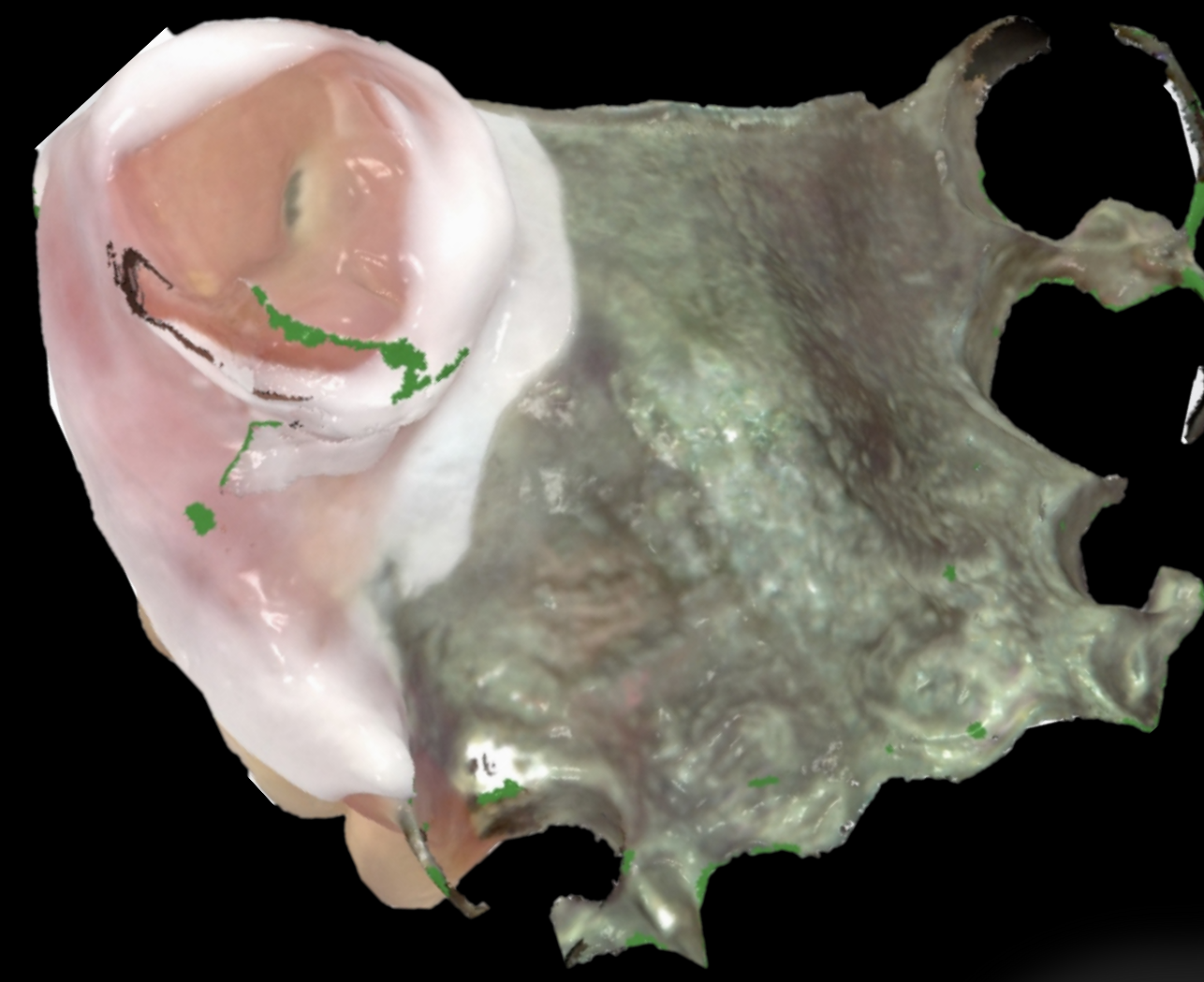
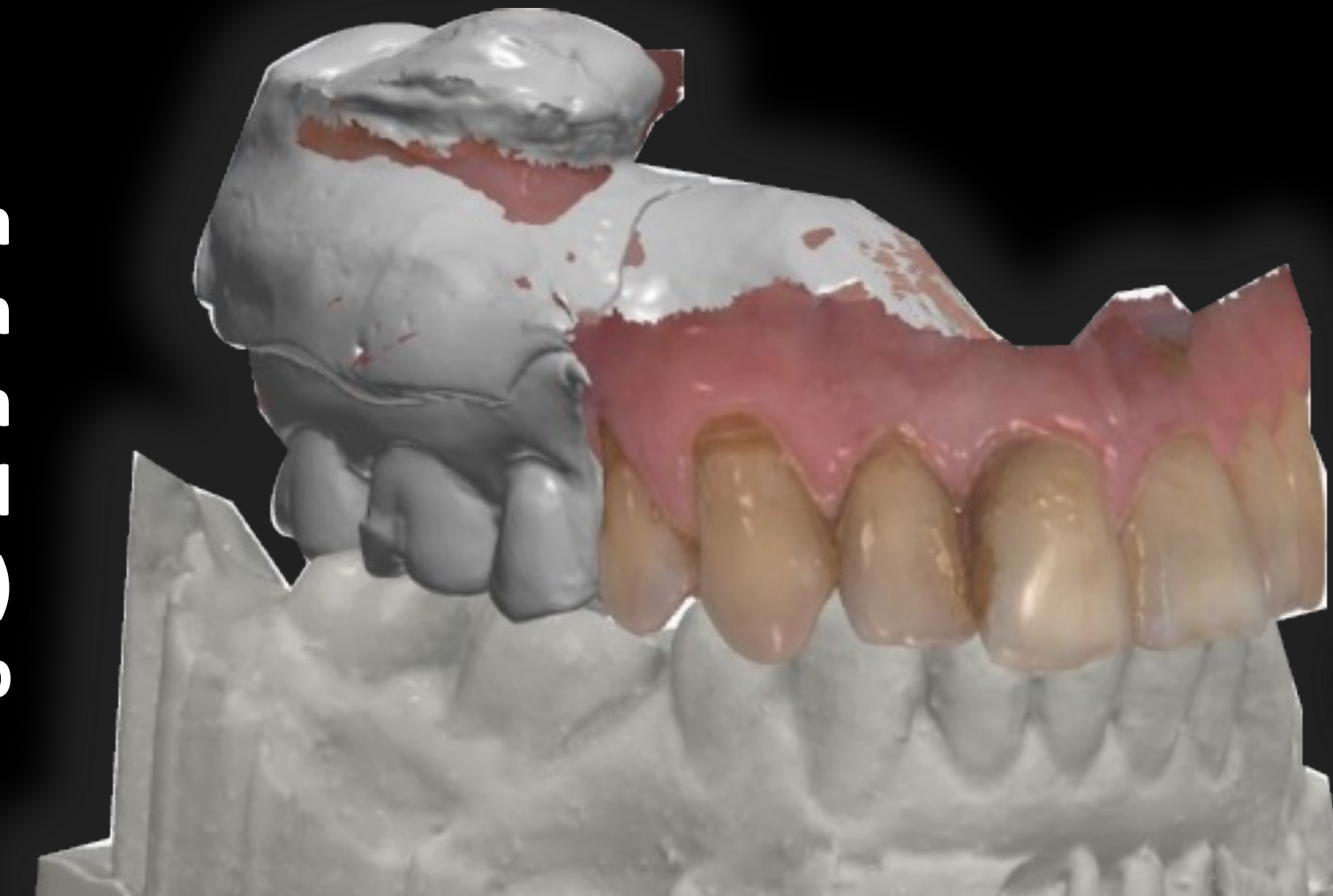


Figure 3. Digital scan (3Shape TRIOS) of original prosthesis with Coe Comfort™ wash impression covering the bulb.

Figure 4. Digital scan of prosthesis with wash impression (gray) and initial intra-oral scan (color) aligned to obtain bulb and tooth position.



Production of new prosthesis

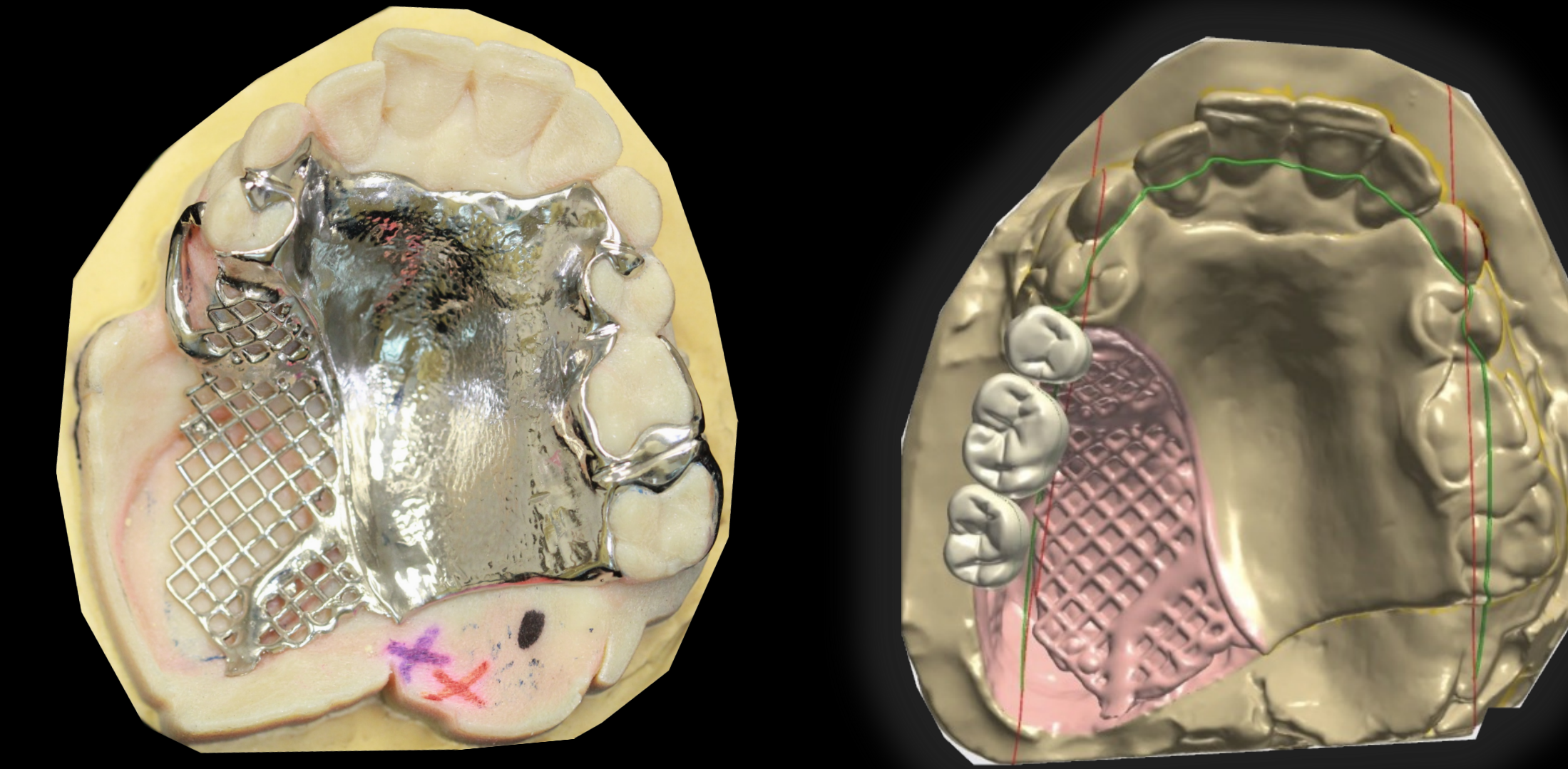


Figure 5 (left). Utilized 3Shape TRIOS intra-oral scan to digitally design and sinter metal framework. **Figure 6 (right).** 3Shape denture design module utilized data from digital impressions (see Fig. 3) to design denture base.

Figure 7. Lateral view of digitally designed denture base and lateral aspect of obturator bulb.



Delivery of prosthesis



Figures 8, 9. Extra-oral and intra-oral views of the final prosthesis.



Figure 10. Lateral view of final prosthesis. Traditional acrylic resin was used to fuse the bulb to the denture base and fill in areas not reachable by 3Shape denture design software.

Introduction: Conventional obturator fabrication involves multiple appointments and is time- and labor-intensive for both the patient and practitioner. For patients with pre-existing obturator prostheses, computer-aided design and manufacturing (CAD-CAM) offers the potential to shorten production time for replacement prostheses. This case presentation describes how a definitive obturator, replacing an ill-fitting prosthesis, was digitally designed and fabricated.

Case Report: This case report describes the digital workflow for the design and fabrication of a definitive obturator prosthesis for a 65-year-old male dentate patient with a history of SCC and maxillectomy. The patient's existing cast metal framework obturator was leaking in the bulb area covering the defect. Due to the patient's professional commitments, there was limited time for appointments. He also declined to go without his existing obturator for the time necessary to perform a laboratory processed hard reline. To allow him to continue using his existing prosthesis, a novel approach was used to fabricate a new prosthesis. In this novel approach, the framework was digitally designed and sintered. Once framework fit was confirmed clinically, a Coe-Comfort™ wash impression was made of the palatal defect with his existing obturator. The Coe-Comfort™ wash impression and the teeth position were then scanned using an intra-oral 3Shape TRIOS scanner. The bulb of the obturator and the teeth were designed using 3Shape CAD software and printed using a Carbon printer. The framework and printed obturator bulb and teeth were then merged using light cured denture resin. Traditional acrylic resin was used to back-fill any areas not reached by digital design.

Conclusion: The definitive obturator was delivered with minor adjustments; the patient was satisfied with the appliance. This approach decreased the number of appointments and clinical time to fabricate a new prosthesis. Future investigations may consider (1) Fully digital workflows avoiding the need for conventional acrylic backfill and (2) patient satisfaction with prostheses fabricated using both analog and digital techniques.

References:

1. Alfaraj, Amal, Fang-Yu Su, and Wei-Shao Lin. "CAD-CAM Hollow Obturator Prosthesis: A Technical Report." *Journal of Prosthodontics* (2022).
2. Hamed, Hala Abd El, Ahmed M. Hebeshi, and Eman Hussein. "Effect of Palatal Vault Depth on the Trueness of Metal Laser-Sintered and Cast Cobalt-Chromium Removable Partial Denture Frameworks." *Journal of Prosthodontics* (2022).
3. Londono, Jimmy, Amara Abreu, Philip S. Baker, and Alan R. Furness. "Fabrication of a definitive obturator from a 3D cast with a chairside digital scanner for a patient with severe gag reflex: a clinical report." *The Journal of Prosthetic Dentistry* 114, no. 5 (2015): 735-738.
4. Romani, Alessia, Luisa Paternoster, Giorgio Gastaldi, and Marinella Levi. "Patient-specific palatal obturator prosthesis from DICOM files through low-cost 3D printing: A case study." *Materials Today: Proceedings* (2022).