



Custom CAD-CAM Metal Housing for 20-year old Implant-Retained Mandibular Overdenture

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Introduction

This case report describes a digital workflow for design and fabrication of a custom metal housing in a patient presenting with two implant abutments of unknown manufacture and design. Digital design and manufacturing techniques were used to fabricate the customized cobalt chrome housing.

Case History

A 70-year old patient with a 10-year history of bisphosphonate use presented with 2 mandibular implants placed approximately 20 years ago. The existing ball attachment abutments retain rubber inserts (O-rings). The abutment measured approximately 4mm in diameter, 4.2mm in height and 3mm in diameter at the area where an undercut was present. No documentation regarding the implant and attachment system was available. Efforts to identify the abutments through cross-referencing with commercially available systems did not yield any matches. Thus, a customized metal housing would be designed and fabricated.

A physical impression of the mandible was made and digitized. Measurements of the abutment and O-rings were recorded. The housing was then digitally designed using an open-source computer-assisted design (CAD) program (Meshmixer; AutoCAD). Initial prototypes were printed for intra-oral try-in. Upon finalizing the design, the definitive cobalt chrome housing was fabricated via selective laser melting. A new mandibular denture was made using computer-aided design computer-aided manufacturing (CAD-CAM) techniques. The metal housings were subsequently picked up intra-orally.

Results

The patient was able to function well with the customized housing and CAD-CAM denture. Custom metal housing can offer sufficient retention for the prosthesis. Having a digital design file aids in reproducibility of the housing in the future.

Conclusion

To address challenges associated with abutments of unknown origin, digital techniques can be used to create customised solutions



Fig. 1 intaglio extra-oral view of existing dentures that patient presented with

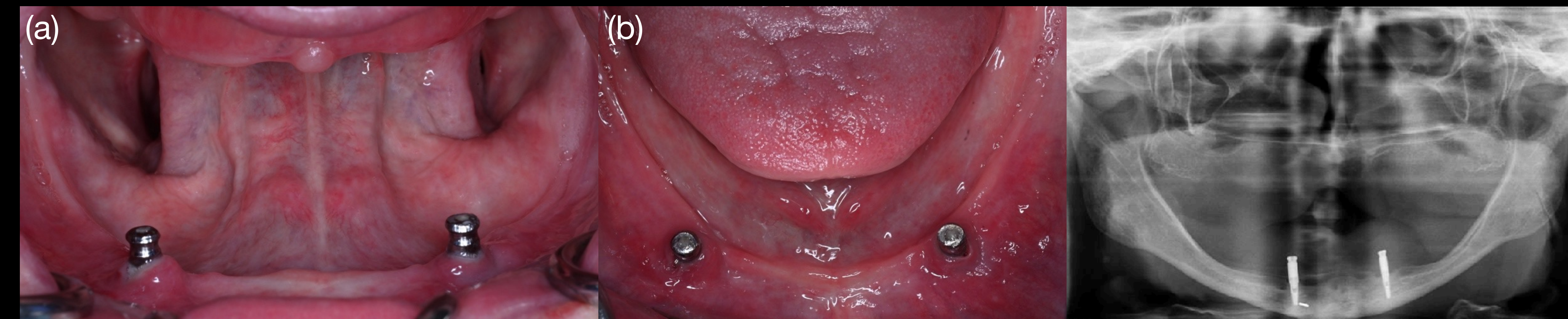


Fig. 2 showing intra-oral images at initial presentation.
(a) frontal view; (b) occlusal view

Fig. 3 showing panoramic radiograph at presentation



Fig. 4 showing intra-oral images with first prototype
(a) frontal view; (b) occlusal view

Fig. 5 final prototype in printed resin



Fig. 6 digital design of final housing

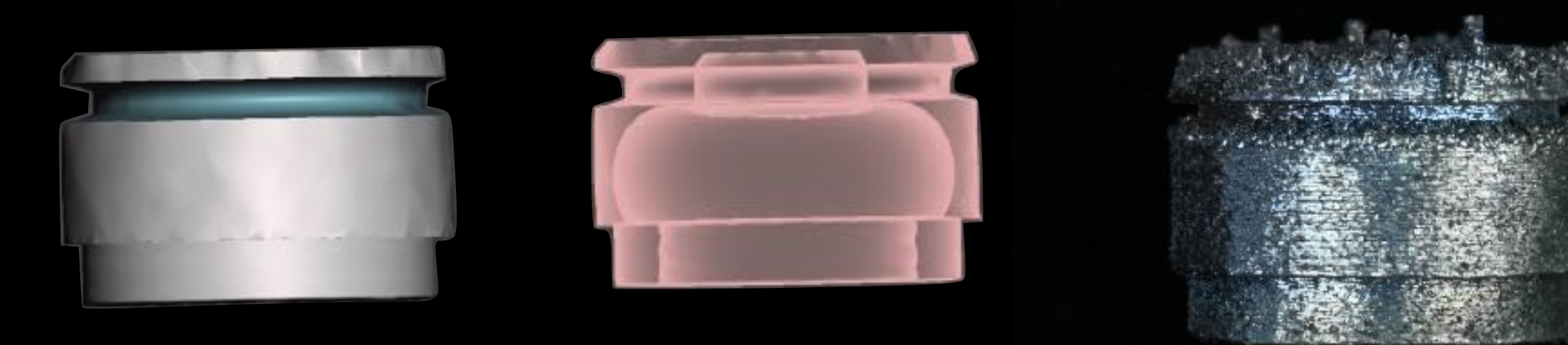


Fig. 7 final cobalt chrome custom housing

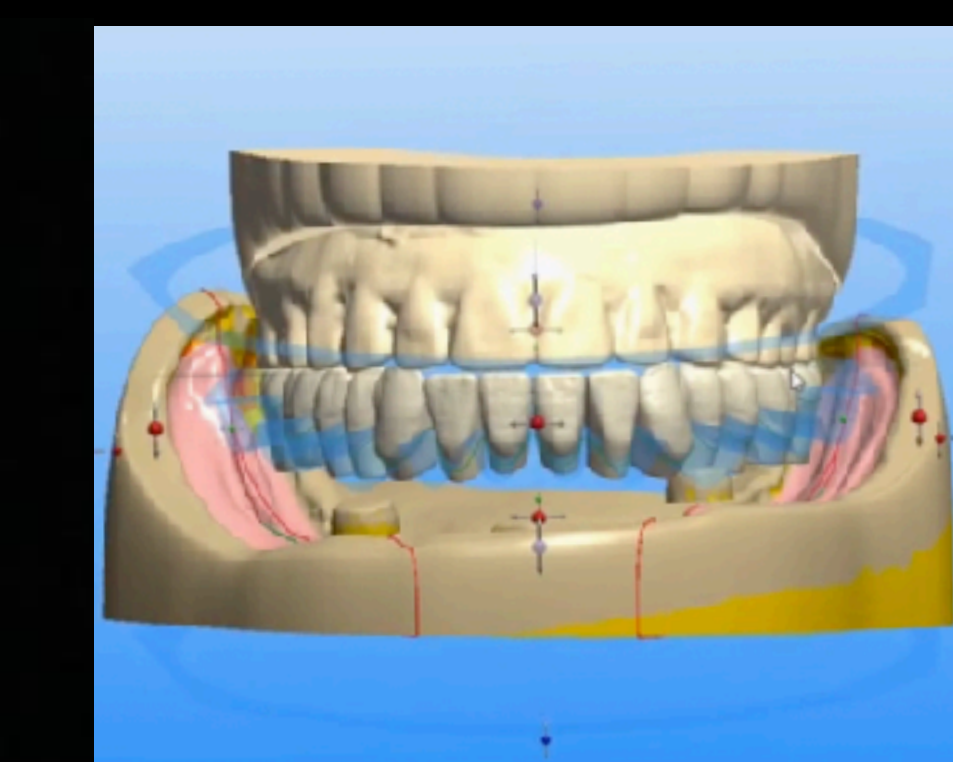


Fig. 8 digital set-up of mandibular denture



Fig. 9 intra-oral occlusal view of final cobalt chrome custom housing

Fig. 10 intaglio view of final denture

Fig. 11 frontal view of final dentures

References

- 1) ACP Position statement: Medication-Related Osteonecrosis of the Jaw. Chicago, American College of Prosthodontics, 2016