



Camera-to-CAD: a novel approach to merging maxillomandibular records and facial photography guided digital tooth setup in a streamlined digital denture workflow: A case report.



Salma Gad, BDS* | Ghida Lawand BDS, MSc | May Alshammari BChD, MClinDent Pros, F Pros RCSEd | Sherif Hosney, BDS, MS, FACP.

Introduction:

- Since traditional workflow rely on analog records, multiple try-ins and clinician-dependent tooth arrangement
- AI-assisted software can automate tooth setup using facial landmarks and occlusal parameters to reduce visits and increase predictability
- Digital dentistry enables facially driven design with 2D images, intraoral scans and virtual jaw relation records

Purpose:

To present a streamlined three-visit digital workflow for complete denture rehabilitation of a fully edentulous patient using digital smile design software with artificial intelligence (AI) features and integrating conventional maxillomandibular relation (MMR) records.

Patient Information & Chief complaint:

68-year-old edentulous female patient (ASA II) seeking rapid replacement of ill-fitting, unesthetic dentures that compromised speech, mastication, and self-confidence.

Clinical Findings:

- Extra-oral findings showed insufficient lip support, an average smile-line
- Intra-oral examination showed moderate ridge resorption (PDI Class 2).
- Baseline intra-oral scans (IOS) of both arches and radiographic imaging confirmed adequate bone and ruled out pathology.

Treatment objectives & Plan:

Clinical Visit 1: Data Acquisition

- 2D extraoral images: frontal at rest and full smile to aid with tooth placement (facial midline, interpupillary line, commissure line, incisal display at rest/smile, lip support)
- Intraoral scans of maxillary and mandibular arches
- Customized printed record base was fabricated for both arches with borders 2mm short

Clinical visit 2: MMR Records

- Functional border molding using printed record base and occlusal wax rims to establish the VDO.
- Esthetics, phonetics and freeway space were assessed using the wax rims.
- Occlusion was recorded in CR.

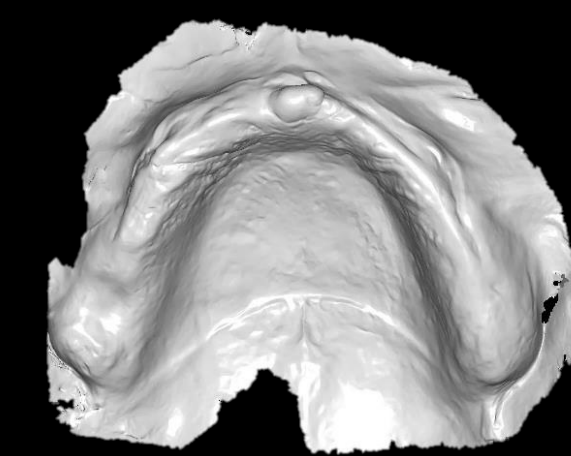
AI-driven tooth set-up:

- 2D facial photos were aligned with maxillary record base via facial landmarks and incisal edge display
- Tooth library and arch form were chosen based on facial width and smile arc
- Tooth setup was exported to the CAD software for teeth setup using lingualized occlusion

Clinical Visit 3: Delivery of milled maxillary and mandibular complete dentures was completed with minor adjustments needed.

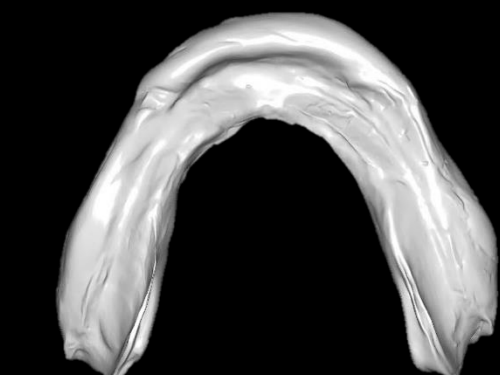
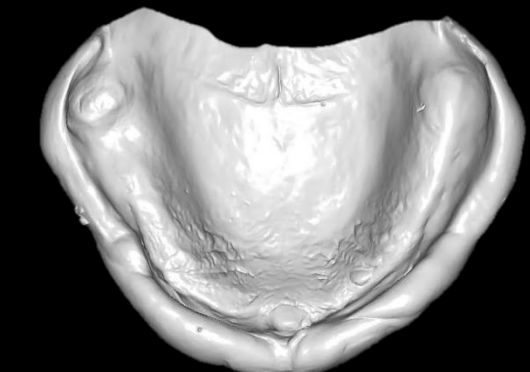
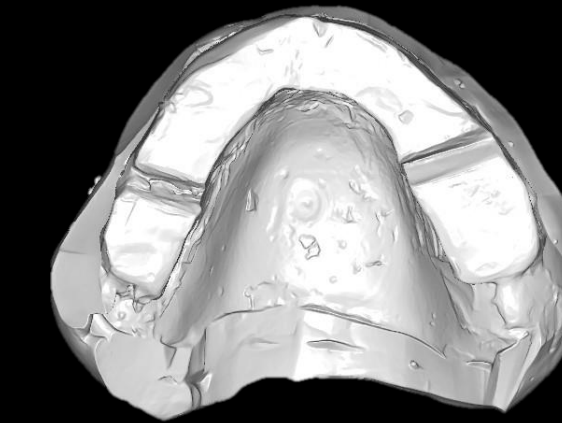
Visit 1

Intra-oral scan

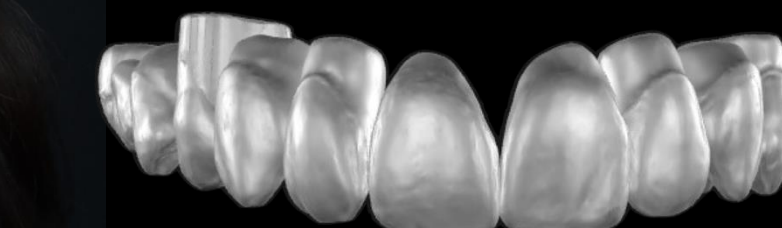
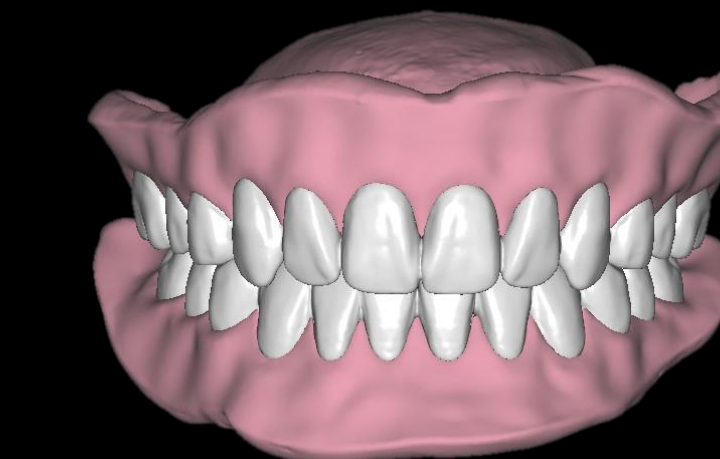
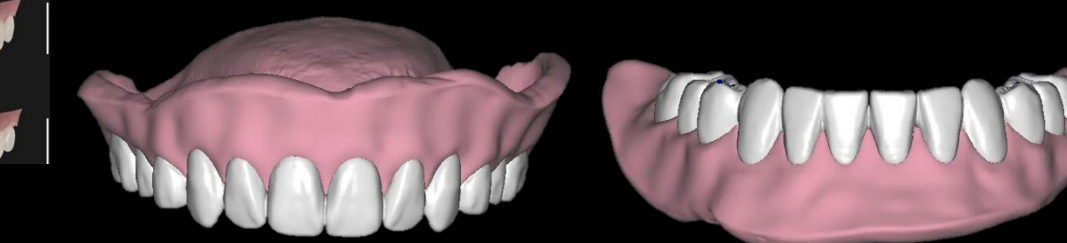
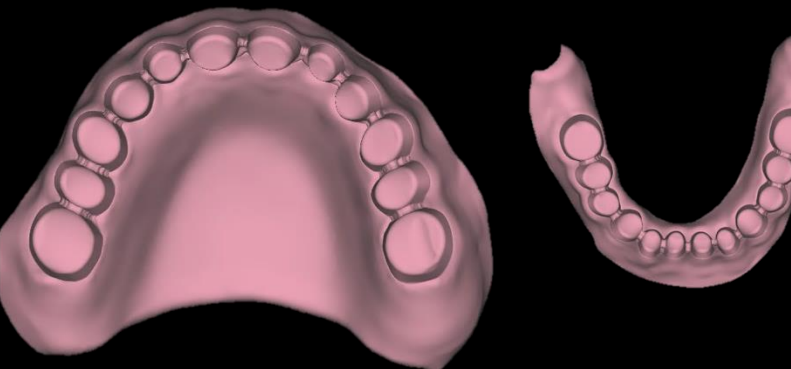
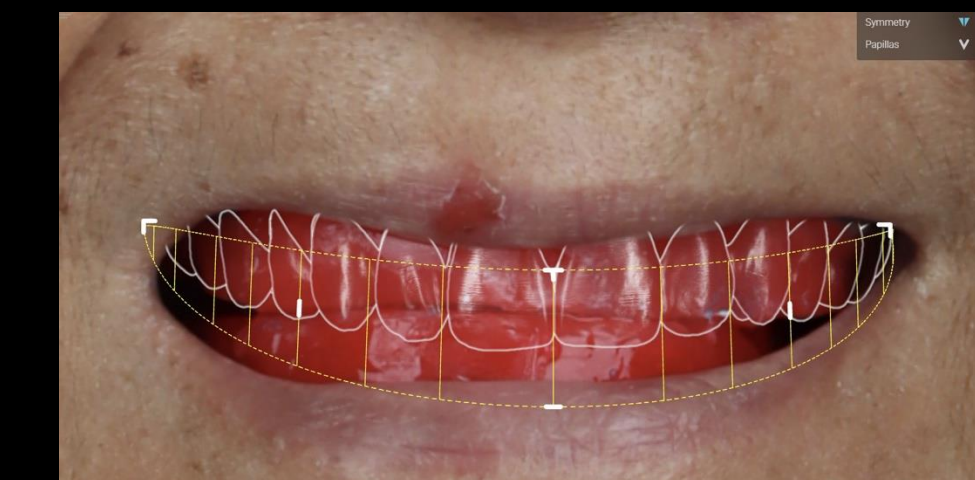


Visit 2

Scans of MMR records



AI generated teeth setup



Visit 3

Delivery of milled upper and lower denture



Follow up & Maintenance: patient is seen for 1 week follow-up and will be seen on annual basis for denture hygiene

Conclusion:

- Integrating conventional MMR with photography-assisted virtual tooth arrangement offers a predictable, patient-specific pathway for digital complete denture fabrication within three visits.
- This approach reduced chair-time and improved esthetic and functional outcomes with minimal post-delivery adjustments

Limitation:

- Accuracy of this technique depend on photo calibration, scan coverage of mobile tissue and accuracy of jaw relation records
- The AI generated teeth set-up is based on a 2D image as a reference which necessitate the need for the clinician to alter the buccolingual position of the teeth specially for posterior teeth