

ECO-IO Protocol

Truemergence LLC

Protocol ECO-IO: Edentulous / CBCT+Optical / IntraOral Scanner



We know that an optical scan of the patient's master model provides the most accurate fit of the surgical guide. Elsewhere on this site a technique that employs a laboratory optical scanner is presented ([ECO-DT Protocol](#)). However, that technique involves either extra trips by the patient or extra appliance fabrication by the clinician; at a cost to the patient. Intraoral scanners are becoming much more commonplace in clinical dental practice. But unlike the desktop scanner, an intraoral scanner cannot maintain the same coordinate system from scan to scan. We solve this problem by attaching a coordinate system to the patient's model. This protocol is explained below, as well as in this article posted on LinkedIn: [Scanbody for Hand-Held Scanning of a Denture for Surgical Guide Development](#).

Facilities / equipment needed:

- -CBCT scanner
- -Intraoral scanner

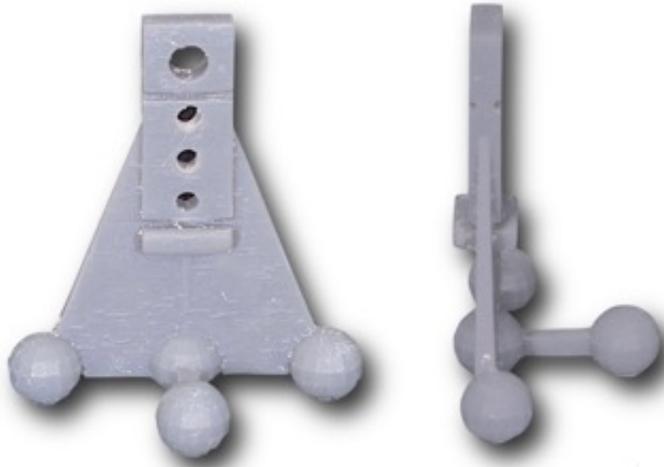


figure 1

figure 2

Items required:

- 1) Patient's existing denture (provided it is suitable for the treatment plan), or
 - -Denture waxup (if patients VDO, etc is being changed)
- 2) Suremark VF-20, V-20, or CF-23 marker tapes with dimensional ball
 - -We use the V-20 ← (Click to zoom)
 - -Here is a link to Suremark's site page with these products on it: [Suremark Dental Markers](#)

- 3) Cotton rolls
- 4) Scanbody for denture model, which is a 3D Printed add-on coordinate system (figures 1 & 2). The printable file for this is available at no cost on “Thingiverse”: [Surgical Guide Denture Scanbody](#). If you or your lab do not have access to a 3D Printer, you can request one from us for shipping charge only. [Go here to make that request.](#)



figure 3

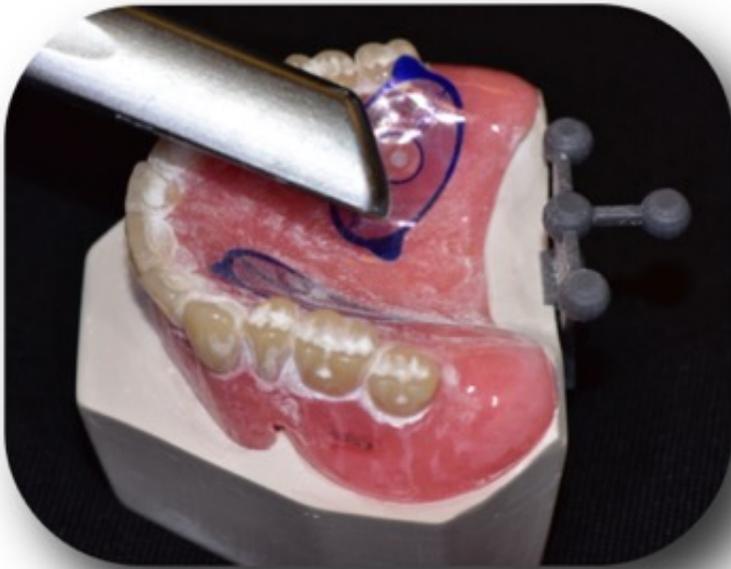


figure 4

Procedure:

- 1) Place 5 or 6 of the tape markers on the exterior surface of the denture (See Title Image).
- 2) CBCT Scan: Patient Wearing Stickered Denture or Waxup:
 - -If the patient's opposing arch has a removable prosthesis, he/she should be wearing it.
 - -Place cotton rolls in the vestibules.
 - -Patient should bite on additional cotton rolls in the posterior quadrants. It is important that the patient NOT be in occlusion during the scan.
 - -Field of View (FOV) should be limited to the dental arch in question and extend apical to just beyond the inferior border of the orbits (maxillary scan) or inferior border (mandibular scan).
 - -Retrieve the denture, making sure all stickers remain intact.
- 3) Optical Scan with your Intraoral Scanner:
 - -Create a Denture + Model assembly. Use one of the following Denture + Model options:
 - a) If you are using a denture waxup with the master model it was made on, this is your Denture + Model assembly.
 - b) Otherwise, In the lab: Pour-up the denture in alginate or PVS, and (optionally) flip onto a base. This is your Denture + Model assembly (figure 3).
 - -Attach the scanbody to the denture model as shown (figure 2). The 3 holes you see are 2mm in diameter, which is the same as implant pilot drills for most systems; so you just need to use your old pilot drills to drill into the cast. I have

- found [2mm x 10mm screws you can get on Amazon](#) that work great for affixing the coordinate system to the model. The one large hole at the most inferior position is for retention in impression material, in the event that you "pour up" the denture in alginate or PVS, then insert the scanbody before the material sets. Place the Denture + Model assembly in the desktop scanner and scan full arch.
- -If you do not wish to use the scanbody, see the "[Workaround](#)" at the bottom of this page.
 - -Scan the denture with your intraoral scanner (figures 3 & 4). **⚠ Important:** Scan the scanbody first. This way, you have an "anchor point" to return to if your scan wand "loses its place".
 - -Then remove the denture from the model without disturbing the model clamp, and scan the edentulous model. Remember to scan the scanbody first so you have a reference area should you "get lost" scanning the edentulous tissue.
- 4) Prepare Scans for Export to Us:
 - -CBCT: ask technician to give/send you files in one of these two formats:
 - -Standard DICOM SET (A folder with hundreds of .DCM files, one for each slice)
 - -Anatamage Invivo (.INV file)
 - -Intraoral scanner files: Convert to STL files of (1) the denture, and (2) the model.
 - 5) Upload:
 - -Go to our [upload page and upload the 3 files](#).
 - -We will be able to merge your files with the CBCT image and produce your surgical guide, as you can see below.

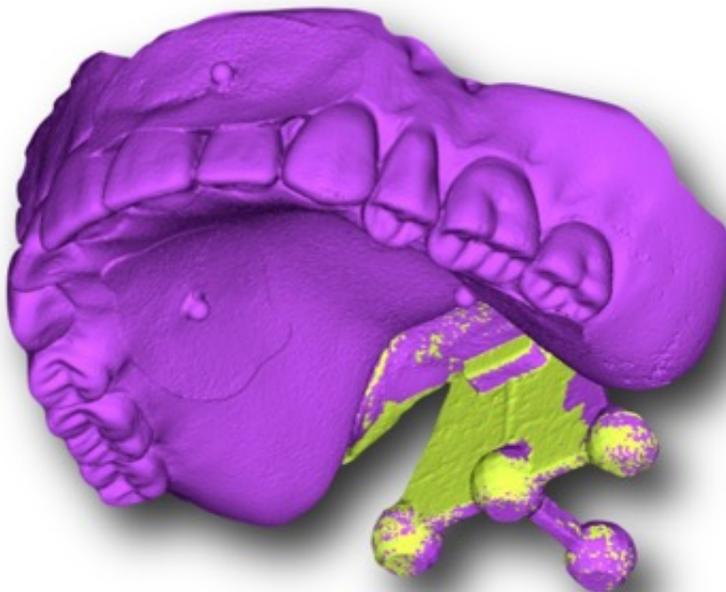


figure 5



- • Workaround for Scanbody: If you do not have access to a scanbody (or you just do not feel like using one), you can create and use landmarks on the denture model:
 - -Pour up the denture intaglio with exaggerated land areas (or if a waxup on master model, make sure you have robust landmarks)
 - -Negative landmarks: Place notches in at least 3 locations on the land area.
 - -Positive landmarks: Affix 3 or more items to the land areas. Blobs of plastic or composite, thumbtacks, thick tape, etc.
 - -Proceed as in Section 3, Item 3 above, just make sure to scan your landmarks first to create a frame of reference for your wand.