Reference Denture Scan Strategy by Mr. Eric D. Kukucka, DD

Designed for the optimal scan experience of reference dentures with 3Shape TRIOS

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Description & Introduction

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Introduction

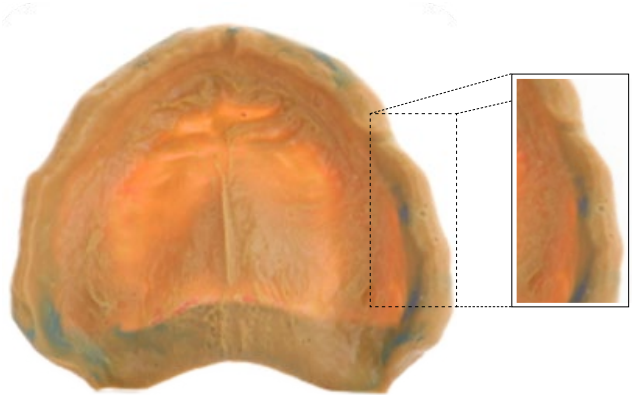
Using 3Shape TRIOS scanners, you can scan impressions within a patient's existing complete removable prosthesis reliably, predictably, and efficiently. While these scanners have been optimized to effectively scan these impression surfaces in a seamless, integrated manner, a designated scan strategy will render excellent scan results and a high-quality definitive prosthesis.

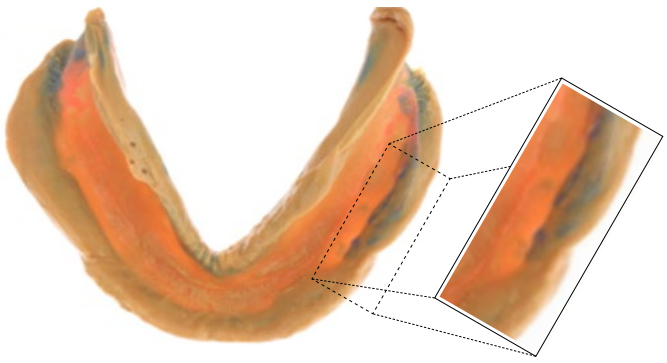
The reference denture technique is preferred by clinicians and technicians globally for its seamless, technically and clinically integrated workflow. This scan strategy delivers increased patient acceptance and satisfaction, reduces postoperative adjustments, and ultimately improves the patient experience as it requires fewer visits to the clinic. To understand how to the obtain the best possible scans, you must designate distinct strategies for the maxilla and mandible, which will be described in detail on the following pages.

Getting Started:

1. Before you begin scanning, evaluate the prosthesis for its distinct characteristics, considering undercuts; the depth, height, and width of the alveolar ridges; peripheral border thickness; and overall size and shape. Go over the strategy in your mind. Visualize the win, by which I mean a perfect scan.
2. Important: Remove any excess impression material on the facial, occlusal, and lingual aspects of the prosthesis to avoid miss-alignment of scans and inaccuracies in occlusion.
3. Under the order form creation it is imperative that you select the removeable scanning indication. Once you have selected the removeable indication and selected the arches you wish to scan the system will prompt you and ask you "how do you wish to Scan the Lower Jaw" / "How do you wishto scan the Upper Jaw". Since we are scanning reference denture impressions we will be selecting the impression scan.
4. Depending on your design software, you should probably leave your scanned model open to prevent any import fails due to a so-called "watertight" model.

Quick Tip
After you have captured the internal alveolar ridge width and depth, allow these scans to render. When you begin to re-scan the peripheral borders, keep the 2D live image, so that at least one third of the window is positioned over the already aligned alveolar ridge scans and no more than two thirds is positioned over the new scans.





Maxilla

Proper strategy is required to achieve global accuracy in scanning the maxillary impression within the prosthesis due to its wide surface and anatomical features, including palate shape, undercuts, and ridge form. Fortunately, this can be handled easily.

Path #1:

1. Start the scanning process from the tuberosity area of one side of the prosthesis and proceed along the centre of the residual ridge towards the tuberosity area of the opposite side.
2. Continue to bring the scanner back across to the incisive papilla (midline point) area and then begin to finalize the palatal "swipe."

Note: You are scanning a wide area, so the scanner should be moved in such a way that new images are easily and accurately stitched to the already captured surface.

3. Rotate your scanner on a 45-degree angle and scan the internal/buccal portion of the alveolar ridge.
4. Stop the TRIOS scanner and allow the scans to render completely. This waiting period is paramount, as it allows for better global accuracy and for the scans to better align themselves in the upcoming passes.

Paths #2 and 3:

Note: These steps can be accomplished in a single pass, but this is often challenging. If you are new to scanning reference dentures, I recommend you work in stages. In this sequence which side is scanned first is of no reference and you can develop a process that works best for you..

1. Position the scanner on the maxillary tuberosity and slowly rotate it towards the peripheral border extension in this region.
2. Once you have captured that initial peripheral border, continue to scan the entire peripheral border along the maxillary arch.
3. Roll the opposing tuberosity peripheral border to ensure cross-arch alignment of the tuberosities.

Note: It is ideal to have one third of the scanner capturing the palatal or ridge portion from path #1 during this entire scan if possible.

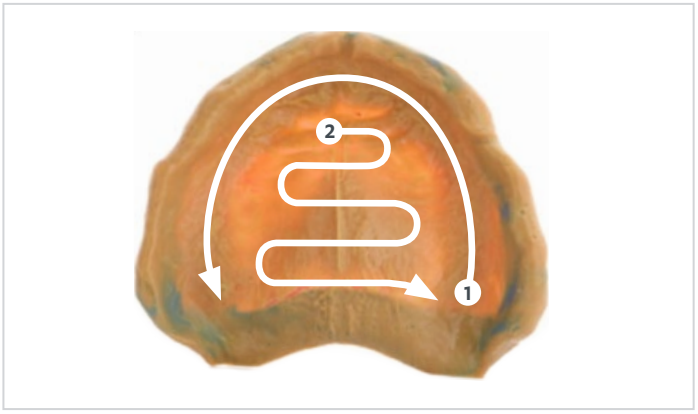
1. Scan the facial/labial/buccal and occlusal surfaces of the prosthesis. This will allow for a reference in the bite scan alignment as well as provide the necessary information to the dental technician using 3Shape Dental Systems.
2. Once you have captured all the occlusal surfaces, do not scan the palatal portion of the prosthesis to avoid a "watertight" scan, which can create issues for the dental technician disseminating the scans in dental systems.

Quick Tip
Take your time. Scan capturing can be stopped at any time and easily restarted, if needed.

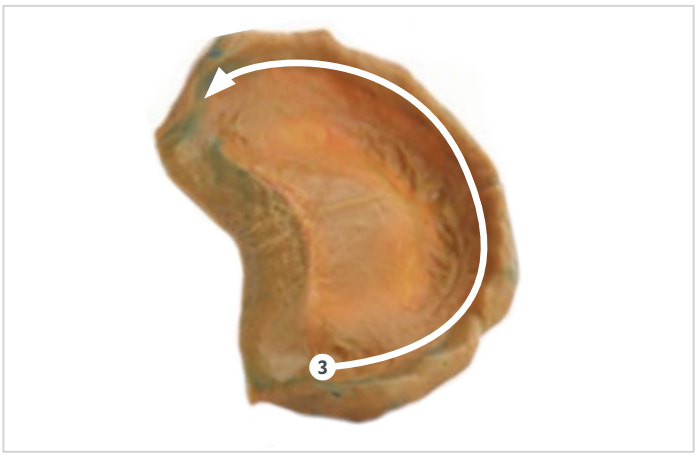
Maxilla

Step-by-step:

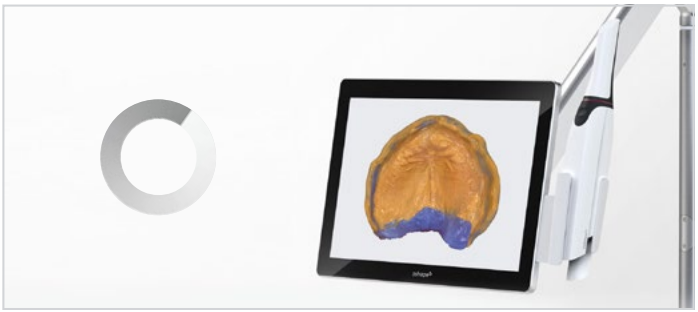
1. Start the scanning process from the tuberosity area of one side of the prosthesis and proceed along the centre of the residual ridge towards the tuberosity area of the opposite side.
2. Return to the midline and complete the scan of the palate using smooth side-to-side movements.
3. Proceed with the buccal aspect of the ridge at a 45- degree angle.
4. Allow the scans time to render.
5. Scan the peripheral borders, buccal/facial, and occlusal of the teeth. I recommend working in two phases, beginning on either side; whichever is scanned first is of no relevance.



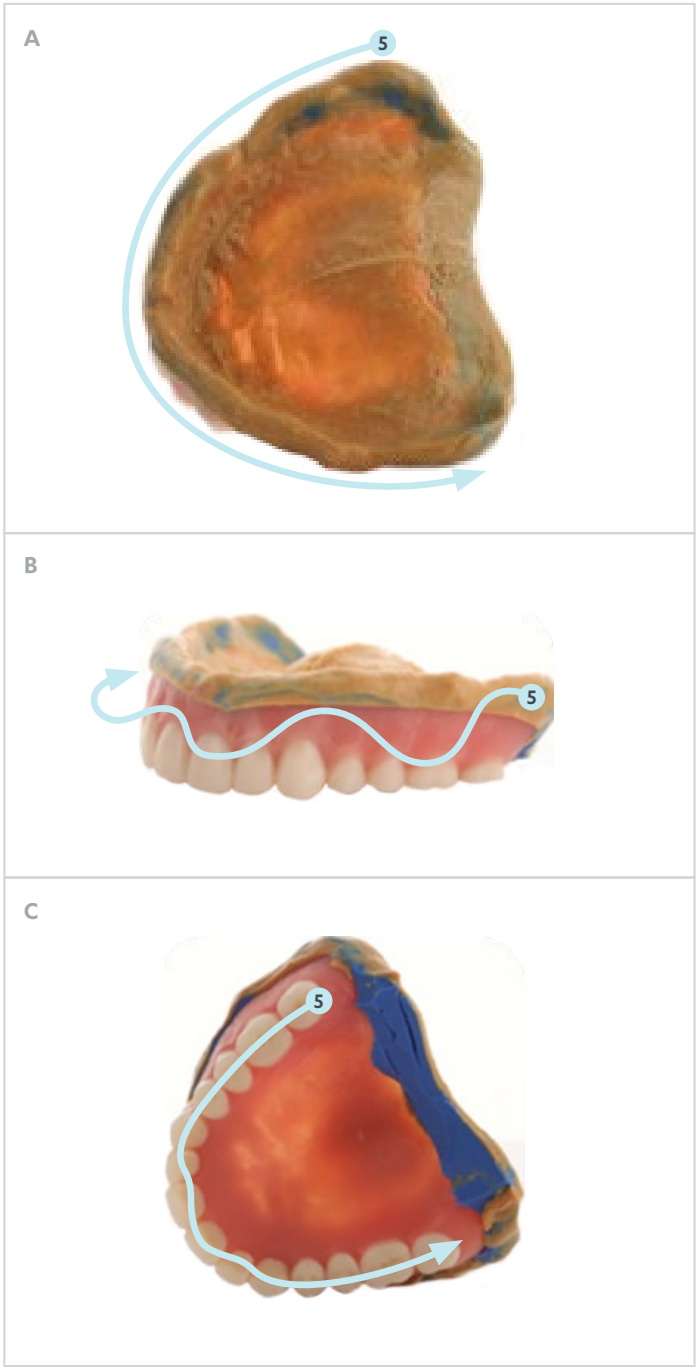
Step 1-2



Step 3



Step 4



Step 5

Mandible

The goal of scanning the mandibular impression within the prosthesis is to achieve global accuracy. This goal is achievable, but it requires a proper strategy due to the mandibular impression's narrow surface and anatomical features, like the retromolar pad, alveolar ridge, lingual borders, and undercuts.

Path #1:

1. Start the scanning process from the first molar region, transitioning back to the retromolar pad area of one side.
2. Proceed along the centre of the residual ridge while rotating the scanner from side to side.
3. To maximize capture of the entire buccal and lingual aspects of the impression, focus on the alveolar ridge as well as some of the peripheral borders, if possible, for both buccal and lingual aspects.
4. Continue in this style toward the retromolar pad on the opposing side. Note: You are scanning a narrow area, so the scanner should be moved in such a way that new images are easily and accurately stitched to the already captured surface.
5. Stop the TRIOS scanner and allow the scans to render completely. This waiting period is paramount for achieving optimal global accuracy and for the scans better aligning themselves in paths #2 and 3.

Paths #2 and 3

Note: These steps could be accomplished in a single pass, but this can be challenging. If you are new to scanning reference dentures, I recommend you work in stages. Whichever side you scan first is of no relevance; develop whichever process works best for you.

1. Position the scanner on the retromolar pad and slowly rotate it towards the lingual peripheral border extension in this region.
2. Once you have captured that initial peripheral border, continue to scan the entire lingual peripheral border along the mandibular arch. Roll at the opposing retromolar pad peripheral border to ensure cross-arch alignment.

Note: It is ideal to have one third of the scanner out capturing the ridge portion from path #1 during this entire scan, if possible.

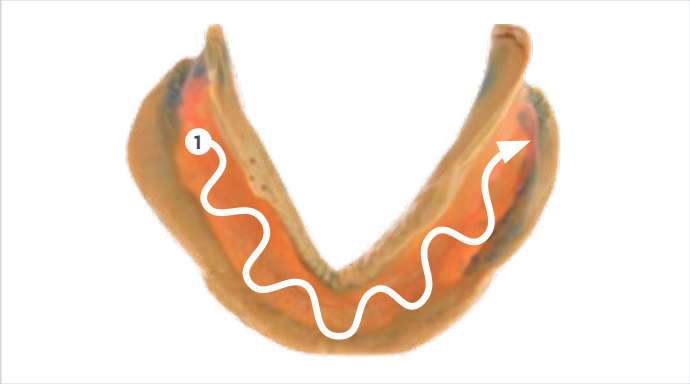
3. Scan the facial/labial/buccal and occlusal surfaces of the prosthesis. This will allow for a reference in the bite scan alignment as well as provide the necessary information to the dental technician using 3Shape Dental Systems.
4. Once you have captured all the occlusal surfaces, do not scan the lingual flange portion of the prosthesis to avoid a "water-tight" scan, which can create issues for the dental technician disseminating the scans in the design stage afterwards.

Quick Tip
Take your time. Scan capture can be stopped at any time and restarted easily, if needed.

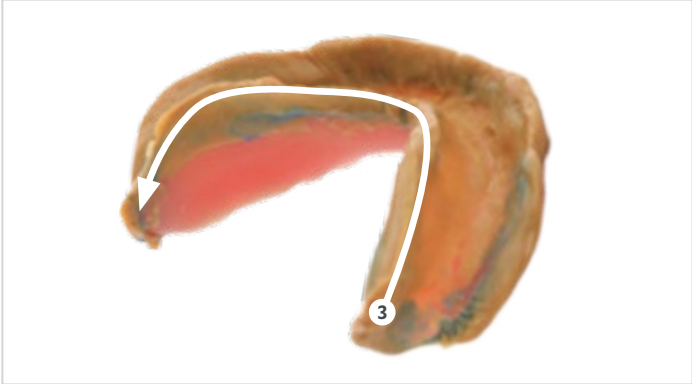
Mandible

Step-by-step:

1. Start the scanning process from the first molar area on one side of the mouth and proceed to the retromolar pad. Move back along the centre of the residual ridge and constantly rotate across the ridge towards the area of the opposing side.
2. Allow the scans time to render.
3. Re-start the scan at the retromolar pad, roll the scanner to the lingual peripheral borders, and scan the entire lingual border.
4. Position the scanner back on the retromolar pad. Rotate the scanner across the buccal peripheral borders, and scan the buccal borders and facial portion of the prosthesis.
5. Scan the buccal and occlusal surfaces of the teeth.

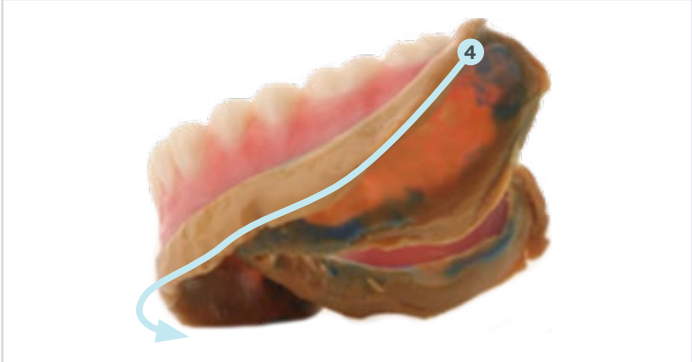


Step 1

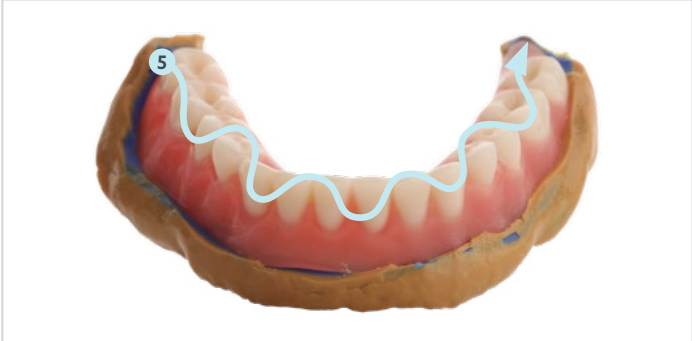


Step 3

Step 2



Step 4



Step 5

Occlusion

The goal in scanning the occlusion is to ensure adequate alignment of the maxillary and mandibular reference dentures in centric occlusion. This can effectively be accomplished by conducting the occlusion scan in two manners:

1. Utilizing the bite scan feature
2. Conducting a 360 bite scan alignment

Personally, I prefer the bite scan feature for its predictability, efficiency, and accuracy. The feature involves simply scanning the maxillary and mandibular reference dentures either intra- or extra-orally. I prefer to conduct this method by using a rigid bite registration material and capturing the patient's repeatable unstrained centric relation record.

Important: Ensure you do not have an excessive amount of registration material on the buccal aspect for the buccal bite scan. You may trim any excessive portion away with a scalpel blade to ensure you see the buccal surfaces of the posterior teeth.

Bite Scan (intra- or extra-orally):

1. Scan right side bite by positioning the scanner 50% on the upper arch and 50% on the lower arch. Continue the bite scan for an additional 3 seconds after the bite has aligned.
2. Scan left side bite by positioning the scanner 50% on the upper arch and 50% on the lower arch. Continue the bite scan for an additional 3 seconds after the bite has aligned.

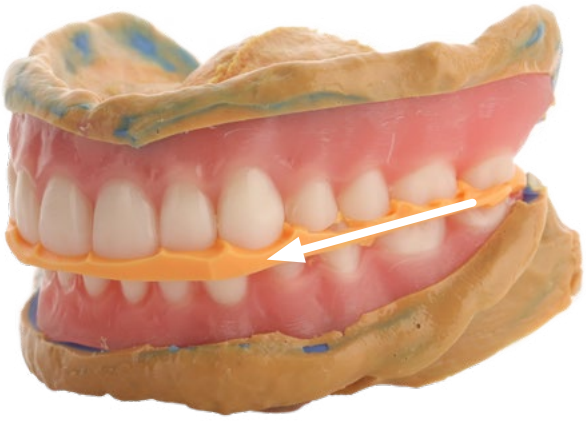
360 Bite Scan

1. Important: Conduct a very stable and secure bite registration that inhibits the possibility of any movement of the registration as you are scanning it in your hands.
2. If possible, scan the entire maxillary prosthesis in the same manner as the maxillary impression scan without stopping the scanner.
3. Proceed to scan the entire facial portion of the maxillary arch, and transition to the lower facial.
4. Once you have scanned the entire facial portion, commence scanning the buccal peripheral border of the mandibular arch, and transition to scanning the alveolar ridge and lingual peripheral borders in the same manner as the maxillary arch.

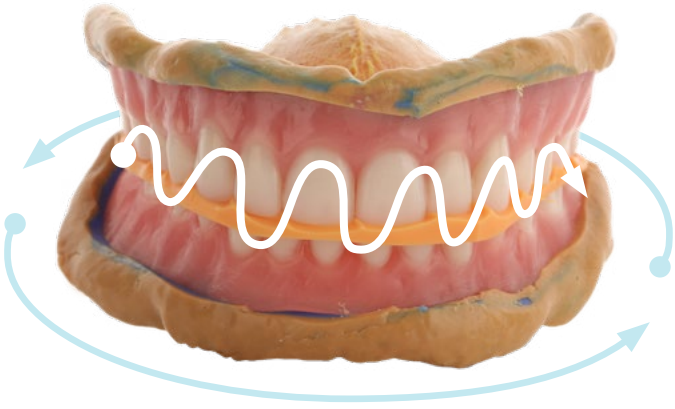
Step-by-Step:

5. Scan the maxillary impression surface.
6. Roll the scanner over the entire front side.
7. Roll the scanner over the peripheral border of the lower.
8. Scan the internal impression surface in its entirety.
9. Align the 360 Scan with three-point alignment for the maxillary arch and mandibular arch.

Right Bite



Left Bite



360 Bite Scan

Conclusion

Reference Denture Impressions

Monoblock Try-in

Final Digital Dentures

Eric Kukucka
Denturist

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