Scan Protocols: Tips to Take Great CBCT Scans

***Note**: All machines acquire scans differently, so you may need to tweak these suggestions for your specific machine. Patient positioning recommendations assume the patient is sitting or standing.*

First, determine what the scan is for (aka Study Purpose): Implant, Impacted teeth, Pathology, Endodontics, Orthodontic, Airway, TMJ, Sinus, Pain, etc.

- **Implants:**
  - *FOV:* Depends on which arch(es) you are planning to place the implant(s).
    - For one implant: Small (~4 or 5 cm in height and diameter)
    - For multiple implants in one arch (maxilla or mandible): Medium (~5 cm high and 8 cm diameter).
    - For multiple implants in both arches: Large (~8-10 cm in height and diameter)
  - *Voxel: ~0.2-0.3* mm
  - *Time:* 15 sec. or longer
  - *Positioning:* Occlusal plane parallel to the floor. If you are considering implant placements on both arches, then center the occlusal plane in the vertical dimension.
  - *Other:* Some implant planning systems require separation between the jaws and between the teeth and soft tissues. You can use cotton rolls or a bite registration to separate the teeth as needed. Cotton rolls placed in the vestibule will separate the teeth and the soft tissues.
- **Impacted teeth:** Same criteria as Implant Cases (without the cotton rolls)
- **Pathology and Pain:**
  - *FOV:* Depends on how big the pathosis/region of interest (ROI) is.
    - For one effected quadrant: Small (~4 or 5 cm in height and diameter)
    - For one effected arch (maxilla or mandible): Medium (~5 cm high and 8 cm diameter).
    - For both arches effected: Large (~10-15 cm in height and diameter)
    - NOTE: Remember for evaluation of Pain, a larger FOV may be appropriate due to the propensity for pain to refer from one area to other.
  - *Voxel: ~0.12-0.*2 mm
  - *Time:* 15 sec. or longer
  - *Positioning:* Occlusal plane parallel to the floor.
- **Endodontics:**
  - *FOV:* Small (~4-5 cm). Endodontic evaluation requires very high resolution, so as small as possible while still capturing the entire Region of Interest (ROI). If there is concern for referred pain, be sure to image both the mandibular and maxillary teeth in the ROI.
  - *Voxel:* as small as your machine will allow (0.075-0.125 mm)
  - *Time:* 15 sec. or more.
  - *Positioning:* Occlusal plane parallel to the floor.

BeamReaders, Inc.
Kennewick, Washington 99336
916.771.3505
www.beamreaders.com

- **Orthodontic/Orthognathic Surgery:**
  - *FOV:* Large (minimum 13 cm in height and diameter). Include as much of the skull in the scan as possible: ensure the scan extends from glabella (superior to the orbits) to the soft tissue mention (below the inferior border of the mandible) and captures the facial soft tissue/profile.
  - *Voxel:* ~0.2-0.3 mm
  - *Time:* ~15-20 sec.
  - *Positioning:* Occlusal Plane parallel to the floor. Teeth should be lightly touching in maximum intercuspation (MIP)
  - *Stabilization:* Ideally use a headband or occipital brace. Avoid use of a chin cup, as this may change the patient profile. Avoid the use of a bite stick, as this alters the occlusion and TMJ relationships.
- **Airway Studies:**
  - *FOV:* Large (minimum 13 cm high and 15 cm diameter). Visualization of the adjacent cervical spine and entire nasal cavity and jaws are needed. Some clinicians may also want to visualize the hyoid bone.
  - *Voxel:* ~0.2-0.3 mm
  - *Time:* 15-20 sec.
  - *Positioning:* Occlusal Plane should be parallel to the plane of the floor. Tell the patient to swallow once before the scan begins and then hold still. The patient's teeth should be closed in their habitual bite. The tongue should be positioned against the roof of the mouth during the scan. This allows for a more accurate airway assessment compared to having the tongue in a retruded position.
  - *Stabilization:* Ideally use a headband or occipital brace. If a chin cup or bite stick are used, be sure the neck is in a neutral position.
- **TMJ Cases:** Depending on the clinical circumstances, there are two scan protocols for imaging the TMJ)
  - **Option 1:** A single scan in closed position
    - *FOV:* Large (~ 10 cm in height). FOV should extend from ~1 inch above the mandibular/glenoid fossae (TMJ) to the inferior border of the mandible and include both upper and lower arches; the patient's occlusion/biting position should be visualized.
    - *Voxel:* ~0.2-0.3 mm
    - *Time:* 15-20 sec.
    - *Positioning:* Teeth lightly touching in MIP, occlusal plane parallel to floor.
    - *Stabilization:* Ideally use a headband or occipital brace. The chin cup can alter the condylar position.
  - **Option 2:** One scan in closed position and one scan in open position
    - See option 1 above for closed position protocol.
    - NOTE: The open position scan is being used solely to determine special relationships of the TMJ and therefore the FOV can be much smaller, and the resolution can be much lower than the closed scan (aka much lower radiation dose to the patient).
    - *FOV:* Large (~ 4 cm in height). FOV should extend from ~1 inch above the mandibular/glenoid fossae (TMJ) to just blow the sigmoid notch/neck of the condyle.
    - *Voxel:* ~0.3 mm
    - *Time:* 5 sec.
    - *Positioning:* Patient in maximum opening, occlusal plane parallel to floor
    - *Stabilization:* Ideally use a headband or occipital bar.

BeamReaders, Inc.
Kennewick, Washington 99336
916.771.3505
www.beamreaders.com

- **Pediatric Cases:** Special considerations should be taken when scanning children. Remember, one size does not fit all! For more information, please visit www.imagegently.org.
    - Select x rays for individual's needs, not merely as a routine
    - Collimate beam to area of interest
    - *Time*: Reduce your time compared to your adult settings.
    - *Voxel*: ~0.3+ mm
    - *Positioning:* according to study. (See above)

Once you have taken the scan, check that the *entire* region of interest is within the FOV, and the patient did not move. (The best way to check for movement is by looking at the cross-section of the mandible if acquired and make sure the cortical borders does not have a shadow around it or check the maxillary sinus-they should have clean borders).

BeamReaders, Inc.
Kennewick, Washington 99336
916.771.3505
www.beamreaders.com