

Acquiring images using CMOS Sensors

 dpes.dentistry.utoronto.ca/dpes-old/node/670.html

Authored by:

Dr. Mindy Cash



Protocol for acquiring images in the Radiology Clinic, using CMOS (complimentary metal oxide semiconductor) sensors, including infection control procedures

In the Radiology Clinic, the patient will already be seated, the medical history reviewed and a brief clinical exam performed, in order to determine the required radiographic prescription.

At dispensary:

Once the prescription has been determined, exchange tag(s) for the necessary equipment; CMOS sensors in the required size(s) in separate plastic containers, XCP positioning devices. Bagged bitewing tabs are available in the clinic operatories.

At the Imaging Chair:

Steps for acquiring images (prior to gloving)

- Return to the operatory, where you will find one white tray cover on the counter beside the sink and a second tray cover on the counter next to the computer.
- Place both containers, each containing a CMOS sensor on the counter near the sink. Remove the container lids and place under the containers. Insert the CMOS sensor(s) into their protective barrier(s), leaving the outer wrapping on.
- If starting with the Size #1 sensor, carefully remove the outer wrapping, ensuring that the inner barrier is not touched with your ungloved hands. Allow the barrier wrapped sensor to be gently placed into the container.
- Carry the container over to the shelf/window and plug it into the USB hub.

- Open the bag containing the positioning devices, and spill its contents onto the tray cover beside the sink. Open the bag containing the bitewing tabs and spill onto the same tray cover (Don't touch any of the positioning devices with your ungloved hands). Optional: If the patient is missing a few teeth and you would like to use cotton rolls for stabilization, then open the bag at this point and spill the cotton rolls onto the tray cover.
- Turn on the X-ray machine, confirming that the kVp and mA are correct.
- Place the lead apron and thyroid collar on the patient.

*Remember that these four steps must be complete before you put on gloves:

1. prepare sensors.
2. open positioning device bag and spill contents on tray cover.
3. turn x-ray machine on, confirming settings.
4. place lead apron and thyroid collar on patient.

Put gown on, wash hands and put on gloves and mask (if wearing).

With gloves on:

- Log into axiUm, select patient from the Rolodex. In the Radiology Clinic, axiUm would already be open at the imaging chair.
 - Select the MiPacs icon in the patient's electronic health record. **Double check at the top of the screen that the correct patient is selected.**
 - Select a template to acquire the images into. This is done by clicking the arrow down on the right of the template description, and selecting the desired template. In the Radiology Clinic, this will be the FMS 20 template.
 - Select the "Show template" icon, found to the left of the template description in the menu bar.
 - Confirm that the CMOS sensor is active, noting that the circle at the top on the right of the menu bar is green.
 - Assemble the positioning devices.
 - Position the CMOS sensor into the appropriate device, so that the correct side is directed toward the tube head.
 - Make sure that the correct image position in the template is highlighted red, indicating where the image will be inserted upon exposure. If it is not, reselect by clicking with the mouse.
 - Position CMOS sensor/positioning device assembly into the patient's mouth, placing the **cord between the headrest and the back of the patient's head**, to prevent it from falling and striking the ground, while ensuring that it is **not pulled tight** and thereby inadvertently pulling it out of the port. Make sure that the cord projects towards the occlusal plane in the anterior region and out of the mouth in the posterior region.
- *Use size#1 for the anterior and size #2 for the posterior.

- Exit the operator, adjust exposure time appropriately according to mounted chart and press and hold the button to expose the image.
- Re-enter the operator and view the image on the computer monitor. **Even if errors are identified at this point, under NO CIRCUMSTANCES should a retake be made without instructor approval.**
- Reposition the CMOS sensor/positioning device assembly to the next position, and continue exposing images.

*Note that the RINN device must be reassembled depending on the quadrant imaged, and the size of the CMOS sensor is changed when imaging the anterior (size #1) and the posterior (size #2).

- When all images have been completed with the first sensor, remove it from the positioning device and carefully place it back into its container, so that the entire sensor and cord is within the container. **Remove gloves** and unplug it from the USB hub. Carry the container back to the main counter.
- Carry and place the container with the second sensor onto the shelf/window. Plug the sensor into the USB hub.
- Re-wash hands and **reglove**.
- Complete all image exposures following the same procedure (steps 15-19).
- **Save images and close MiPacs:** You may click on “Save” icon, or simply close MiPacs by clicking the X and you will be prompted to save all images. Students cannot approve images. If a dialogue box opens requesting a user name and password for approving images, select “Cancel” or “Don’t approve”.
- **Remove gloves** and optional mask and return to the viewing room, where you will review, assess and discuss the images.

In the Viewing Room:

Steps to review and approve images

- Ensure that axiUm is open with the correct patient selected. Open MiPacs. Select the new series to review from list on left of screen. This should be the series with a red triangle.
- Self-evaluate the images, making note of any deficiencies and the need for retakes.
- Ask an instructor to review the images. If it has been determined that retakes are required, on the template screen in MiPacs, drag the insufficient images down to the overflow area. This will leave the specific location in the template empty, and ready for re-imaging. **Close MiPacs.**

No changes should be made to the images (i.e. density or contrast) in the unapproved state. Any changes that are made should be undone using the “Undo All” icon, while all images are selected.

Return to the operatory and follow the steps to expose the retakes or new images, as outlined above. Corrected images are added to the original series. Prior to re-imaging, you will need to check to ensure that the barriers are still covering the sensor(s), and that they are not damaged prior to re-use.

Making adjustments to series mounting in MiPacs

The series must be mounted correctly prior to approval.

- Unapproved images can be dragged to different positions within the template.
- Rotations can be done as required to reflect the proper anatomic position, using “Rotate 90 degrees clockwise” icon.
- Any retaken images that are not diagnostically useful should be pulled out of the template, and dragged into the overflow area at the bottom.
- If you have taken more images than fits in the original template, or wish to include the original retake with the corrected view, remount the series. Accomplish this by selecting a new appropriate template and choosing “Remount current series”.

This will cause all images to drop into the overflow area. Remount the images into the new template into the appropriate positions and orientation.

Once images are **confirmed to be adequate and mounted correctly**, select all images to ensure that no changes (ie. density or contrast) have been made purposely, or inadvertently, and click the “Undo All” icon. The clinical instructor can then approve the series in MiPacs.

Return to the operatory:

Hang up the lead apron and thyroid collar on the hooks provided, and dismiss the patient.

Cleaning the operatory:

- Put on your gown and a new pair of gloves. Discard all disposables, dis-assemble the positioning devices and wash and leave in sink. DO NOT turn off the X-ray unit (this is how staff identify which units need to be cleaned). Place sensor(s), barrier wrapped in their correct plastic containers and return to the dispensary where you will obtain your tag(s).
- Complete the Image Request in axiUm.
- Complete Chart Add to add the treatment code for radiographs taken (necessary to trigger patient billing) and if applicable the re-take imaging code. The instructor will then swipe to complete this and enter the Technique Evaluation.

The author would like to acknowledge the significant contributions of Dr. Karen Aiken and Mrs. Andrea Welsh to the article.

Article Reviewed By

Dr. Ross Barlow and Mrs. Andrea Welsh