

Lab Experiment # 4

Digital Radiography (DR) *Digital Image Manipulation Functions*

Purpose

This experiment is designed to demonstrate the effect of changes in image annotation, image flip/rotate, electronic collimation, image inversion, magnification, and window width & window level settings when using computed radiography and how to use them to improve image quality.

Learning Objectives

After completing this lab, you should be able to:

1. Use the laboratory equipment properly.
2. Set up the control console and ceiling tube mount correctly.
3. Function effectively in group work.
4. Perform the experiment independently.
5. Explain the effect of image annotation, flip, rotate, and collimation of the digital image.
6. Evaluate the effect of image inversion and magnification of the digital image.
7. Explain the use of window width & window level settings to improve image quality.
8. Summarize the use of window width and window level functions and their importance to producing optimum digital images.

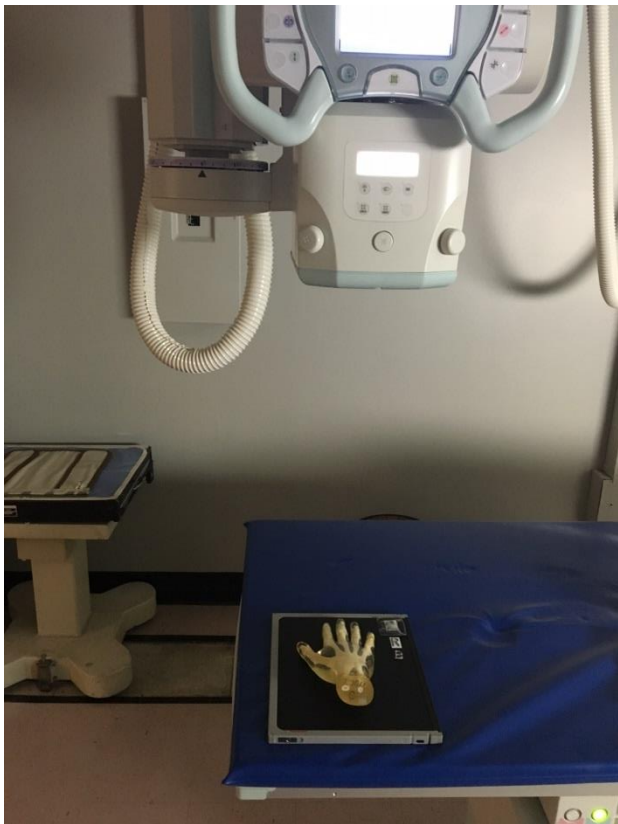
Materials Needed

- Hand phantom
- Digital (DR) image receptor
- Set of lead markers
- You will be working with digital images produced and saved in the system

Experimental Procedure

Instructions for all the Exposures

1. Place the hand phantom in the center of the DR image receptor in the prone position for PA projection.
2. Direct the central ray **perpendicular** through the **center of the part and the image receptor**.
3. Tape the x-ray beam attenuating (lead) markers onto the image receptor and collimate the beam to the size of the **image receptor**.
(The room, anatomical side, and exposure number must be labeled on **ALL** images.)
4. Set the x-ray tube, mode of operation and as indicated in the technique worksheet.
5. Take an exposure using the settings indicated in the technique worksheet.



Use the hand radiograph to perform post-processing manipulation

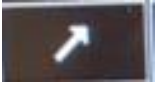


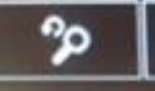

Technique Worksheet

(PA HAND – Tabletop TT)

Technical Factors for Room A, B, C, and D

	mA	Time	mAs	kVp	Image Receptor	Focal Spot	SID	LGM
	sec					Small or large	inches	
1	100		1	64	CR		40	

Worksheet

Icon	Function (What does it do?)
1 	
2 	
3 	
4 	
5 	
6 	
7 	

8



Post-Processing Manipulations of the Hand

Done

9. Horizontally flip the image to make it a **mirror-image**.

10. Rotate the image **90 degrees to the right**.

11. Magnify (pan and zoom) the image to **only see the the first PIP joint**

12. Electronically collimate, mask, or shutter the image to **only see the thumb**.

13. Reverse, or invert, the image's **black-white grayscale**.
(aka image reversal or image inversion)

14. Place a letter "R" (right side marker) **next to the thumb**.
(aka image annotation)

15. Measure the **width of the first proximal phalanx**.

16. Increase window width (WW).

17. Decrease window width (WW)

18. Increase window level (WL).



19. Decrease window level (WL).

