**FOCAL SPOT SIZE**

**Laboratory Experiment #11**

**Procedure:**

Place a small bone, such as a phalanx, a coin, and a resolution test template side by side on a 6-8-inch rectangular sponge, with one-half of a 10 x 12-inch 400-speed screen cassette centered *below* the sponge. Make two exposures at 40 inches SID using the large and small focal spot factors listed below. Label the exposures and develop.

Fixed: 40 kVp

Exposure #1: 100 mA-small focus at 0.02 sec.

Exposure #2: 200 mA-large focus at 0.01 sec.

Alternate Techniques:

Fixed kVp: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exposure #1 at small focus: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exposure #2 at large focus: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Analysis:**

1. Observe the radiographic images of the bone, noting the edges of small details. Can you tell visually which image demonstrates the greater sharpness? If so, which?

2. Determine the number of line pairs per millimeter (LP/mm) resolved in each image of the test template and record. Which focal spot size resolves greater sharpness?

3. As focal spot size increases, what happens to sharpness of detail (increase, decrease, or remain equal)?

4. Measure the length of the real bone and the two bone images and record; be sure to make all of your measurements in exactly the same part of the bone.

5. Determine the magnification factors for Film A and Film B by dividing the real bone length into each film’s image length, and record.

6. Compare the two magnification factors in #5. Would you consider any magnification differences you measured in this lab between the large and small F.S. to be *significant* (1.2 mm or greater)?

7. Review the textbook diagrams on F.S. size. Do *both* the umbra and the penumbra expand with a larger F.S.? Does this help explain your results? Is focal spot size a controlling factor over magnification of the gross image?

8. Compare the shape of the coin images on the films and the real coin shape. Do changes in focal spot size distort the shape of the images of objects?

9. Compare the bone images. If you maintained equal mAs and kVp, should a focal spot size change have affected density or contrast? If there was a change, what other factors did you change in this experiment which might have caused it?

10. What is a good overall rule of thumb for minimizing unsharpness by using F.S. size?