**BEAM-PART-FILM ALIGNMENT**

**Laboratory Experiment #16**

**Procedure:**

Take eight radiographs of a coin and the spherical head (not the whole bone) of a dry femur bone as listed below the various angles and centering. Use 2 mAs and 42 kVp with 400-speed screens tabletop. Place the objects on a 3-inch sponge placed on the film. Carefully measure and maintain the same DIS, compensating for tube angles, on all exposures. Mask off small portions to get several exposures on each film. Be sure to number each exposure with lead markers. When off-centering, the CR does not need to be on the film.

Alternate Technique = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exposure #1: SPHERICAL BONE: beam centered and

perpendicular.

Exposure #2: SPHERICAL BONE: beam angled 35 degrees

but centered.

Exposure #3: SPHERICAL BONE: beam off-centered 8 inches

but perpendicular. (Mask table from unused

half of 16-inch-wide beam with leaded

rubber.)

Exposure #4: COIN: beam centered and perpendicular.

Exposure #5: COIN: beam angled 35 degrees but centered.

Exposure #6: COIN: angled 45 degrees to film. Tape the

coin to a 45-degree-angle-sponge at a spot

which maintains equal object/image receptor

distance (3 inches) as the rectangular

sponge provided. Beam perpendicular to film

and centered.

Exposure #7: COIN: angled 45 degrees to film. Tape the

coin to a 45-degree-angle sponge at a spot

which maintains equal object/image receptor

distance (3 inches) as the rectangular

sponge provided. *Beam perpendicular to the*

*coin.*

Exposure #8: COIN: angled 45 degrees to film. Tape the

coin to a 45-degree-angle sponge at a spot

which maintains equal object/image receptor

distance (e inches) as the rectangular

sponge provided. *Beam angled isometrically*

at 22.5 degrees.

**Analysis:**

Note the direction of tube shift or angle in each case. Remember that the *width* of the image (perpendicular to the tube shift) must also increase along with its length (Parallel to the tube shift) for *magnification* to be present. You may superimpose images for comparisons.

1. Visually compare Exposures #1 and #2. Does angling the beam cause shape distortion of a spherical object?

2. Did this angle *significantly* magnify the spherical object more than 1 mm?

3. Visually compare Exposures #2 and #3. Does off-centering cause the same *types* of image effects as angling? Why? Note: This off-centering only causes about 15 degree angle, so the effect will be much less than in Exposure #2. Can *any* change be measured?

4. Compare Exposures #4 and #5. Does angling the beam cause distortion of a *flat object* when the part is parallel to the film?

5. Would off-centering the tube cause shape distortion when the part is parallel to the film? Would it magnify the image?

6. Compare Exposures #4 and #6. Does angling the part in relation to the film cause distortion when the tube is centered and perpendicular to the film? If so, in what way (foreshorten or elongate)? Does it magnify the image (is the width greater, too)?

7. Compare Exposures #4 and #7. Does angling the tube so that it is perpendicular to the part completely eliminate distortion when the part is angled in relation to the film? Is this image foreshortened, elongated, or not distorted?

8. Compare Exposures #4 and #8. Does angling the tube isometrically adequately eliminate distortion?

9. Are there significant visible changes in sharpness, contrast, or density from changes in alignment, as long as SID is maintained?