

Chapter 01: Guidelines for Image Analysis

Martensen: Radiographic Image Analysis, 5th Edition

MULTIPLE CHOICE

1. The patient demographic requirements for radiographic images include all of the following *except*
 - a. patient and facility identification.
 - b. time and date.
 - c. birth date.
 - d. technologist's identification.

ANS: D

2. Which of the following is true about image markers?
 1. They are radiopaque.
 2. They should be reversed before being placed on the IR.
 3. They should be positioned as close to the median plane as possible.
 4. They will be magnified if positioned on the imaging table or patient.
 - a. 1 only
 - b. 1 and 4 only
 - c. 2 and 3 only
 - d. 4 only

ANS: B

3. What is the marker placement for the projection of lateral vertebrae?
 - a. Laterally on the side being identified
 - b. Anteriorly, identifying the side positioned closer to the IR
 - c. Anywhere within exposure field
 - d. Laterally, identifying the side situated closer to the IR

ANS: B

4. What is the marker placement for the projection of PA cranium?
 - a. Laterally on the side being identified
 - b. Anteriorly, identifying the side positioned closer to the IR
 - c. Anywhere within the exposure field
 - d. Laterally, identifying the side situated closer to the IR

ANS: A

5. What is the marker placement for the projection of PA oblique vertebrae?
 - a. Laterally on the side being identified
 - b. Anteriorly, identifying the side positioned closer to the IR
 - c. Anywhere within the exposure field
 - d. Laterally, identifying the side situated closer to the IR

ANS: D

6. What is the marker placement of the projection of lateral hand?

- a. Laterally on the side being identified
- b. Anteriorly, identifying the side positioned closer to the IR
- c. Anywhere within the exposure field
- d. Laterally, identifying the side situated closer to the IR

ANS: C

7. Which guideline should be used to position the identification (ID) plate?
 - a. Place the ID plate within the collimated field whenever possible.
 - b. Position the ID plate toward the direction in which the central ray was angled.
 - c. Position the ID plate next to the narrowest anatomic structure.

ANS: C

8. Good collimation practices will do all of the following *except*
 - a. decrease the radiation dosage.
 - b. affect the amount of scatter radiation that reaches the IR.
 - c. reduce the visibility of recorded details.
 - d. reduce digital radiography histogram analysis errors.

ANS: C

9. Elongation occurs in all of the following situations *except* when the
 - a. part is off-center.
 - b. central ray is angled with the part.
 - c. central ray and part are perpendicular but the IR is angled.
 - d. central ray and IR are perpendicular and the part is angled.

ANS: D

10. For an open joint space to be obtained, the central ray must be aligned _____ to the joint.
 - a. perpendicular
 - b. parallel
 - c. 5 degrees cephalic for each 4 inches of tissue thickness
 - d. 5 degrees caudal for each 4 inches of tissue thickness

ANS: B

11. When the central ray is angled, the structure situated _____ is projected the most.
 - a. farther away from the IR
 - b. closer to the IR
 - c. proximal to the tube
 - d. distal to the tube

ANS: A

12. Three images were obtained on the same structure with a computed radiography system. Image 1 was obtained using a 48-inch source–image receptor distance (SID) and a 5-inch object–image receptor distance (OID); image 2 was obtained using a 48-inch SID and a 3-inch OID; and image 3 was obtained with a 48-inch SID, a 3-inch OID, and a larger IR. Which image will demonstrate the sharpest recorded detail?
 - a. Image 1
 - b. Image 2

- c. Image 3
- d. There will be no difference in recorded detail.

ANS: B

13. Three images were obtained on the same structure with a computed radiography system. Image 1 was obtained using a 48-inch source–image receptor distance (SID) and a 5-inch object–image receptor distance (OID); image 2 was obtained using a 48-inch SID and a 3-inch OID; and image 3 was obtained with a 48-inch SID, a 3-inch OID, and a larger IR. Which image will demonstrate the greatest size distortion?
- a. Image 1
 - b. Image 2
 - c. Image 3
 - d. There will be no difference in size distortion.

ANS: A

14. A small focal spot should be used for each of the following situations *except* when
- a. fine detail demonstration is important.
 - b. extremities are imaged.
 - c. the milliamperage setting is above 300.
 - d. the patient can control motion.

ANS: C

15. An image demonstrating motion and adequate density was obtained using 100 mA at 0.5 seconds. If the time is changed to 0.25 seconds, what mA should be used to maintain density?
- a. 100 mA
 - b. 200 mA
 - c. 300 mA
 - d. 400 mA

ANS: B

16. Anatomical relationships are affected by
1. varying degrees of patient obliquity and flexion.
 2. off-centering.
 3. geometrical factors of magnification, elongation, and foreshortening.
 4. similar structures of shape and size.
- a. 1 and 4 only
 - b. 1, 2, and 4 only
 - c. 1, 3, and 4 only
 - d. All of the above

ANS: D

17. Good collimation practices result in which of the following?
1. Reduces histogram analysis errors
 2. Clearly delineates the VOI
 3. Improves the visibility of recorded details by reducing the amount of scatter radiation that reaches the IR
 4. Decreases the radiation dosage by limiting the amount of scatter from the patient

- a. 2 and 3 only
- b. 1, 2, and 3 only
- c. 1, 2, and 4 only
- d. 1, 2, 3, and 4

ANS: B

18. Minimizing size distortion is accomplished by which of the following?

- 1. Using the longest feasible SID
 - 2. Using the shortest possible OID
 - 3. Decreasing the angle of the CR
 - 4. Placing the part as close to the IR as possible
- a. 2 and 3 only
 - b. 1, 2, and 3 only
 - c. 1, 2, and 4 only
 - d. 1, 2, 3, and 4

ANS: C

19. Collimation guidelines include all of the following *except* for

- 1. chest and abdomen projections, collimate to within 1 inch (2.5 cm) of the patient's skin line.
 - 2. extremity projections, collimate to within 0.5 inch (1.25 cm) of the skin line of the thickest VOI.
 - 3. chest and abdomen projections, collimate to within 0.50 inch (1.25 cm) of the IR edge.
 - 4. collimating structures within the torso, bring the collimated borders to within 1 inch (2.5 cm) of the VOI.
- a. 1 and 3
 - b. 2 and 4
 - c. 3 only
 - d. 4 only

ANS: B

20. The medial and lateral femoral condyles are not superimposed on a lateral knee projection. The larger, lateral condyle is 1 inch (2.5 cm) anterior to the medial condyle. The best way to correct this error is to

- a. rotate the medial condyle 1 inch (2.5 cm) anteriorly.
- b. rotate the medial condyle 0.5 inch (1.25 cm) anteriorly.
- c. increase the CR angle to accommodate for the larger condyle.
- d. increase the CR angle to magnify the smaller condyle.

ANS: B

21. When imaging long bones, which of the following is (are) correct statement(s)?

- 1. Choose a large enough IR so that one or both joints are included on the projection.
- 2. Extend the collimation field so it extends 1 to 2 inches (2.5 cm to 5 cm) beyond the joints spaces as required.
- 3. Histogram errors may occur if the system algorithm does not recognize a diagonal exposure field.
- 4. Align the long bone parallel to the IR to prevent a histogram analysis error.

- a. 1 only
- b. 4 only
- c. 1, 2, and 4 only
- d. 1, 2, 3, and 4

ANS: D

22. The greatest detail sharpness is obtained by using
- 1. a small focal spot.
 - 2. the longest SID.
 - 3. the smallest OID.
 - 4. longer exposure times.
- a. 1 only
 - b. 4 only
 - c. 1, 2, and 3 only
 - d. 1, 2, 3, and 4

ANS: C

23. To correctly mark a crosstable lateral hip projection,
- 1. place the marker anteriorly to prevent it from obscuring posterior structures.
 - 2. place the marker to indicate the side closest to the IR.
 - 3. place the marker toward the edge of the IR outside the exposure field.
 - 4. include an arrow to indicate the side positioned away from the table or cart.
- a. 1 and 2 only
 - b. 1, 2, and 3 only
 - c. 1, 2, and 4 only
 - d. 1, 2, 3, and 4

ANS: A

24. The off-centered diverged beams of a perpendicular CR will affect structures in the same manner as an angled CR. Which of the following statements best describes this relationship?
- 1. At a 40-inch SID, the divergence of x-rays is 1 degree for every inch off-centered in any direction from the CR.
 - 2. At a 48-inch SID, beam divergence is off-centered about 2 degrees for every inch in any direction from the CR.
 - 3. At a 40-inch SID, the divergence of x-rays is 2 degrees for every inch off-centered in any direction from the CR.
 - 4. At a 72-inch SID, beam divergence is off-centered about 1 degree for every inch.
- a. 1 and 2 only
 - b. 3 and 4 only
 - c. 1 and 4 only
 - d. 2 and 4 only

ANS: B

25. When displaying images acquired on a direct–indirect-capture digital radiography system (DR), which of the following statements are true?
- 1. Patient orientation must be considered.
 - 2. Diagonally obtained projections will be displayed vertically.