

Radiography Essentials for Limited Practice

Chapter 1 Role of the Limited X-ray Machine Operator

1. The oldest and largest radiologic science professional organization is the:
 - A. American Registry of Radiologic Technologists (ARRT)
 - B. American Society of Radiologic Technologists (ASRT)
 - C. Joint Review Committee on Education in Radiologic Technology (JRCERT)
 - D. American Hospital Radiology Administrators (AHRA)

2. The organization that sets standards and prepares examinations necessary to certify radiologic technologists and limited operators is the:
 - A. American Registry of Radiologic Technologists (ARRT)
 - B. American Society of Radiologic Technologists (ASRT)
 - C. Joint Review Committee on Education in Radiologic Technology (JRCERT)
 - D. American Hospital Radiology Administrators (AHRA)

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Chapter 2 Introduction to Radiographic Equipment

1. The radiation that exits the opposite side of the patient to expose the film is called:
 - A. attenuated radiation
 - B. scatter radiation
 - C. primary radiation
 - D. remnant radiation

2. The term used to describe radiation that is absorbed by matter is:
 - A. scatter
 - B. attenuation
 - C. remnant
 - D. latent

3. The "unseen" image that is contained in the film before it is processed is called the:
 - A. latent image
 - B. remnant image
 - C. primary image
 - D. secondary image

4. The radiation that exits the body in all directions and causes unwanted exposure on the film as well as anyone who is in the room is called _____ radiation.
 - A. remnant
 - B. scattered
 - C. secondary
 - D. primary

5. Which film sizes continue to be manufactured in English sizes only?
 1. 8 x 10 in.
 2. 10 x 12 in.
 3. 14 x 17 in
 - A. 1 and 2

- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

6. The boxlike device attached under the tube housing that allows the limited operator to vary the size of the radiation field is called the:

- A. port
- B. detent
- C. housing
- D. collimator

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Chapter 3 Basic Mathematics for Limited Operators

1. A radiograph made using 20 mAs and 100 kVp has satisfactory radiographic density, but is lacking in radiographic contrast. Which of the following techniques will improve the appearance of the radiograph?
 - A. 10 mAs and 115 kVp
 - B. 40 mAs and 115 kVp
 - C. 40 mAs and 85 kVp
 - D. 10 mAs and 85 kVp

2. A satisfactory shoulder radiograph is made on a patient measuring 14 cm. using 15 mAs and 75 kVp. Approximately how much mAs is needed to produce a similar radiograph on a patient measuring 16 cm.?
 - A. 16 mAs
 - B. 20 mAs
 - C. 25 mAs
 - D. 35 mAs

3. A satisfactory knee radiograph is made using 10 mAs, 76 kVp , 40-inches SID, and a bucky with a grid ratio of 12:1. The GCF for a 12:1 grid is 5. How much mAs is needed to make a satisfactory radiograph of the same knee without a grid?
 - A. 2 mAs
 - B. 5 mAs
 - C. 20 mAs
 - D. 40 mAs

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Chapter 4 Basic Physics for Radiography

1. X-rays have electromagnetic energy. The velocity (or speed) of this energy travels at a speed of:

- A. 186,000 meters per second
- B. 200,000 meters per second
- C. 186,000 miles per second
- D. 200,000 miles per second

2. The smallest possible unit of electromagnetic energy is the:

- A. proton
- B. neutron
- C. electron
- D. photon

3. Which of the following would be considered a characteristic of x-rays?

- 1. have no mass
- 2. are electrically neutral
- 3. travel in straight lines

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

4. The electrical current flowing in an x-ray tube is measured in:

- A. milliamperes
- B. kilovoltage
- C. Ohms
- D. potential difference

5. The force or strength of the electron flow in an electrical current is measured in:

- A. milliamperes
- B. kilovoltage

- C. Ohms
- D. resistance

6. The device used to produce the high voltage needed for x-ray production is called the:

- A. diode
- B. generator
- C. transformer
- D. rectifier

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Chapter 5 X-ray Production

1. The target and the filament in the x-ray tube are made of:
 - A. pyrex glass
 - B. tungsten
 - C. copper
 - D. aluminum

2. Electrons are made available in the filament of the x-ray tube by a process called:
 - A. heterogeneous
 - B. characteristic production
 - C. Bremsstrahlung production
 - D. thermionic emission

3. The anode in x-ray tubes rotates at a high rpm to:
 - A. dissipate the heat
 - B. create more photons
 - C. create a heterogeneous beam
 - D. allow more Bremsstrahlung to be emitted

4. The target in the x-ray tube is angled to affect the:
 1. heat capacity
 2. number of photons
 3. sharpness of the image
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

5. Which of the following would be a common small focal spot size in an x-ray tube?
 - A. 0.1 mm
 - B. 0.3 mm
 - C. 0.6 mm

D. 1.2 mm

6. What size of target angle is required for the radiation to cover a 35 cm x 43 cm IR at a distance of 40 inches?

- A. 6 degrees
- B. 10 degrees
- C. 12 degrees
- D. 15 degrees

7. The intensity of the x-ray beam is greatest at the:

- A. center of the x-ray beam
- B. anode end of the beam
- C. cathode end of the beam
- D. either side of the beam

8. The penetrating power of the x-ray beam is controlled by varying the:

- A. mA
- B. mAs
- C. kVp
- D. exposure time

9. If the mA is doubled, the x-ray photons emitted from the tube:

- A. double
- B. triple
- C. increase by a factor of 4
- D. remain the same

10. What material is used as the added filter material in x-ray tubes?

- A. oil
- B. glass
- C. copper
- D. aluminum

11. X-ray equipment that operates at 70 kVp and above must have how much aluminum equivalency permanently installed?

- A. 2.0 mm/Al
- B. 2.5 mm/Al
- C. 3.0 mm/Al
- D. 3.2 mm/Al

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Chapter 6 X-ray Circuit and Tube Heat Management

1. Which of the following supplies and controls the heat required by the x-ray tube filament for thermionic emission of electrons?
 - A. rectifier
 - B. autotransformer
 - C. filament circuit
 - D. high-voltage circuit

2. Which of the following is controlled directly on the x-ray control panel?
 1. mA
 2. rectification
 3. automatic exposure control
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

3. How many phototiming cells are contained in an automatic exposure control (AEC) device in an x-ray table?
 - A. 1
 - B. 2
 - C. 3
 - D. 4

4. Which of the following is varied automatically when using automatic exposure control (AEC)?
 - A. exposure time
 - B. kilovoltage
 - C. milliamperage
 - D. back-up time

5. Which of the following can cause too much heat on the anode and cause it to crack and fail?

1. excessive exposure on a cold tube
2. a rapid series of large exposures
3. mA settings greater than 400 mA

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

6. X-ray tubes should undergo the warm-up procedure again after they have been idle for more than:

- A. 30 minutes
- B. 1 hour
- C. 1.5 hours
- D. 2 hours

7. What is the heat unit (HU) of the anode if 200 mA, 0.10 sec., and 80 kVp is used on a single-phase generator?

- A. 400
- B. 1000
- C. 1200
- D. 1600

8. How many heat units (HU) are generated on a high frequency (HF) generator if an exposure time of 300 mA, 0.12 sec., and 95 kVp is used?

- A. 36
- B. 2,800
- C. 3,420
- D. 28,500

9. Which of the following will help prolong the life of an x-ray tube?

1. warm up the anode each morning
2. use low ma setting whenever possible
3. use the low-speed rotor whenever possible

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3

D. 1, 2, and 3

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Chapter 7 Principles of Exposure and Image Quality

1. Radiographic contrast is controlled by the:
 - A. mA
 - B. mAs
 - C. kVp
 - D. SID

2. If the intensity of the x-ray beam is 100 mR at an SID of 40 inches, what is the intensity if the SID is changed to 48 inches?
 - A. 40 mR
 - B. 69 mR
 - C. 83 mR
 - D. 120 mR

3. The quantity, or number of photos produced per second during an exposure is controlled by the:
 - A. mA
 - B. mAs
 - C. kVp
 - D. SID

4. The variation in tissue densities within the patient is referred to as the:
 - A. radiographic contrast
 - B. subject contrast
 - C. long scale contrast
 - D. short scale contrast

5. The overall contrast seen in the radiographic image is referred to as:
 - A. radiographic contrast
 - B. subject contrast
 - C. long scale contrast
 - D. short scale contrast

6. Which of the following are considered a part of shape distortion?

1. magnification
2. foreshortening
3. elongation

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

7. The unsharp edges of a body part are referred to as the:

- A. umbra
- B. elongation
- C. recorded detail
- D. penumbra

8. Which of the following would be considered involuntary motion?

1. tremors
2. peristalsis
3. heartbeats

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

9. Quantum mottle is typically seen on the radiographic image when using:

- A. high mA, high kVp techniques
- B. low mA, high kVp techniques
- C. an SID greater than 48 inches
- D. a very slow screen speed

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Chapter 8 Screen/Film Image Receptor Systems

1. Which of the following would have the greatest screen speed:
 - A. RS 100
 - B. RS 200
 - C. RS 250
 - D. RS 400

2. The greatest detail would come from a screen speed of:
 - A. 100
 - B. 200
 - C. 400
 - D. 800

3. As the contrast of the film decreases, latitude:
 - A. decreases
 - B. increases
 - C. remains the same
 - D. varies depending on the kVp

4. The number which represents a film's density is termed the:
 - A. D-max
 - B. base + fog
 - C. optical density (OD)
 - D. spectral sensitivity

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Chapter 9 Digital Image Receptor Systems

1. When using computed radiography (CR), where is the image stored until it is processed?
 - A. On a hard drive
 - B. In a film/screen cassette
 - C. In a flat panel detector unit
 - D. In a photostimulable phosphor plate

2. Digital imaging requires that the exposure technique is accurately set. Which of the following is the most critical of the exposure factors?
 - A. SID
 - B. kVp
 - C. mA
 - D. Exposure time

3. One of the major advantages of using CR or DR systems is the:
 - A. reduced total cost for the institution
 - B. reduction in patient dose
 - C. the ability to see images with greater detail
 - D. the ability to see images very fast

4. All of the digital images made in an x-ray department are stored in a system called the:
 - A. DR
 - B. ALARA
 - C. PACS
 - D. DICOM

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Chapter 10 X-ray Darkroom and Film Processing

1. What special type of filter should be used in the darkroom as a safelight?
 - A. D-max
 - B. GBX
 - C. blue sensitive
 - D. green sensitive

2. The wattage of the bulb in the darkroom safelight should be:
 - A. 2.5 watts
 - B. 5 watts
 - C. 2.5 to 5 watts
 - D. 7 to 15 watts

3. During safelight testing, the film should be exposed to the safelight for:
 - A. 1 minute
 - B. 2 minutes
 - C. 3 minutes
 - D. 5 minutes

4. Which of the following is used in the darkroom to imprint a standardized gray scale image on a radiographic film?
 - A. Film identification printer
 - B. Densitometer
 - C. Sensitometer
 - D. Penetrometer

5. The replenisher rate for the developer solution is:
 - A. 40 ml
 - B. 50 ml
 - C. 60 to 70 ml
 - D. 100 to 110 ml

6. The replenisher rate for the fixer solution is:

- A. 60 ml
- B. 70 ml
- C. 80 to 100 ml
- D. 100 to 110 m.

7. The temperature of the developer solution in an automatic processor is:

- A. 95 degrees
- B. 98 degrees
- C. 100 degrees
- D. 110 degrees

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Chapter 11 Scatter Radiation and Its Control

1. The negative effect of scatter radiation reaching the film is:
 - A. fog
 - B. lower density
 - C. higher contrast
 - D. higher dose

2. Which of the following will affect the amount of scatter radiation reaching the film?
 1. higher kVp
 2. dense body part
 3. volume of tissue irradiated
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

3. Scatter radiation can be controlled by:
 1. grids
 2. reducing field size
 3. reducing mAs
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

4. The effectiveness of a radiographic grid is determined by the:
 - A. grid radius
 - B. grid ratio
 - C. grid lines
 - D. grid frequency

5. A grid must be used when the body part becomes larger than:

- A. 4 cm
- B. 8 cm
- C. 4-8 cm
- D. 10-12 cm

6. Grid cut-off will occur when:

- 1. the grid is tilted
- 2. the kVp is too high
- 3. when the SID is out of focal range

- A. 1 and 2
- B. 1 and 3
- C. 2 and 3
- D. 1, 2, and 3

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Chapter 12 Formulating X-ray Techniques

1. Which of the following factors would you see on an exposure technique chart?
 1. kVp
 2. generator phase
 3. part thickness in cm
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3
2. In determining the best level of kVp to use for a given body part, which of the following is used?
 - A. lowest kVp
 - B. average kVp
 - C. optimum kVp
 - D. variable kVp
3. The use of 200 mA and 0.12 sec would result in _____ mAs.
 - A. 24
 - B. 32
 - C. 240
 - D. 320
4. Practically, which mA station can be used for most small to average size patients who can cooperate during the examination?
 - A. 100 mA
 - B. 200 mA
 - C. 300 mA
 - D. 400 mA
5. Which of the following pathological conditions would require an increase in exposure technique?

- A. necrosis
- B. arthritis
- C. pneumothorax
- D. pleural effusion

6. Which of the following pathological conditions would require a decrease in exposure technique?

- A. pneumothorax
- B. pneumonia
- C. edema
- D. cardiomegaly

7. Which of the following grids would have a higher grid factor and therefore a high mAs?

- A. 5:1 ratio
- B. 8:1 ratio
- C. 12:1 ratio
- D. 16:1 ratio

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Chapter 13 Radiobiology and Radiation Safety

1. The unit of radiation exposure is the:
 - A. rad
 - B. rem
 - C. roentgen
 - D. sievert

2. The unit of absorbed dose is the:
 - A. rad
 - B. rem
 - C. gray
 - D. roentgen

3. Which of the following x-ray examinations would give the patient the highest bone marrow dose?
 - A. chest
 - B. limb
 - C. abdomen
 - D. skull

4. If a patient received a whole body dose of 25 rem, what biological effect would result in the body?
 - A. nausea
 - B. erythema
 - C. blood changes
 - D. temporary sterility

5. At what dose level to the whole body would death occur?
 - A. 25 rem
 - B. 150 rem
 - C. 250 rem
 - D. 600 rem

6. Radiation badges should be worn:

- A. at the collar
- B. at the waist
- C. at the waist and anterior portion of the body
- D. at the collar and anterior portion of the body

7. A pregnant radiation worker may not receive more than _____ per month.

- A. 0.02 rem
- B. 0.05 rem
- C. 0.10 rem
- D. 0.25 rem

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Chapter 14 Introduction to Anatomy, Positioning, and Pathology

1. The definition of an organ is:
 - A. the smallest units of living things
 - B. a group of similar cells that work together to perform functions
 - C. a group of tissues that work together to perform specialized and complex functions
 - D. complex proteins that provide the “blueprint” for the body’s structure and function

2. The definition of pathology is:
 - A. study of aging
 - B. study of abnormal conditions of the body
 - C. study of function of the body
 - D. study of structure of the body

3. Which of the following are respiratory system structures?
 1. thymus
 2. trachea
 3. bronchi
 - A. 1 and 2 only
 - B. 1 and 3 only
 - C. 2 and 3 only
 - D. 1, 2, and 3

4. The human skeletal system consists of _____ bones?
 - A. 206
 - B. 412
 - C. 103
 - D. 260

5. What is a condyle?
 - A. a hole in bone that provides a passage for nerves and blood vessels
 - B. a long, sharp bony process
 - C. a bony ridge
 - D. a rounded process that forms part of a joint

6. What term describes movement of a part away from the central axis of the body?

- A. flexion
- B. extension
- C. adduction
- D. abduction

7. What term describes straightening of a joint?

- A. flexion
- B. extension
- C. adduction
- D. abduction

8. What does supination mean?

- A. to turn the wrist so that the palm of the hand is up
- B. to turn the wrist so that the palm of the hand is down
- C. to turn the wrist so that the palm of the hand faces laterally
- D. to turn the wrist so that the palm of the hand faces medially

9. Anatomic position is described by which of the following statements?

- A. lying on one's back with arms and legs extended, palms turned outward, and toes facing anteriorly
- B. lying on one's back with arms and legs extended, palms turned backward, and toes facing anteriorly
- C. standing facing the observer with palms of hands turned forward and toes facing anteriorly
- D. standing facing the observer with palms of hand turned backward and toes facing anteriorly

10. What is the meaning of the term cephalic?

- A. toward the head
- B. away from the head
- C. the front part of the body
- D. the back part of the body

11. What term refers to the back portion of the body or of a body part?

- A. anterior
- B. posterior
- C. cephalic

D. caudal

12. Which plane divides the body into equal right and left halves?

- A. transverse
- B. axial
- C. midcoronal
- D. midsagittal

13. Which plane divides the body into equal anterior and posterior halves?

- A. transverse
- B. axial
- C. midcoronal
- D. midsagittal

14. Which term describes the body position when the patient is lying on his or her back?

- A. supine
- B. lateral
- C. prone
- D. erect

15. To achieve a prone position, the patient must be placed ____?

- A. upright
- B. in a recumbent position on his or her stomach
- C. in a recumbent position on his or her back
- D. in a recumbent position on his or her side

16. What term is used to describe the path of the CR from the radiographic tube, through the patient and to the IR?

- A. position
- B. projection
- C. tangential
- D. lateral

17. What three items must be precisely aligned to obtain a quality radiograph?

- A. the x-ray tube, the IR, and the CR
- B. the x-ray tube, the IR, and the collimator field light
- C. the CR, the body part, and the collimator field light

D. the CR, the body part, and the IR

18. What is indicated by a radiographic side marker?

- A. the side of the patient
- B. the side of the collimator field light
- C. the side of the x-ray tube
- D. the side of the IR

19. What term refers to the condition in which the tissue of a bone is broken or disrupted?

- A. dislocation
- B. sprain
- C. fracture
- D. infection

20. Which of the following is the medical term for swelling?

- A. degeneration
- B. regeneration
- C. atrophy
- D. edema

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Chapter 15 Upper Extremity and Shoulder Girdle

1. The digits of the hand are composed of which bones?
 - A. carpals
 - B. metacarpals
 - C. phalanges
 - D. tarsals
2. Which bones are located in the palm area of the hand?
 - A. carpals
 - B. metacarpals
 - C. phalanges
 - D. tarsals
3. Which surface of the hand should be in contact with the IR when performing a PA projection?
 - A. anterior (palmar)
 - B. posterior (dorsal)
 - C. medial
 - D. lateral
4. Which surface of the hand should be in contact with the IR when performing a standard lateral projection?
 - A. lateral
 - B. medial
 - C. anterior (palmar)
 - D. posterior (dorsal)
5. What is the position of the wrist when performing the PA oblique projection?
 - A. hand and wrist flat with anterior surface in contact with IR
 - B. fingers flexed with anterior surface of wrist in contact with IR
 - C. coronal plane of wrist at 45° angle to IR with anteromedial surface on IR
 - D. medial surface of wrist on IR with coronal plane perpendicular to IR
6. Which of the following are bones of the forearm?

- A. radius and ulna
- B. tibia and fibula
- C. humerus and radius
- D. clavicle and scapula

7. What is the position of the arm when performing the AP projection of the forearm?

- A. elbow flexed, wrist and elbow perpendicular to IR, hand in lateral position
- B. elbow flexed, wrist and elbow perpendicular to IR, hand pronated
- C. elbow extended, wrist and elbow parallel to IR, hand pronated
- D. elbow extended, wrist and elbow parallel to IR, hand supinated

8. What is the relationship between the humeral epicondyles and the IR to achieve a proper lateral projection of the humerus?

- A. parallel
- B. perpendicular
- C. from true anatomic position, 45° medial rotation
- D. from true anatomic position, 45° lateral rotation

9. What are the proper patient instructions, just prior to the exposure, for the AP projection of the shoulder?

- A. stop breathing and do not move
- B. breathe quietly and do not move
- C. slow deep breaths and do not move
- D. pant quickly and do not move

10. Which projection of the shoulder will demonstrate an open glenohumeral joint space and the glenoid process in profile?

- A. AP projection with internal rotation
- B. AP projection with external rotation
- C. AP oblique projection (Grashey method)
- D. PA oblique projection (Scapular Y)

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Chapter 16 Lower Extremity and Pelvis

1. The forefoot is composed of which bones?
 - A. phalanges and tarsals
 - B. tarsals and metatarsals
 - C. phalanges and metatarsals
 - D. cuneiforms and cuboid
2. What tarsal bone is commonly referred to as the “heel bone”?
 - A. talus
 - B. cuneiforms
 - C. navicular
 - D. calcaneus
3. What is the anatomical name for the bone commonly known as the kneecap?
 - A. fibula
 - B. tibia
 - C. patella
 - D. flabella
4. What anatomic structures articulate to form the knee joint?
 - A. the condyles of the femur and the tibial plateaus
 - B. the condyles of the femur and the tibial tuberosities
 - C. the head of the femur and the acetabulum
 - D. the head of the femur and the tibial plateaus
5. When performing an AP axial projection of the foot, the central ray is directed _____.
 - A. 10° toward the toes
 - B. 10° toward the heel
 - C. 25° toward the heel
 - D. Perpendicular to the IR

6. Where is the CR directed when performing an AP projection of the ankle joint?
- A. Perpendicular to a point midway between the malleoli
 - B. Perpendicular to the base of the 3rd metatarsal
 - C. Angled 10° cephalic to a point midway between the malleoli
 - D. Angled 10° cephalic to the base of the 3rd metatarsal
7. Where is the CR directed when performing the AP projection of the knee?
- A. ½ inch below the apex of the patella
 - B. ½ inch below the base of the patella
 - C. 1 inch distal to the medial epicondyle of the femur
 - D. 1 inch proximal to the medial epicondyle of the femur
8. If a knee x-ray is made while the patient is wearing denim jeans, which of the following is likely to appear on the image?
- A. Nothing. Denim jeans are radiolucent.
 - B. The jeans will leave an artifact on the image.
 - C. Nothing. Leaving the patient's jeans on helps to protect the patient's modesty.
 - D. The jeans will totally block out the knee anatomy because x-rays cannot penetrate denim.
9. What is the proper rotation of the lower limbs for an AP projection of the pelvis?
- A. 15° medial
 - B. 5° medial
 - C. 5° lateral
 - D. 15° lateral
10. What is the name of the fracture that occurs from repeated injuries that are insufficient to cause a fracture from a single occurrence?
- A. bimalleolar
 - B. Colles'
 - C. spiral
 - D. stress

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Chapter 17 Spine

1. The cervical spine is composed of what number of vertebrae?
 - A. 5
 - B. 7
 - C. 9
 - D. 12

2. What is the term for the block-like, anterior portion of a typical vertebra?
 - A. body
 - B. lamina
 - C. pedicle
 - D. articular process

3. Why is a 72-inch SID used for the lateral projection of the cervical spine?
 - A. This SID enables the limited operator to use a lower kVp technique
 - B. This SID reduces patient dose
 - C. This SID helps to overcome the magnification caused by the increased OID of the position
 - D. This SID provides more room for the limited operator to assist the patient into the proper position

4. What angle and direction is the CR directed when performing an AP axial projection of the cervical spine?
 - A. 15° caudad
 - B. 15° cephalad
 - C. 25° caudad
 - D. 25° cephalad

5. A “breathing technique” is used to advantage when performing a lateral projection of which of the following portion of the spine?
 - A. cervical
 - B. thoracic
 - C. lumbar
 - D. sacrum

6. Which of the following devices will improve visualization of the spinous processes on the lateral projection of the thoracic spine?
- A. a piece of lead behind the shadow of the patient's back
 - B. a wedge filter placed with the thicker end on the upper thoracic spine
 - C. a sandbag near the patient's shoulders and another near the patient's hips
 - D. a positioning sponge to elevate the patient's waist
7. Which projection of the lumbar spine demonstrates the "Scottie dog" configuration of the zygapophyseal joint?
- A. AP
 - B. AP axial
 - C. oblique
 - D. lateral
8. What positioning technique is used to improve patient comfort and reduce the lordotic curve of the lumbar spine when performing a recumbent AP projection of the lumbar spine?
- A. raising the patient's arms above the head
 - B. crossing the patient's arms across the chest
 - C. flexing the patient's knees and placing a support under them
 - D. having the patient distribute weight equally on both feet
9. Which region of the spine is the most common site of pathologic compression fracture of vertebral bodies resulting from osteoporosis?
- A. cervical
 - B. thoracic
 - C. lumbar
 - D. coccyx
10. What term is used to describe an abnormal lateral curvature of the spine?
- A. lordosis
 - B. kyphosis
 - C. scoliosis
 - D. laminosis

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Chapter 18 Bony Thorax, Chest, and Abdomen

1. What anatomic term is used to describe the inferior, lateral “corners” of the lungs?
 - A. hila
 - B. apices
 - C. cardiophrenic angles
 - D. costophrenic angles

2. The right lung has _____ lobes and the left lung has _____ lobes.
 - A. 2, 2
 - B. 2, 3
 - C. 3, 2
 - D. 3, 3

3. What body habitus term is applied to the person of “average” size?
 - A. asthenic
 - B. sthenic
 - C. hypersthenic
 - D. hyposthenic

4. What is the name of the structure that separates the thoracic cavity from the abdominal cavity?
 - A. aortic arch
 - B. parietal peritoneum
 - C. visceral peritoneum
 - D. diaphragm

5. Which of the following are ways that chest radiography differs from radiography of the ribs?
1. 72-inch SID is used
 2. higher kV is used
 3. exposure is made on expiration
- A. 1 and 2 only
B. 1 and 3 only
C. 2 and 3 only
D. 1, 2, and 3
6. Which of the following techniques is recommended for optimum chest radiography?
- A. high kVp, high mA, and short exposure time
B. low kVp and 40-inch SID
C. low kVp, long exposure time, and “breathing technique”
D. high mAs and low kVp
7. What is the purpose of rolling the patient’s shoulders anteriorly when performing the PA projection of the chest?
- A. This motion makes the position more comfortable for the patient
B. This motion reduces magnification of the heart shadow
C. This motion rotates the scapulae out of the lungs
D. This motion places the coronal plane parallel to the upright grid cabinet
8. Where is CR directed for the upright, PA projection of the chest?
- A. midsagittal plane at the level of t7
B. midcoronal plane at the level of t7
C. midsagittal plane at the level of the iliac crests
D. midcoronal plane at the level of the iliac crests
9. Which of the following is proper placement of the patient’s arms for the upright, lateral projection of the chest?
- A. backs of the hands on the hips with the shoulders rolled anteriorly
B. raised over the head, hands grasping opposite elbows
C. abducted from thorax
D. adducted from thorax
10. What patient breathing instructions maximize the amount of air in the lungs on the PA projection of the chest?

- A. stop breathing after second deep inspiration
- B. stop breathing after deep inspiration
- C. stop breathing after expiration
- D. continue slow, even breathing

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Chapter 19 Skull, Facial Bones, and Paranasal Sinuses

1. Which of the following positioning landmark is located at the junction of the nose and the upper lip?
 - A. EAM
 - B. glabella
 - C. foramen magnum
 - D. acanthion
2. What does the abbreviation “EAM” represent?
 - A. external auditory meatus
 - B. external anterior mastoid
 - C. external anterior meatus
 - D. external acoustic magnum
3. What anatomic term refers to the air-filled cavities located in some bones of the face and cranium?
 - A. sella turcica
 - B. zygomatic prominences
 - C. paranasal sinuses
 - D. paranasal foramina
4. Which positioning baseline, used for radiography of the skull and facial bones, extends from the outer corner of the eye to the EAM?
 - A. the acanthiomeatal line
 - B. the infraorbitomeatal line
 - C. the orbitomeatal line
 - D. the mentomeatal line
5. How is the CR directed for a PA axial projection (Caldwell method) of the skull?
 - A. 15° cephalic
 - B. 15° caudad
 - C. 30° cephalic
 - D. 30° caudad

6. Why is sinus radiography performed with the patient in the upright position?
- A. to demonstrate air/fluid levels
 - B. for ease of patient positioning
 - C. for patient comfort
 - D. to prevent superimposition of the cranial structures on the paranasal sinuses
7. Which radiographic projection of the cranium best demonstrates the maxillary sinuses?
- A. AP axial (Towne method)
 - B. SMV
 - C. PA axial (Caldwell method)
 - D. parietoacanthial (Waters method)
8. A lateral projection of the face, using detail screens with no grid, is used to image which of these bones?
- A. mandible
 - B. nasal bones
 - C. orbits
 - D. zygoma
9. A "blow-out fracture" involves which of the following structures?
- A. occipital bone
 - B. mandible
 - C. nasal bones
 - D. floor of the orbit
10. Which facial bones are most commonly fractured?
- A. nasal bones
 - B. zygomatic arches
 - C. orbits
 - D. mandible

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Chapter 20 Radiography of Pediatric and Geriatric Patients

1. A common condition among geriatric patients is diverticulitis, which affects the:
 - A. lungs
 - B. colon
 - C. eyes
 - D. brain

2. Nonaccidental trauma is a term that may be used to describe:
 - A. aspiration of a foreign object
 - B. ingestion of a foreign object
 - C. slipped capital femoral epiphysis
 - D. physical manifestations of child abuse

3. When the degree of skeletal maturation, also called “bone age,” is not consistent with a child’s chronological age, the cause is usually pathology involving the:
 - A. skeletal system
 - B. endocrine system
 - C. respiratory system
 - D. reproductive system

4. Greenstick fractures are commonly seen in:
 1. pediatric patients
 2. geriatric patients
 - A. 1
 - B. 2
 - C. 1 and 2
 - D. Neither 1 nor 2

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Chapter 21 Image Critique

1. The bulbs in x-ray viewboxes must be changed every:
 - A. 9 months
 - B. 10 months
 - C. 1 year
 - D. 2 years

2. X-ray images of the fingers, hands, feet and toes are placed on the viewbox with the distal aspect:
 - A. pointing up
 - B. pointing down
 - C. pointing to the right if the part is right-sided
 - D. point to the left if the part is left-sided

3. Which of the following would be considered an anatomical or positioning error and would require a repeat?
 1. processing problems
 2. incorrect positioning
 3. exclusion of significant anatomy
 - A. 1 and 2
 - B. 1 and 3
 - C. 2 and 3
 - D. 1, 2, and 3

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Chapter 22 Ethics, Legal Considerations, and Professionalism

1. The threat of being touched in an injurious way defines:
 - A. libel
 - B. negligence
 - C. false imprisonment
 - D. assault

2. The standard of reasonable care is based upon:
 - A. the doctrine of the reasonably prudent person
 - B. the doctrine of *respondeat superior*
 - C. the doctrine of *res ipsa loquitur*
 - D. the rule of personal responsibility

3. Which of the following human needs is more basic than the others?
 - A. activity
 - B. esteem
 - C. sleep
 - D. love

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Chapter 23 Safety and Infection Control

1. Which of the following describes the Trendelenburg position?
 - A. The patient is lying face down.
 - B. The patient's head is elevated.
 - C. The patient is lying on the left side.
 - D. The patient's head is lower than the feet.

2. A lightheaded or faint sensation upon first sitting up is termed:
 - A. dyspnea
 - B. orthopnea
 - C. orthostatic hypotension
 - D. debilitation

3. The single best protection against disease in the health care setting is:
 - A. vaccination
 - B. wearing a mask
 - C. frequent hand hygiene
 - D. sterile technique

4. An autoclave provides sterilization by means of:
 - A. heat produced by steam under pressure
 - B. gas plasma technology
 - C. a heated mixture of Freon and ethylene oxide
 - D. soaking items in a bath of germicidal solution

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Chapter 24 Assessing Patients and Managing Acute Situations

1. The medical term for loss of bladder control is:
 - A. incontinence
 - B. hypotension
 - C. diuresis
 - D. bradycardia

2. Which of the following measurements are considered vital signs?
 1. pulse
 2. blood pressure
 3. temperature
 4. respirations
 - A. 1 and 2 only
 - B. 3 and 4 only
 - C. 1, 2 and 3 only
 - D. 1, 2, 3, and 4

3. A sphygmomanometer is an instrument used to measure:
 - A. pulse
 - B. respirations
 - C. blood pressure
 - D. oxygen saturation

4. When stress causes an attack of bronchial constriction and difficult breathing, the condition is called:
 - A. aspiration
 - B. asthma
 - C. incontinence
 - D. hypertension

5. A rapid, weak, and ineffective heartbeat defines a state called:
 - A. hypertension
 - B. angina
 - C. stridor
 - D. fibrillation

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Chapter 25 Medications and Their Administration

1. The effectiveness of a drug is referred to as its:
 - A. toxicity
 - B. potency
 - C. efficacy
 - D. hydration

2. The government agency responsible for, among other things, setting standards for control of drugs is the:
 - A. PDR
 - B. ASRT
 - C. FDA
 - D. DEQ

3. A natural or synthetic drug whose actions are similar to the actions of morphine is called a/an:
 - A. opiate
 - B. opioid
 - C. antihistamine
 - D. steroid

4. An instrument used to monitor the oxygen saturation of sedated patients is called a/an:
 - A. pulse oximeter
 - B. respiratory depressant
 - C. anticoagulant
 - D. antagonist

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Chapter 26 Medical Laboratory Skills

1. A needle holder, sometimes called a barrel, is a plastic tube designed to:
 - A. receive contaminated sharps
 - B. contain the blood specimen obtained by venipuncture
 - C. support a vacuum tube during blood specimen collection
 - D. prevent needlestick injuries

2. Test results such as negative, trace, 1+, 2+, 3, and 4+ are typical of which of the following laboratory tests?
 - A. white blood cell count
 - B. red blood cell count
 - C. microscopic evaluation of urine sediment
 - D. chemical evaluation of urine using a reagent strip

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Chapter 27 Additional Procedures for Assessment and Diagnosis

1. When the standard test for distance vision cannot be performed because the patient is unfamiliar with the English alphabet, which of the following can be used instead?
 - A. near vision acuity chart
 - B. Ishihara test
 - C. Snellen E chart
 - D. calibration rod

2. When a patient's distance vision measurement is reported as OS 20/40 sc, this means that:
 - A. with the right eye and wearing glasses, the patient can read at 40 feet what a person with normal vision can read at 20 feet
 - B. with the left eye and without glasses, the patient can read at 20 feet what a person with normal vision can read at 40 feet
 - C. with the left eye and wearing glasses, the patient can read at 40 feet what a person with normal vision can read at 20 feet
 - D. with the right eye and wearing glasses, the patient can read at 20 feet what a person with normal vision can read at 40 feet

3. A flow-volume graph is a means of plotting the results of a/an:
 - A. electrocardiogram
 - B. Ishihara test
 - C. forced expiration spirometry test
 - D. exercise tolerance test

4. One contradiction for spirometry testing is the presence of hemoptysis, which means:
 - A. coughing up blood
 - B. collapsed lung
 - C. bronchodilation
 - D. a type of eye surgery