3701-72-03
ACTION: Final

AMENDED
Appendix

DATE: 10/15/2021 12:16 PM
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APPENDIX
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3701-72-03

GXMO CLINICAL TRAINING MODULES

I.   **CHEST/ABDOMEN MODULE**

For the Chest / Abdomen category, given a radiograph or a diagram, the student will correctly label key radiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

A.   ANATOMIC TRAINING

1.   Chest

a.   PA upright
b.   Lateral upright (left)
c.   AP Lordotic
d.   AP supine
e.   Lateral decubitus
f.   Posterior oblique
g.   Anterior oblique

2.   Ribs

a.   AP
b.   Oblique

3.   Abdomen

a.   AP – erect
b.   AP – supine

Except for bone densitometry, if multiple clinical modules are taken together or as a sequence, the digital image receptor training only has to be provided and assessed once.

B.   DIGITAL IMAGE RECEPTORS

1.   Didactic Fundamentals: The student will be familiar with basic digital terms & concepts, basic differences in digital image acquisition methods, the effects of "windowing" on image contrast and density.

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GXMO CLINICAL TRAINING MODULES

    a.   Digital Basics:
    b.   Digital Image Acquisition Technologies: 2 basic types – Computed Radiography (CR) & Digital Radiography (DR)
    c.   Display Qualities
    d.   Practical Considerations – Differences between CR & Film
    e.   Practical Considerations – Differences between CR & DR

2.   Clinical Essentials Lab – CR & Digital Image Receptor (IR)

    a.   Introductory concepts to digital IRs
    b.   CR Essentials
    c.   Auto-recognition systems and histograms
    d.   Optimal Technique Considerations
    e.   CR Plate Fogging - CR plates especially sensitive tofogging
    f.   Common errors resulting in a poor-quality image

3.   Digital Image Receptor Psychomotor Skills

    a.   Processing the CR Plate
    b.   Erasure control
    c.   Electronic image management
    d.   Basic artifact analysis
    e.   Edge enhancement algorithms

II.   EXTREMITY MODULE

For the Extremity category, given a radiograph or a diagram, the student will correctly label key radiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

A.   ANATOMIC TRAINING

1.   Toes

    a.   AP
    b.   Oblique
    c.   Lateral

2.   Foot

    a.   AP axial
    b.   Medial oblique
    c.   Lateral oblique
    d.   Mediolateral
    e.   AP weightbearing
    f.   Lateral weightbearing

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3.   Ankle

      a.   AP
      b.   AP 15° internal oblique (mortise)
      c.   Lateral
      d.   Oblique 45° internal
      e.   Oblique 45° external

4.   Calcaneus (Os Calcis)

      a.   Calcaneal axial

5.   Tibia, Fibula

      a.   AP
      b.   Lateral

6.   Knee

      a.   AP
      b.   Lateral
      c.   AP weight bearing
      d.   Lateral oblique 45°
      e.   Medial oblique 45°
      f.   PA
      g.   PA axial – intercondylar fossa (tunnel)

7.   Patella

      a.   Lateral
      b.   Supine flexion 45° (Merchant)
      c.   PA
      d.   Prone flexion 90° (Settegast)
      e.   Prone flexion 55° (Hughston)

8.   Femur (Distal)

      a.   AP
      b.   Mediolateral
      c.   Cross-table lateral

9.   Pelvis

      a.   AP

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10. Hip

   a.   AP
   b.   Lateral
   c.   Cross-table lateral

11. Fingers

   a.   PA finger
   b.   Mediolateral lateral
   c.   Oblique
   d.   AP thumb
   e.   Oblique thumb
   f.   Lateral thumb

12. Hand

   a.   PA
   b.   Lateral
   c.   Oblique

13. Wrist

   a.   PA
   b.   Oblique 45°
   c.   Lateral
   d.   PA for scaphoid

14. Forearm

   a.   AP
   b.   Lateral

15. Elbow

   a.   AP
   b.   Lateral
   c.   External oblique
   d.   Internal oblique
   e.   AP partial flexion

16. Humerus

   a.   AP
   b.   Lateral

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17. Shoulder

    a. AP internal and external rotation
    b. Inferosuperior axial
    c. Posterior oblique (Grashey)
    d. AP neutral
    e. Transthoracic lateral
    f. Scapular Y

18. Scapula

    a. AP
    b. Lateral

19. Clavicle

    a. AP
    b. AP axial 15-30° cephalad
    c. PA axial 15-30° caudad

20. Acromioclavicular joints

    a. AP bilateral with and without weights

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(B) DIGITAL IMAGE RECEPTORS

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GXMO CLINICAL TRAINING MODULES

    f.   Common errors resulting in a poor-quality image

3. Digital Image Receptor Psychomotor Skills

    a. Processing the CR Plate
    b. Erasure control
    c. Electronic image management
    d. Basic Artifact analysis
    e. Edge enhancement algorithms

III. SKULL – SINUSES MODULE

For the Skull / Sinuses category, given a radiograph or a diagram, the student will correctly label key radiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

A.   ANATOMIC TRAINING

    1.   Skull

        a.   AP axial (Towne)
        b.   Lateral
        c.   PA (Caldwell)
        d.   PA
        e.   Facial Bones
            i.   Lateral
            ii.   Parietoacanthial (37° Waters)
            iii.   PA (Caldwell)
            iv.   Parietoacanthial (55° Waters)
            v.   Lateral nasal bones
            vi.   Lateral orbits
        f.   Paranasal Sinuses
            i.   Lateral
            ii.   PA (Caldwell)
            iii.   Parietoacanthial (Waters)
            iv.   Submentovertical (full basal)
            v.   Open mouth parietoacanthial (Waters)

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GXMO CLINICAL TRAINING MODULES

B.   DIGITAL IMAGE RECEPTORS

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    e. CR Plate Fogging - CR plates especially sensitive tofogging
    f. Common errors resulting in a poor quality image

3. Digital Image Receptor Psychomotor Skills

    a. Processing the CR Plate
    b. Erasure control
    c. Electronic image management
    d. Basic artifact analysis
    e. Edge enhancement algorithms

IV. **SPINE MODULE**

For the Spine, given a radiograph or a diagram, the student will correctly label key radiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

A.   ANATOMIC TRAINING

1.   Cervical spine

    a.   AP axial cephalad
    b.   PA axial caudad
    c.   AP open mouth
    d.   Lateral

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    e.   45° oblique
    f.   Lateral swimmers
    g.   Lateral flexion and extension
    h.   Cross-table lateral

2.   Thoracic Spine

    a.   AP
    b.   Lateral

3.   Lumbar Spine

    a.   AP
    b.   Lateral
    c.   L5-S1 lateral spot
    d.   Oblique 45°
    e.   AP L5-S1 spot, 30-35° cephalad

4.   Sacrum and Coccyx

    a.   AP sacrum, 15-25° cephalad
    b.   AP coccyx, 10-20° caudad
    c.   Lateral sacrum
    d.   Lateral coccyx

5.   Sacroiliac Joints

    a.   AP
    b.   25-30° posterior oblique
    c.   25-30° anterior oblique

6.   Scoliosis Series

    a.   AP/PA scoliosis series

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    d. Practical Considerations – Differences between CR & Film
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3. Digital Image Receptor Psychomotor Skills

    a. Processing the CR Plate
    b. Erasure control
    c. Electronic image management
    d. Basic artifact analysis
    e. Edge enhancement algorithms

V.   PODIATRIC MODULE

For the Podiatric (weight-bearing) category, given a radiograph or a diagram, the student will correctly label key radiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

   A.   ANATOMIC TRAINING

     1.   Toes – "collimated" studies

        a.   AP w.b.
        b.   Lateral oblique
        c.   Medial oblique
        d.   Elevated lateral digit w.b.
        e.   Hallux lateral w.b.

     2.   Foot

        a.   AP (DP) angle & base w.b.
        b.   Medial oblique
        c.   Lateral oblique
        d.   Weight-bearing oblique projections (medial & lateral) w.b.
        e.   Lateral (angle & base) w.b.

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  f. Forefoot (FF)/sesamoid axial (using standard
    w.b.orthoposer)

 3. Ankle

  a. AP w.b
  b. Mortise w.b.
  c. Medial oblique w.b.
  d. Lateral oblique w.b.
  e. Lateral w.b.

 4. Calcaneus (Os Calcis)

  a. Calcaneal axial w.b.
  b. Harris-Beath (ski-jump) w.b.

 5. Basic Wheelchair views – non-weightbearing

  a. Foot projections – lateral, medial, AP
  b. Ankle projections – AP, mortise, internal & external
    oblique

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B. DIGITAL IMAGE RECEPTORS

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  terms & concepts, basic differences in digital image acquisition
  methods, the effects of "windowing" on image contrast and density.

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GXMO CLINICAL TRAINING MODULES

3. Digital Image Receptor Psychomotor Skills

   a. Processing the CR Plate
   b. Erasure control
   c. Electronic image management
   d. Basic artifact analysis
   e. Edge enhancement algorithms

VI. BONE DENSITOMETRY MODULE

For the Bone Densitometry category, the student will correctly label keyradiographic anatomic landmarks.

On a simulated patient, the student will demonstrate their working knowledge of standard terminology for patient positioning and projection.

A. DXA scanning of P/A lumbar spine, lateral spine, hip, forearm, and total body

   1. Anatomy

      a. ROI
      b. Bony landmarks
      c. Adjacent structures

   2. Scan acquisition

      a. Patient instructions
      b. Patient positioning
      c. Selection of appropriate scan parameters

   3. Scan analysis and print out

      a. ROI placement
      b. BMC, area and BMD
      c. T-score, Z-score

   4. Common problems

      a. Poor bone edge detection
      b. Nonremovable artifacts
      c. Variant anatomy
      d. Fractures and other pathology

   5. Follow- up scans

      a. Unit of Comparison
         i. BMD

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     ii.   T-score
  b. Reproduce baseline study

B.   BONE DENSITOMETRY EQUIPMENT

   1. Basic Concepts

   The student will become familiar with the fundamental aspects of osteoporosis and the non-invasive assessment methods of bone.

    a. Osteoporosis
         i.   WHO definition
         ii.   Types of Osteoporosis: Primary vs. Secondary
         iii. Type I osteoporosis (post menopausal) vs. Type II osteoporosis (senile)
         iv. Risk factors
    b. Introduction to various methods commonly used
         i.   Quantitative Ultrasound (QUS)
         ii.   Dual Energy X-ray Absorptiometry (DXA)
    c. Measuring BMD
        i. Basic Statistical concepts
          a.   Mean
          b.   Standard deviation
          c.   Coefficient of variation
        ii. Interpreting patient results
          a.   BMD
          b.   Z-score
          c.   T-score

   2. Equipment Operation & Quality Assurance

    The student will become familiar with the basic components of a dual-x-ray absorptiometry device (DXA) and with the quality assurance concept.

    a. Computer console and switches
    b. Data base maintenance
    c. Quality assurance
        i. Use of phantoms and/or calibration
        ii. Troubleshooting
        iii. Identify possible shift or drift
    d. QA pass or fail
    e. Quality of BMD
        i. Define precision
        ii. Define accuracy
    f. Factors that affect both accuracy and precision
        i. Scanner
        ii. Operator

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             iii. Patient
   g. Least significant change (LSC)
             i. Definition of LSC
             ii. Measurement of LSC
   h. Radiation dose
             i. Dose of various procedures
             ii. Minimizing patient exposure
                 a.   Patient instruction
                 b.   Performing correct exam