Specialized Topics in Areas of Radiologic Sciences
P.O. Box 2931 Toledo, Ohio 43606
Phone: 419-471-1973
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Unit 43

Fundamentals of Skeletal Radiology

By

Clyde A. Helms

Prepared by: Carolyn J. Frigmanski, M.A., B.S.R.T. ®
Founder, S.T.A.R.S.

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Sincerely,

Carolyn J. Frigmanski, M.A.,B.S.R.T. ®, Founder

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Dear **S.T. A. R.S.** Participant,

A new edition of Fundamentals of Skeletal Radiology has been published with a few minor changes.

I am accommodating all purchasers of this product under the following requirements.

If you purchased or have access to the **Third Edition** of: **Fundamentals of Skeletal Radiology** by Clyde Helms, please **COMPLETE ALL QUESTIONS ON THIS POST TEST AND SEND YOUR ANSWER SHEET TO THE S.T.A.R.S. OFFICE FOR EVALUATION AND CERTIFICATE CREATION.**

If you purchased or have access to the **Fourth Edition** of: **Fundamentals of Skeletal Radiology** by Clyde Helms, please **SUBSTITUTE THE FOLLOWING QUESTIONS ON THIS POST TEST AND SEND YOUR ANSWER SHEET TO THE S.T.A.R.S. OFFICE FOR EVALUATION AND CERTIFICATE CREATION.**

Question #23 The most common malignant primary bone tumor is a(an)

A. Ewing's sarcoma B. fibrosarcoma C. chondrosarcoma D. osteosarcoma

Question #26 About ____% of classic Ewing's sarcoma has lesions in the diaphysis of children.

A. 20 B. 30 C. 40 D. 50

Question #27 Chondrosarcomas most frequently occur in patients older than age

A. 15 B. 20 C. 30 D. 40

Question #75 _____ causes deposition of granulation tissue in the body, primarily in the lungs.

A. Fibrosarcoma B. Sarcoid C. Charcot's joint D. Hemophilia

Questions 90 – 94 are referenced in Chapter 8.

Question #93 One etiology of avascular necrosis (AVN) includes

A. alcoholism B. arthritis C. smoking D. bulemia

Question #115 _____ imaging is useful in evaluating AVN and carpal fractures.

A. CT B. PET C. Ultrasound D. MR

I appreciate your co-operation that allows everyone to get 12 A.S.R.T. Category A ce credits.

Carolyn J. Frigmanski, M.A.,B.S.R.T. ®

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Unit 43

Title: **Fundamentals of Skeletal Radiology by Clyde A. Helms**

Please complete the answer sheet at the conclusion of this post test and return it to the **S.T.A.R.S.** office.

Chapter 1

1. The most abused examination ordered in radiology is probably plain films of the

   A. skull & lumbar spine B. sinuses & abdomen C. ribs & chest D. spine & pelvis

2. The number of head trauma patients who have subdural and epidural bleeds without having a skull fracture is currently

   A. 40% B. 50% C. 60% D. 70%

3. Radionuclide bone scans are often negative, even with marked skeletal involvement, in patients with

   A. metastatic lesions
   B. occult lesions
   C. spondylolisthesis
   D. multiple myeloma

4. The plain film examination that gives the greatest gonadal radiation dose is

   A. lumbar spine B. abdomen C. hip D. pelvis

5. Lumbar myelography is **NOT** the preferred modality when comparing it to computed tomography (CT) or magnetic resonance imaging (MRI) because myelography

   A. is a very painful exam
   B. may necessitate an overnight admission
   C. is not as accurate
   D. has a higher radiation dose than a CT scan

6. Every radiologist has the responsibilities of helping to educate and guide the inexperienced clinician to obtain the appropriate imaging examinations and to

   A. recommend more exams
   B. become the final authority in ordering exams
   C. increase revenues for the practice
   D. eliminate those exams that are unnecessary

Chapter 2

7. The method used for differential diagnosis of benign, bubbly lytic lesions based on a radiologist's experience is called

   A. "discriminator identification"
   B. "pattern identification"
   C. "pattern analyses"
   D. "mnemonics differential"

8. Fibrous dysplasia can be excluded in the differential diagnosis of a bubbly lytic lesion if it

   A. is sclerotic
   B. has a ground glass appearance
   C. contains periostitis
   D. is patchy

9. When a differential diagnosis of fibrous dysplasia is established, an adamantinoma should also be mentioned when the lesion is located in the

A. pelvis B. phalanges C. tibia D. epiphyses

10. The most common benign cystic lesion of the phalanges is a (an)

A. enchondroma
B. osteoblastoma
C. chondroblastoma
D. nonossifying fibroma

11. The only lesion that possesses closed epiphyses, abuts to articular surfaces, is eccentrically located with well defined nonsclerotic margins is the

A. eosinophillic granuloma
B. giant cell tumor
C. osteoblastoma
D. nonossifying fibroma

12. If a differential diagnosis of aneurismal bone cyst is being considered, the physician needs to include the differential diagnosis of _____ because one of its appearances simulates ABC's.

A. chondritis
B. enchondroma
C. osteoblastoma
D. osteomyelitis

13. Almost every differential diagnosis of a lytic lesion will include _____ _____ because there is no reliable way to radiographically exclude it.

A. Brown tumors
B. fibrous tissue
C. multiple myeloma
D. infection sites

14. Chondroblastomas are among the easiest lesions to identify radiographically because they occur anatomically only in the _____ and they occur almost exclusively in patients in an age group of

A. phalanges, 40 years and older
B. epiphysis, 30 years and under
C. joints, 20 years and under
D. ribs, 50 years and under

15. The primary pathology possessing sclerotic lesions in patients older than 40 years of age is

A. metastatic disease
B. myeloma
C. chondroblastoma
D. osteoblastoma

Chapter 3

16. In determining malignant versus benign lesions, the aspect with up to a 90% accuracy rate is

A. cortical destruction
B. periostitis
C. orientation or axis of the lesion
D. zone of transition

17. Some experienced investigators dealing with malignant bone tumors state the only way benign periostitis can occur in a malignant lesion is if there is an accompanying

A. infection
B. concomitant fracture or infection
C. eosinophilic granuloma
D. aneurysmal bone cyst

18. It is critical for physicians to be aware that the zone of transition can only be

A. seen clearly on a plain film
B. seen clearly on a MR image
C. applied to blastic lesions
D. applied to sclerotic lesions

19. If a lesion has a narrow zone of transition, it is considered

A. aggressive
B. malignant
C. benign
D. permeative

20. Jack Edeiken, a famed skeletal radiologist, evaluated 4,000 malignant tumors and found they could be correctly diagnosed in 80% of the cases by utilizing the patient's

A. physical weight
B. ethnic background
C. chronilogical age
D. geographical location

21. The imaging modality that should be routinely used in the workup of malignant tumors is

A. plain film radiography
B. computed tomography (CT)
C. angiography
D. magnetic resonance (MRI)

22. The most common malignant primary bone tumor is a (an)

A. malignant giant cell tumor
B. osteosarcoma
C. chondrosarcoma
D. fibrosarcoma

23. The most common malignant primary bone tumor is a (an)

A. Ewing's sarcoma
B. fibrosarcoma
C. chondrosarcoma
D. osteosarcoma

24. A type of osteosarcoma that originates from the periosteum, grows outside the bone, and often wraps around the diaphysis is called a

A. parosteal sarcoma
B. chondrosarcoma
C. malignant giant cell tumor
D. malignant fibrous histiocytoma

25. A classic permeative lesion in the diaphysis of a long bone in a child is known as

A. Ewing's sarcoma
B. osteosrcoma
C. chondrosarcoma
D. fibrosarcoma

26. About ____ % of classic Ewing's sarcoma has lesions in the diaphysis of children.

A. 20
B. 30
C. 40
D. 50

27. Chondrosarcomas most frequently occur in patients older than age

A. 15
B. 20
C. 30
D. 40

28. The only malignant tumor involving a large amount of bone while the patient is asymptomatic is

A. fibrosarcoma
B. primary lymphoma
C. Ewing's sarcoma
D. malignant fibrous histiocytoma

29. One of the only lesions that is **not** characteristically "hot" on a radionuclide bone scan is a (an)

A. osteochondroma B. chondrosarcoma C. enchondroma D. myeloma

30. One of the few uses of _____ is the differentiation of a solid mass from a ganglion in musculoskeletal MRI.

A.Omniscan B. Multihance C. Gd-DTPA D. Prohance

Chapter 4

31. Skeletal "_____ _____" lesions are the processes that are so radiographically characteristic that a biopsy or additional diagnostic tests are unnecessary.

A. "don't touch" B. "quick fix" C. "self-healing" D. "self-diagnosing"

32. Myositis ossificans and avulsion injuries are two posttraumatic entities of which a biopsy should **not** be performed because any area that is _____can have a high nuclear-chromatin ratio and a high mitotic figure count, thereby occasionally simulating a malignancy.

A. infected B. calcified C. fractured D. healed

33. Discogenic vertebral disease can mimic metastatic disease on both _____ and _____ evaluations.

A. radiographic/clinical
B. radiographic/computed tomography CT
C. nuclear/computed tomography (CT)
D. clinical/magnetic resonance imaging (MRI)

34. The two key radiographic views recommended in diagnosing a pseudo-dislocation of the humerus are

A. anteroposterior (AP) and axillary
B. transcapular and axillary
C. internal and external rotation
D. transcapular and anteroposterior (AP)

35. A pseudocyst of the humerus is described as

A. an osteochondritis dissecans
C. a malignant lesion in the head of the humerus
B. a lytic lesion of the tuberosity
D. a benign lesion in the olecranon process

36. The term os odontoideum identifies

A. a "joint mouse" B. hemivertebrae C. a fractured dens D. a fractured lamina

37. A dorsal defect of the patella is indicative of

A. ligament damage B. dislocation C. bone cyst D. metastatic disease

38. The term osteopoikilosis describes

A. traumatized bone tissue B. callus formation C. cyst formation D. metastatic disease

39. In identifying nonossifying fibromas, the radiologist should recommend

A. a biopsy B. a MRI scan C. no intervention D. surgical removal

40. "Pitt's pit" is a commonly encountered lytic lesion of the lateral aspect of the

A. femoral neck B. distal tibia C. proximal tibia D. patella

Chapter 5

41. In trauma radiography, one of the key points for a radiologist to remember is to always

A. look at the area of interest only B. get two radiographs at 90 degrees to each other
C. physically examine the patient D. order x-rays of adjacent body parts to be safe

42. A fracture of the lateral masses of C1 involving the splitting apart of the bony ring is called

A. hangman's B. Jefferson's C. cervical fission D. bifurcated spine

43. Clay shovelers fracture involves the fracture of the spinous process of

A. D1 or D2 B. L3 or L4 C. C6 or C7 D. L1 or L2

44. A fracture of the posterior elements of C2 and usually displacement of the C2 body anterior to C3 is a

A. Hangman's fracture B. depressed C. comminuted D. spiral

45. Disruption of the posterior ligaments & anterior compression of a cervical vertebral body is called

A. Jones fracture B. simple fracture C. Flexion "teardrop" fracture D. compound fracture

46. A fracture of the posterior body at L1 or L2 level is commonly called a _____ fracture.

A. chip B. linear C. Cotton's D. Smith

47. A fracture through the spinous process at L1 or L2 level is commonly called a _____ fracture.

A. Chance B. compressed C. torsion D. longitudinal

48. A _____ _____ injury may distract the posterior elements, ligaments & anterior compression of L1-L2.

A. soft tissue B. sudden impact C. seat belt D. sport diving

49. Many seemingly innocuous fractures in the hand should be recognized as serious injuries requiring

A. casting B. surgical fixation C. amputation D. physical therapy

50. A comminuted fracture of the base of the thumb that extends into the joint space is termed a

A. Bennett's B. Rolando's C. Kimmel's D. game keepers

51. A baseball finger is an avulsion injury at the _____ of the distal phalanx.

A. head B. shaft C. base D. tuft

52. A fall on the outstretched hand can result in a lunate/perilunate dislocation associated with a

A. transscaphoid fracture
B. triquetrum fracture
C. capitate fracture
D. radial styloid fracture

53. The carpal tunnel view of the wrist is used to diagnose a fracture of the

A. ulna
B. hook of the hamate
C. scaphoid
D. ulnar aspect of the lunate

54. On an anteroposterior (AP) wrist radiograph, the Terry Thomas sign is an indicator of a

A. fracture of the capitate
B. perilunate dislocation
C. dislocation of the radius
D. rotary subluxation of the scaphoid

55. A scaphoid fracture is a potentially serious injury because of the high rate of

A. median nerve damage
B. carpal tunnel syndrome
C. nonunion of the fracture pieces
D. avascular necrosis

56. The recommended follow up if a scaphoid fracture is clinically suspected but not radiographically evident is to

A. repeat the film in 2 days
B. cast the wrist and repeat the film in a week
C. take special views for the scaphoid
D. cast the wrist as a precaution

57. The most common fracture of the distal radius & ulna that results in a dorsal angulation of the distal forearm and wrist after a fall on the outstretched arm is called

A. greenstick
B. Monteggia's
C. Smith's
D. Colle's

58. Plastic bowing deformity of the forearm is often treated by

A. traction on the arm
B. keeping the arm in a sling
C. casting the arm
D. breaking the bones and resetting them

59. A helpful radiographic indicator of a fracture about the elbow is

A. redness
B. edema
C. joint effusion
D. a displaced fat pad

60. The anterior fat pad gets displaced superiorly and outward with

A. swelling
B. fracture
C. joint effusion
D. dislocation

61. The most common dislocation of the shoulder is the _____ dislocation.

A. anterior
B. posterior
C. superior
D. inferior

62. To perform a transscapular view of the humerus, the coracoid process, the spine of the acromium, and the blade of the scapula is used to locate the

A. humeral head
B. glenoid fossa
C. greater tuberosity
D. lesser tuberosity

63. Pelvic fractures fairly common to long jumpers, sprinters, hurdlers, gymnasts and cheerleaders are

A. comminuted B. stress C. avulsion D. linear

64. The most serious of the stress fractures to the hip or leg occur at the

A. femoral neck B. distal femur C. proximal tibia D. distal tibia

65. One stress fracture often misdiagnosed clinically and overlooked radiographically occurs in the

A. fibula B. proximal tibia C. calcaneus D. lateral malleolus of the tibia

66. Lisfranc's fracture is described as a fracture-dislocation of the _____ bones.

A. carpal B. facial C. tarsal D. tarsometatarsal

Chapter 6

67. The majority of arthritides are most easily examined and categorized by looking at their effect on the

A. wrists B. hands C. spine D. hips

68. Signs of primary osteoarthritis and rheumatoid arthritis occur _____in 75 to 80% of the cases.

A. asymmetrically B. unilaterally C. proximally D. bilaterally

69. Sclerosis, osteophytes and joint space narrowing occurs with

A. all trauma B. osteoporosis C. degenerative joint disease D. cysts

70. Soft tissue swelling, osteoporosis, joint space narrowing and marginal erosions are indications of

A. rheumatoid arthritis B. gout C. metastasis D. juvenile arthritis

71. HLA-B27 Spondyloarthropathies involves

A. total fusion B. bony ankylosis C. osteophyte creation D. damaged discs

72. Gout manifests with random distribution of well-defined erosions in the _____.

A. hips B. feet C. spine D. hands

73. Pain, cartilage calcification and joint destruction indicate the presence of

A. osteoporosis B. uric acid crystals C. bursistis D. pseudogout

74. Collagen-vascular diseases present with _____ deviation of the phalanges.

A. ulnar B. radial C. exaggerated D. extreme

75. _____ causes deposition of granulation tissue in the body, primarily in the lungs.

A. Fibrosarcoma B. Sarcoid C. Charcot's joint D. Hemophilia

76. _____ and _____ are crystal-induced arthrides.

A. Dermatomyositis/scleroderma
B. Hemochromatosis/sarcoidosis
C. Gout/pseudogout
D. Osteochondromatosis/Reiter's syndrome

77. The most severe degree of joint destruction is radiographically seen in

A. juvenile rheumatoid arthritis
B. synovial osteochondromatosis
C. hemochromatosis
D. Charcot's joint

78. The common radiographic feature of hemophilia, juvenile rheumatoid arthritis and paralysis is

A. overuse B. disuse C. effusion D. joint destruction

79. Most joint effusions are clinically obvious and do **not** require radiographic validation except for the

A. elbow B. knee C. shoulder D. wrist

80. The hallmark sign of avascular necrosis is increased

A. effusion B. swelling C. joint erosion D. joint density

81. "Joint mice" identifies free fragments of bone in patients who have

A. arthritis B. avascular necrosis C. osteochondritis dissecans D. rheumatoid arthritis

Chapter 7

82. The main radiographic finding in osteoporosis is the thinning of the

A. cortex B. medulla C. periosteum D. epiphysis

83. In most cases it is **not** possible to radiographically distinguish between osteoporosis and

A. osteopenia B. erosion C. osteomalacia D. necrosis

84. Occasionally, aggressive osteoporosis from misuse can mimic a permeative lesion such as

A. osteosarcoma B. Ewing's sarcoma C. fibrosarcoma D. primary lymphoma

85. Osteomalacia in children is also called

A. scurvy B. beri-beri C. rickets D. polio

86. Subperiosteal bone resorption in hyperparathyroidism is seen most commonly on the radial aspect of the

A. ulna B. metacarpals C. radius D. phalanges

87. The diagnosis of osteosclerosis may be affected by _____ when taking a radiograph.

A. positioning B. technique C. respiration D. film developing

88. The bone-in-bone appearance in vertebral bodies and "sandwich vertebrae" identify

A. Paget's disease B. pyknodysostosis C. osteopetrosis D. renal osteodystrophy

89. A group of people who possess increased cortical thickness from increased stress are

A. pilots B. the military C. cab drivers D. professional athletes

Chapter 8

90. Achondroplasia is a common cause of

A. arthritis B. dwarfism C. giantism D. bone cancer

91. Diaphyseal cortical thickening primarily of long bones indicates _____ disease.

A. Paget's B. metastatic C. metabolic D. Engelmann's

92. Hypertrophic pulmonary osteoarthropathy is easily identified by clubbing of the _____.

A. fingers B. hips C. feet D. thumbs

93. One etiology of avascular necrosis (AVN) includes

A. alcoholism B. arthritis C. smoking D. bulemia

94. Melorheostosis has the appearance likened to

A. an oil slick B. pooled water C. "dripping candle wax" D. water waves

Chapter 9

95. A sagittal T1-weighted sequence is essential for knee examinations to evaluate the

A. cruciate ligament B. menisci C. cartilage D. collateral ligaments

96. The magnetic resonance imaging (MRI) sequence to use to examine the collateral ligaments is

A. sagittal B. axial C. T1 weighted, coronal D. T2 weighted, coronal

97. One of the most useful signs in evaluating knee anatomy on a magnetic resonance(MR) image is called

A. "parrot beak" B. "bucket handle" C. "bowtie" D. "thumbnail"

98. Injuries to the medial collateral ligament usually occur from a blow to the _____ part of the knee.

A. anterior B. posterior C. lateral D. superior

99. A meniscofemoral ligament that passes behind the PCL is called the ligament of _____.

A. Humphrey B. Sartorious C. Arcuate D. Wrisberg

100. The 2 recommended planes to diagnose chondromalacia of the patella are

A. sagittal and coronal
B. coronal and axial
C. sagittal and axial
D. T1 weighted sequence and axial

Chapter 10

101. The shoulder muscle that is almost exclusively addressed surgically is the

A. supraspinatus B. infraspinatous C. subscapularis D. teres minor

102. The MRI view to best demonstrate the rotator cuff, supraspinatus tendon and the supraspinatus muscle is

A. anteroposterior (AP) axial B. oblique coronal C. oblique sagittal D. lateral

103. Impingement of the critical zone of the supraspinatus tendon occurs from

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

104. Trauma from repeated _____can result in glenoid labral tears.

A. shoveling B. throwing C. bowling D. pushing

105. In _____, fluid can be seen in the tendon sheath surrounding an otherwise normal tendon.

A. tendonitis B. effusion C. tenosynovitis D. disrupted tendon

Chapter 11

106. The author believes the primary cause of missed diagnoses in MR spine imaging is

A. an angled axial protocol
B. axial images without angling
C. contiguous images without gaps
D. sagittal images

107. Both T1-weighted and T2-weighted MR images should be obtained in both the _____ and the _____ planes.

A. coronal, axial B. sagittal, coronal C. sagittal, axial D. oblique sagittal, axial

108. About ___ to ___% of young people have disc bulges with no symptoms.

A. 30, 50 B. 25, 40 C. 15, 30 D. 10, 25

109. One of the most common causes of failed back surgery is a missed diagnosis of a disc extrusion called

A. bulge B. free fragment C. protrusion D. bulging annulus fibrosis

110. The use of intravenous gadolinium in MR imaging will allow virtual certainty in distinguishing

A. bone grafts from free disc fragments
B. post-op scarring from disc material
C. bone grafts from disc material
D. free disc fragments from post-op scarring

Chapter 12

111. The tendon at the ankle routinely affected pathologically is called the

A. Achilles B. extensor C. flexor D. peroneal

112. A flat foot results from the rupture and loss of arch support given by the

A. posterior tibial tendon B. digitorum longus tendon
C. hallucis longus tendon D. Achilles tendon

113. The best evaluation tool to diagnose acute ankle ligament abnormalities is

A. magnetic resonance imaging (MRI) B. computed tomography (CT)
C. radiographic film D. clinical evaluation

114. The bane of most foot and ankle specialists, after diabetic infection, is

A. tarsal coalition B. sinus tarsi syndrome
C. chronic lateral ankle pain D. stress fractures

Chapter 13

115. _____imaging is useful in evaluating AVN and carpal fractures.

A. CT B. PET C. Ultrasound D. MR

116. In magnetic resonance (MR) wrist imaging, three-dimensional volumetric images with thin slices are used to replace

A. T1-weighted B. coronal plane C. small FOV D. T2-weighted

117. Because of the ease with which the diagnosis is made, many hand surgeons dispute the need for imaging a particular upper extremity condition called

A. ganglia B. Paget's disease C. carpal tunnel syndrome D. tendonitis

118. The best visualization of the acetabular labrum is accomplished with

A. nonarthrogram magnetic resonance imaging (MRI)
B. magnetic resonance imaging (MRI) arthrography
C. traditional arthrogram
D. nuclear scan

119. Idiopathic transient osteoporosis of the hip is believed to be an early result of a

A. old fracture B. benign tumor C. lytic lesion D. slipped capital epiphysis

120. The optimal magnetic resonance imaging (MRI) protocol of the elbow includes axial and coronol T1 and T2 weighted images in addition to

A. fat suppressed B. fast spin-echo T2 sequences
C. sagittal D. oblique coronal

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Answer Sheet for: Unit 43: Fundamentals of Skeletal Radiology by Clyde A. Helms

Please place your lettered selection for each question in the respective box and return *ONLY this post test sheet to* S.T.A.R.S.

1.	11.	21.	31.	41.	51.	61.
2.	12.	22.	32.	42.	52.	62.
3.	13.	23.	33.	43.	53.	63.
4.	14.	24.	34.	44.	54.	64.
5.	15.	25.	35.	45.	55.	65.
6.	16.	26.	36.	46.	56.	66.
7.	17.	27.	37.	47.	57.	67.
8.	18.	28.	38.	48.	58.	68.
9.	19.	29.	39.	49.	59.	69.
10.	20.	30.	40.	50.	60.	70.

Answer Sheet for: Unit 43 Fundamentals of Skeletal Radiology by Clyde A. Helms

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71.	81.	91.	101.	111.
72.	82.	92.	102.	112.
73.	83.	93.	103.	113.
74.	84.	94.	104.	114.
75.	85.	95.	105.	115.
76.	86.	96.	106.	116.
77.	87.	97.	107.	117.
78.	88.	98.	108.	118.
79.	89.	99.	109.	119.
80.	90.	100.	110.	120.