

Chapter 2. Shoulder, Pelvis, and Limbs

Multiple Choice

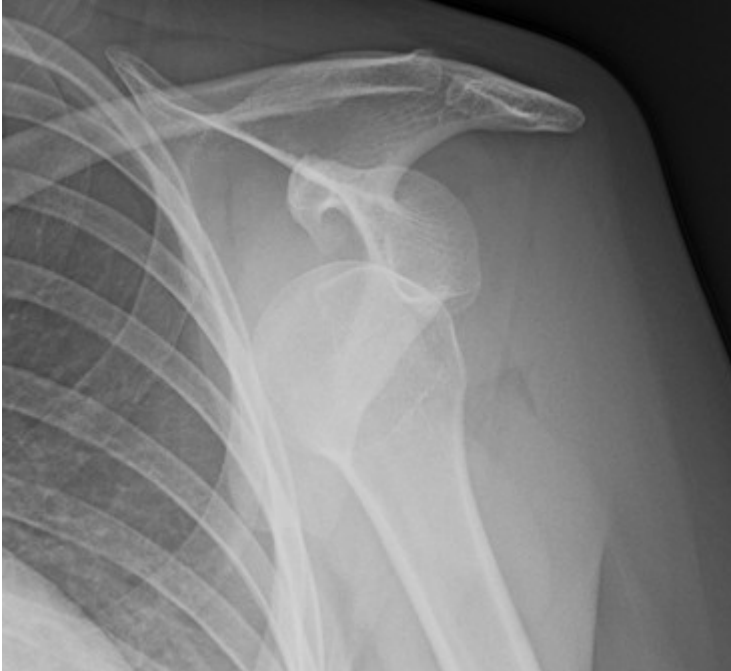
Identify the choice that best completes the statement or answers the question.



1.

This image depicts a patient with:

- A. a Salter-Harris fracture.
- B. a normal proximal humerus.
- C. an anatomic neck fracture of the humerus.
- D. a surgical neck fracture of the humerus.



2.

The patient depicted in the image has:

- A. an anterior shoulder dislocation.
- B. a normal shoulder in complete adduction.
- C. a separated shoulder.
- D. a fracture of the proximal humeral shaft.



3.

The patient in this image has:

- A. a dislocated shoulder.

- B. an AC joint separation.
- C. a Bankart lesion.
- D. a winged scapula.



4.

The patient in this image has:

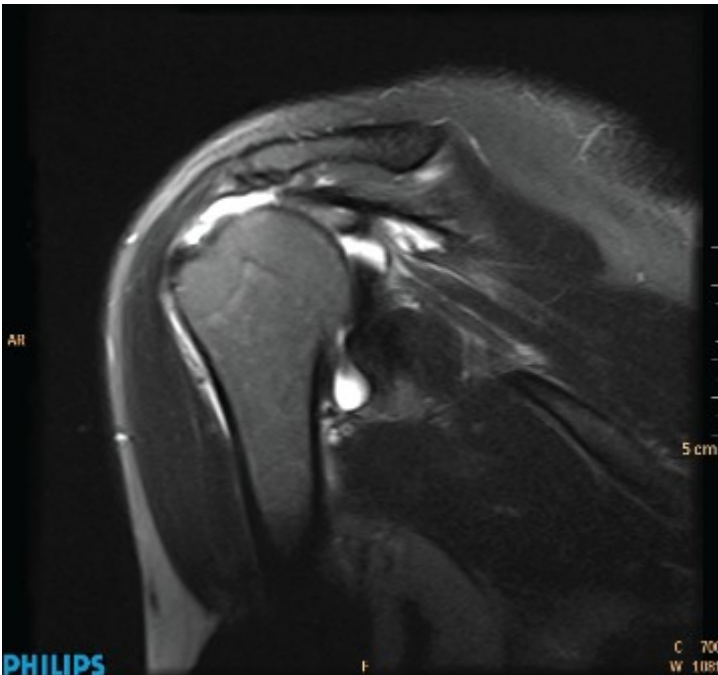
- A. glenohumeral joint osteoarthritis.
- B. dislocated shoulder.
- C. separated shoulder.
- D. Bankart lesion.



5.

This image from a PA chest radiograph shows the incidental finding of:

- A. chronic AC joint separation.
- B. old nonunited Bankart fracture.
- C. a chronic full-thickness supraspinatus tear.
- D. blastic metastatic bone lesions.



6.

What is the diagnosis based on the coronal T2 MRI?

- A. AC joint separation
- B. Full-thickness rotator cuff tear
- C. Radiographically occult humeral head fracture
- D. Glenoid labral tear



7.

Lateral elbow radiograph after trauma; other radiographs show no fracture. Your diagnosis is:

- A. occult intra-articular fracture.
- B. dislocated elbow.
- C. normal elbow.
- D. torn distal biceps tendon tear.



8.

The patient in this image has:

- A. a boxer's fracture.
- B. degenerative joint disease of the first carpometacarpal joint.
- C. a fractured scaphoid.
- D. a spiral second metacarpal fracture.



9.

The image shows a patient with:

- A. acute onset of hand pain.
- B. a positive rheumatoid arthritis (RA) titer.
- C. carpal tunnel syndrome.
- D. history of multiple prior hand injuries.



10.

The patient in this image has:

- A. hip joint degenerative joint disease.
- B. hip joint dislocation.
- C. fractured femoral neck.
- D. femoral neck osteophyte.



11.

Based on the image, what condition/injury does this patient have?

- A. A left femoral neck fracture
- B. Right hip degenerative joint disease
- C. Lytic bone disease
- D. Fracture of the right ilium



12.

The skeletal findings in this patient with a distended bladder (opacified after contrast-enhanced CT) include:

- A. right hip dislocation.
- B. left pubic rami fractures.
- C. right hip joint degenerative joint disease.
- D. right femoral neck fracture.



13.

What can you tell about the patient in the MR image?

- A. The patient has been on high-dose steroids for a severe rash.
- B. The patient is an oncology patient with new onset of hip pain.
- C. The patient has hip pain associated with high fever and leukocytosis.
- D. The patient has a normal hip; symptoms in the hip are secondary to lumbar disk disease.



14.

This MR arthrogram depicts a patient with:

- A. a normal physical exam of the hip.
- B. systemic arthritis.
- C. pain and sensation of clicking in the joint.
- D. injury suffered while playing shuffleboard.



15.

The patient in this image has:

- A. knee joint rheumatoid arthritis.
- B. a skiing injury.
- C. knee joint osteoarthritis.
- D. puncture wound to the knee joint.



16.

The MR image shows a patient with a:

- A. normal knee.
- B. meniscus tear.
- C. patella alta.
- D. popliteal venous thrombosis.



17.

Radiographs on this patient, including the cross-table lateral shown here, revealed no visible fracture. How will the patient be managed?

- A. Because no fracture is shown, the patient will be told that walking is safe, NSAIDs will be prescribed, and the patient will be referred to physical therapy.
- B. Because of the lipohemarthrosis, the patient will be kept on non-weight-bearing and will have an urgent CT or MRI.
- C. Radiographic findings above suggest medial meniscus tear. The patient will be scheduled for MRI next week and will be scheduled to see an orthopedic surgeon whenever convenient.
- D. Physical examination was unremarkable and the patient was told to go back to work.



18.

The patient in this image:

- A. has a normal knee.
- B. has a Segond fracture.
- C. is a patient with Osgood-Schlatter disease.
- D. has a tibial plateau fracture.



19.

Based on the image of this pediatric patient, what can you tell this patient has?

- A. Clinical findings of Osgood-Schlatter disease
- B. Acute twisting injury of the knee
- C. Tenderness of the quadriceps tendon
- D. Popliteal fossa mass



20.

The patient in this image has which of the following injuries/conditions?

- A. Tibial osteosarcoma
- B. Lateral malleolar fracture
- C. A healing tibial stress fracture
- D. Fibula osteomyelitis



21.

- The patient in this image has suffered what type of injury?
- A. A lateral malleolar fracture; stable ankle mortise
 - B. A lateral malleolar fracture with widening of the ankle mortise
 - C. A talar dome osteochondral lesion
 - D. Stress fracture of the first metatarsal



22.

What can you tell about this patient whose lateral calcaneus radiograph is shown?

- A. The patient is a long-distance runner with chronic heel pain.
- B. The patient has lost the ability to plantar flex at the ankle.
- C. The patient has cancer with new onset of foot pain.
- D. This patient landed on his feet from a 12-foot fall and also has back pain.



23.

The patient in the following image has:

- A. a normal foot.
- B. a Haglund's deformity.
- C. a Lisfranc fracture.
- D. plantar fasciitis.



24.

What specific injury/deformity does the patient in this image suffer from?

- A. Rheumatoid arthritis (RA) of the first tarso-metatarsal joint
- B. Lisfranc fracture
- C. Bunion deformity
- D. Haglund's deformity

25. The Salter-Harris classification refers to:

- A. the location of fractures associated with growth plates in the immature skeleton.
- B. the degree of hip subluxation in hip degenerative joint disorder.
- C. the degree of femoral angulation relative to the tibia.
- D. the laxity in the pubic bones associated with pregnancy.

26. If you suspect a labral tear in a patient whose shoulder dislocation you have just reduced:

- A. request a shoulder CT.
- B. request a shoulder MRI.
- C. request a Grashey view.
- D. request a bone scan.

27. If you suspect a clavicular fracture and the AP view is not diagnostic, you should:

- A. request a clavicular CT.
- B. request a clavicular MRI.
- C. request a 45-degree cephalic tilt AP radiograph.
- D. request a bone window radiograph.

28. Which of the following is *not* correct pertaining to a shoulder dislocation?

- A. Posterior dislocations are more common than anterior dislocations.

- B. Dislocations tend to occur with arm abduction and external rotation.
- C. Dislocations typically can be reduced nonsurgically.
- D. Dislocations may be associated with a Bankart lesion.

- _____ 29. Severe acromioclavicular (AC) joint separation is characterized by a tear of which of the following?
- A. Glenohumeral ligaments
 - B. Coracoclavicular ligaments
 - C. Sternoclavicular ligaments
 - D. Subclavius muscle
- _____ 30. The initial imaging examination for patients with chronic shoulder pain is:
- A. MRI.
 - B. CT arthrography.
 - C. radiography.
 - D. ultrasound.
- _____ 31. The usual modality of choice for diagnosing a muscle tear, if needed for clinical management, is:
- A. radiography.
 - B. CT.
 - C. MRI.
 - D. nuclear medicine.
- _____ 32. Which of the following statements is correct for displacement of the elbow fat pads?
- A. This feature is only visible on MRI.
 - B. This feature is associated with intra-articular fracture.
 - C. This feature is associated with distal biceps tendon rupture.
 - D. This feature is associated with medial epicondylitis.
- _____ 33. Which of the following statements regarding an acute elbow dislocation is correct?
- A. The patient should be put in a sling and told to return for repeat radiographs in 6 weeks.
 - B. An MRI should be done immediately.
 - C. The patient should immediately be referred to an orthopedic surgeon.
 - D. The patient should have an elbow ultrasound done to assess brachial artery patency.
- _____ 34. A suspected distal biceps tendon rupture is definitively diagnosed with:
- A. CT.
 - B. MRI.
 - C. oblique radiographs.
 - D. nuclear medicine.
- _____ 35. In patients with severe elbow epicondylitis, ultrasonography is:
- A. the only appropriate imaging modality.
 - B. appropriate with experienced personnel.
 - C. never valuable.
 - D. only valuable when used with contrast.

- ____ 36. Which of the following would *not* be appropriate in a patient with pain and point tenderness in his anatomical snuff box but no visible fracture?
- A. Splinting the patient and asking the patient to return for repeat radiographic evaluation in 1 to 2 weeks.
 - B. Sending the patient for an immediate MRI.
 - C. Casting the patient for 6 weeks with repeat radiographs at that time.
 - D. Sending the patient for an immediate CT.
- ____ 37. After a patient fell on his outstretched hand, a lateral radiograph of the wrist showed an abnormal dorsal angulation of the distal radius. The patient was diagnosed with a:
- A. game keeper's hand.
 - B. Smith fracture.
 - C. Colles fracture.
 - D. Kienböck's fracture
- ____ 38. An elderly patient presents after a fall with hip pain, inability to bear weight, an apparent shortened limb, and a laterally rotated thigh. The immediate imaging modality of choice is:
- A. hip CT arthrography.
 - B. hip radiography.
 - C. hip joint MRI.
 - D. hip CT.
- ____ 39. Which of the following is *not* associated with avascular necrosis (AVN) of the femoral head?
- A. Femoral neck fracture
 - B. Legg-Calvé-Perthes disease
 - C. Radiographic lucency beneath the articular cortex
 - D. Slipped capital femoral epiphysis in pediatric cases
- ____ 40. A merchant view of the knee would reveal which of the following?
- A. An anterior cruciate ligament (ACL) rupture
 - B. A patella fracture
 - C. A tibial fracture
 - D. Patella alta
- ____ 41. A patient with knee pain after athletic injury has a physical examination that suggests medial meniscus tear. Knee radiographs are normal. You order:
- A. CT scan with multiplanar image reconstruction.
 - B. knee MRI.
 - C. knee arthrography.
 - D. knee ultrasonography.
- ____ 42. You see a patient with pain and swelling in the calf 1 week post arthroscopic knee surgery. You request:
- A. radiography to rule out septic arthritis.
 - B. CT to identify suspected bone injury.
 - C. leg venous sonography to rule out deep venous thrombosis (DVT).
 - D. MRI to rule out recurrent medial meniscus tear.

- ____ 43. Your patient reports bilateral leg aching and cramping after walking a short distance. Popliteal and ankle pulse are weak. You requisition:
- A. lower extremity Doppler sonography (noninvasive lower extremity arterial testing).
 - B. lower extremity venous duplex sonography.
 - C. radionuclide bone scan.
 - D. MR angiography (MRA).
- ____ 44. Radiographs of an injured ankle show a nondisplaced bimalleolar fracture. The appropriate course of action is as follows:
- A. Cast the patient's ankle and schedule follow-up radiographs in 6 weeks.
 - B. Schedule MRI to search for associated ligament tears.
 - C. Refer the patient immediately to an orthopedic surgeon.
 - D. Order CT with volume rendered displays.
- ____ 45. Your 20-year-old female patient is training for a marathon and experiences progressively intense pain in her left second metatarsal. You suspect a stress fracture and recommend that she stop running and return for repeat radiographs in 2 weeks. However, she wants a diagnosis immediately. Your office schedules her for:
- A. orthopedic consultation and physical therapy.
 - B. foot MRI or radionuclide bone scan.
 - C. lower extremity noninvasive arterial testing.
 - D. CT scan with multiplanar reconstructions.
- ____ 46. Your 60-year-old female patient has developed a flat foot. You suspect a tear of the posterior tibial tendon. After radiographs that reveal nonspecific findings, you order:
- A. ankle ultrasound (if local expertise is available) or ankle MRI.
 - B. three-phase radionuclide bone scan.
 - C. ankle CT arthrography.
 - D. physical therapy.
- ____ 47. Your 65-year-old patient with diabetes has radiographs that show a typical Charcot foot. Swelling, however, is much worse recently, and the patient now has a fever and leukocytosis. You request:
- A. CT of the foot.
 - B. lower extremity venous duplex sonography.
 - C. MRI of the foot without gadolinium.
 - D. MRI of the foot without and with gadolinium.

Chapter 2. Shoulder, Pelvis, and Limbs

Answer Section

MULTIPLE CHOICE

1. ANS: C
This is a surgical neck fracture of the humerus because the cortical discontinuity laterally is below the greater tuberosity and, therefore, below the level of the anatomic humeral neck.

PTS: 1
2. ANS: A
The humeral head is clearly not in close relation to the glenoid, and there is a subcoracoid position of the humeral head. Therefore this image is consistent with an anterior dislocation.

PTS: 1
3. ANS: B
The obvious wide separation of the space between the distal end of the clavicle and the acromion, the elevation of the clavicle in relation to the acromion, and the very wide coracoclavicular space indicate an AC joint separation.

PTS: 1
4. ANS: A
The narrow joint space and the inferior marginal osteophyte of the articular surface of the humeral head indicate glenohumeral joint osteoarthritis.

PTS: 1
5. ANS: C
This image shows a chronic full-thickness supraspinatus tear because of the bone-on-bone apposition of the humeral head and the inferior surface of the acromion.

PTS: 1
6. ANS: B
Note the wide fluid-filled gap between the retracted edge of the rotator cuff at the 12:00 humeral head position and the very short stump of distal tendon at the greater tuberosity.

PTS: 1
7. ANS: A
The diagnosis is occult intra-articular fracture because of the presence of a visible posterior fat pad and an elevated anterior fat pad, which indicates joint effusion (probably a hemarthrosis in a setting of trauma).

PTS: 1
8. ANS: B
Note the large marginal osteophytes projecting distally from both sides of the first carpometacarpal joint.

PTS: 1

9. ANS: B

Note the loss of articular cartilage and the demineralization consistent with RA, the absence of marginal osteophytes, and the absence of either an acute or old fracture. Carpal tunnel makes no sense in this context, and RA does not have an acute onset.

PTS: 1

10. ANS: B

The femoral head is clearly not within the acetabulum; it is lateral and too cephalad.

PTS: 1

11. ANS: A

Compare the intact margins of the right femoral neck with the absent visualization of the left femoral neck because of overlap of the fracture fragments, and the medial position of the left femoral head in relation to the trochanters.

PTS: 1

12. ANS: B

This image shows left pubic rami fractures because of the disrupted cortical margins of the left superior and inferior pubic rami. This image is clearly not of a right hip dislocation because of the normal position of the femoral head. Right hip degenerative joint disease is not correct because of the normal cartilage (joint) space and absence of osteophytes. Right femoral neck fracture is incorrect because of the intact cortical margins of the right femoral neck.

PTS: 1

13. ANS: A

This image indicates the patient has been on high-dose steroids because the curvilinear subcortical hypointensity within the femoral head is so characteristic of avascular necrosis (AVN), and a common cause of AVN is steroid use.

PTS: 1

14. ANS: C

This image is consistent with a patient who has pain and a clicking sensation in the joint. The tear is easily seen as a hyperintensity within the normally hypointense triangular acetabular labrum.

PTS: 1

15. ANS: B

A skiing injury is correct because of the obvious discontinuity of the anterior cruciate ligament.

PTS: 1

16. ANS: B

A meniscus tear is evident because of the large, obvious, hyperintense tear seen in the posterior horn of the meniscus. Patella alta and popliteal venous thrombosis are not appropriate responses because neither the patella nor the popliteal vein is shown in the image.

PTS: 1

17. ANS: B

The horizontal sharp edge in the supra-patellar region is classic for lipohemarthrosis, which always means that there is an intra-articular fracture, even if radiographically occult. A meniscal tear may cause an effusion, but it will not cause a lipohemarthrosis, as shown in the image. No patient with blood and marrow lipids in their knee joint has a normal physical examination or should be considered to have a “normal x-ray.”

PTS: 1

18. ANS: D

This image shows an obvious complex fracture deformity of the lateral half of the lateral tibial plateau.

PTS: 1

19. ANS: A

Note the soft tissue swelling superficial to and the fragmented appearance of the tibial apophysis.

PTS: 1

20. ANS: C

Note the smooth, solid appearing periosteal new bone formation (essentially a mature fracture callus) and the transverse band of increased bone density of the tibial shaft, indicating advanced healing of a tibial shaft stress fracture. There is no erosive or lytic bone disease, and no acute fracture is shown.

PTS: 1

21. ANS: A

This image shows a lateral malleolar fracture and a stable ankle mortise because the horizontal radiolucent fracture line in the distal fibula is below the ankle joint.

PTS: 1

22. ANS: D

The cortical discontinuity of the plantar surface of the posterior calcaneus is an obvious fracture and such fractures commonly occur from a fall, which often also causes back injury.

PTS: 1

23. ANS: B

The “hump” of bone adjacent to the insertion of the Achilles tendon is the characteristic appearance of a Haglund’s deformity. Radiologic diagnosis of plantar fasciitis requires ultrasound or MRI. The region in which a Lisfranc fracture occurs is not shown in this image.

PTS: 1

24. ANS: C

Note the medial angulation of the first metatarsal and the extra bone along the medial margin of the head of the first, first metatarsal, consistent with bunion deformity. The base of the second metatarsal lines up nicely with the middle cuneiform, so no Lisfranc fracture is shown. There is no gross joint space loss or demineralization to suggest RA, and no calcaneus is shown for a diagnosis of Haglund’s deformity.

PTS: 1

25. ANS: A

The Salter-Harris classification refers to the location of fractures associated with growth plates in the immature skeleton. This is a basic definition that is shown in a chart in the text.

PTS: 1

26. ANS: B

Of the choices provided, only MRI can even show the labrum.

PTS: 1

27. ANS: C

The text explicitly discusses the need for a 45-degree cephalic tilt AP radiograph to sometimes reveal a nondisplaced fracture that is not seen in a straight AP radiograph. A clavicular CT or MRI is incorrect because in numerous places in this chapter we emphasize how complete and high-quality radiography can avoid the need for expensive cross-sectional imaging. "Bone windows" refers to CT image display.

PTS: 1

28. ANS: A

The vast majority of shoulder dislocations are anterior.

PTS: 1

29. ANS: B

A tear of coracoclavicular ligaments characterizes severe AC joint separation. Glenohumeral and sternoclavicular ligaments relate to different joints than the AC joint. The subclavius muscle does not make sense in this situation.

PTS: 1

30. ANS: C

The text recommends repeatedly that joint and bone diseases are first evaluated with radiography before more elaborate and expensive procedures.

PTS: 1

31. ANS: C

Soft-tissue contrast resolution is greatest with MR, and the text specifically makes a statement about MRI used for muscle injuries. Radiography may be used to exclude fracture in a case of suspected muscle tear, but it does not have the soft-tissue contrast resolution to show a muscle tear. CT does not have the soft-tissue contrast resolution of MRI needed to examine a muscle injury. Nuclear medicine examinations in musculoskeletal disease are mainly for bones and are also used in oncology; they are not used to diagnose muscle tears.

PTS: 1

32. ANS: B

Displacement of the elbow fat pads is associated with intra-articular fracture, which is fundamental basic medical knowledge emphasized in the text. The text discusses this as a radiographic finding, not an MRI finding. The biceps tendon and the epicondyles are extra-articular, so these options are incorrect.

PTS: 1

33. ANS: C

Acute elbow dislocations are potentially catastrophic injuries that require specialty care.

PTS: 1

34. ANS: B

MRI is the procedure of choice for a suspected distal biceps tendon rupture. CT and radiography do not show enough soft-tissue detail. Nuclear medicine does not show tendon injuries.

PTS: 1

35. ANS: B

Ultrasound can be useful, but only when the examiner has a great deal of training and experience in musculoskeletal MRI. Ultrasound is not the only appropriate imaging modality for patients with severe elbow epicondylitis; MRI is often very useful and may provide an alternative diagnostic explanation for symptoms not evident from sonography.

PTS: 1

36. ANS: C

This option is not appropriate because of the potential of major overtreatment if there is no fracture. Splinting the patient and asking the patient to return for repeat radiographic evaluation is appropriate when there is clinical suspicion of a radiographically occult fracture that may become visible after 1 week because of resorption of bone mineral along the fracture line. Sending the patient for an immediate MRI or CT is appropriate because both modalities may show a radiographically occult fracture.

PTS: 1

37. ANS: C

A Colles fracture involves abnormal dorsal angulation of the distal radius.

PTS: 1

38. ANS: B

Radiography is always the initial procedure for suspected acute fracture in the extremities.

PTS: 1

39. ANS: D

Slipped capital femoral epiphysis is not related to AVN of the femoral head. AVN can be a complication of fracture (A). Legg-Calvé-Perthes disease is an idiopathic AVN in children. Radiographic lucency beneath the articular cortex is a radiographic sign of AVN.

PTS: 1

40. ANS: B

The merchant view is a special view of the patella that may not even show the tibia. No radiographic view shows the ACL. You can only appreciate patella alta on a lateral radiograph or sagittal MR or CT image.

PTS: 1

41. ANS: B

CT does not have the soft-tissue contrast resolution to show a meniscus tear. Arthrography would not be appropriate except in the rare case of an athletic injury in a patient with a pacemaker, intracranial aneurysm clip, or some other contraindication to MRI, and even then would ideally be followed by immediate post-arthrogram CT. Knee ultrasonography is incorrect because of the technical limitations of ultrasound; it does not show menisci.

PTS: 1

42. ANS: C

The clinical situation clearly should raise suspicion of DVT. The text makes it clear that venous sonography is the procedure of choice to rule out DVT.

PTS: 1

43. ANS: A

This clinical situation should raise suspicion of arterial insufficiency, which would require noninvasive lower extremity arterial testing. Lower extremity venous duplex sonography and radionuclide bone scans do not examine arteries. MR angiography (MRA) is incorrect because of the basic principle of starting with an established initial lower-cost procedure that is far more easily tolerated by the patient than MRA.

PTS: 1

44. ANS: C

These injuries are unstable and require open reduction and internal fixation by an orthopedic surgeon.

PTS: 1

45. ANS: B

An orthopedic consultation would not be needed if there is no stress fracture. Lower extremity noninvasive arterial testing is for arterial disease, not a stress fracture. CT would only show an advanced stress fracture with visible morphologic changes; CT is not as sensitive to bone marrow edema as MRI and not as sensitive to physiologic bone activity as a radionuclide study.

PTS: 1

46. ANS: A

A three-phase radionuclide bone scan and ankle CT arthrography will not show tendons. Physical therapy would not fix a tendon tear.

PTS: 1

47. ANS: D

The clinical situation outlined clearly raises the specter of osteomyelitis, and the text specifically discusses the need for MRI without and with contrast enhancement in this situation. CT does not show bone marrow edema or infiltration. Lower extremity venous duplex sonography is not for osteomyelitis.

PTS: 1