

A scenic coastal landscape at sunset. A winding elevated highway bridge with concrete pillars spans across the ocean, curving from the foreground towards the horizon. The sky is filled with vibrant colors of orange, pink, and purple, transitioning into a darker blue at the top. The ocean is calm, reflecting the colors of the sky. In the foreground, there are green and brownish plants on a hillside. The background shows distant mountains and a coastline.

Orthopaedics

Single Choice Questions (SCQ) and Extended Match Questions (EMQ)

Emergency Medicine Fellowship Program

1. Question

Match the year of appearance of the ossification centre for each of the following parts around the elbow.

Sort elements

- Medial epicondyle ▪ 5 years of age
- Trochlea ▪ 7 years of age
- Capitulum ▪ 1 year of age
- Olecranon ▪ 9 years of age
- Lateral epicondyle ▪ 11 year of age
- Radial head ▪ 3 years of age

The sequence of appearance of the ossification centres around the elbow can be remembered by the mnemonic CRITOE (Capitulum, Radial head, Internal epicondyle, Trochlea, Olecranon, External epicondyle, with the Capitulum being visible at 1 year and the others every 2 years after that. ([link](#)))

2. Question

Match the carpal bone with the age that it is usually visible by on plain radiography

Sort elements

- Capitate ▪ In the first year of life
- Triquetrum ▪ 3 years of life
- Hamate ▪ Between 1 and 2 years of life
- Lunate ▪ 4 years of life
- Pisiform ▪ 9-10 years of life
- Scaphoid ▪ 5 years of life
- Trapezoid ▪ 7 years of life
- Trapezium ▪ 6 years of life

The easiest way to remember the ossification centres of the carpal bones is to start with the capitate of your right hand, then work your way anti-clockwise (adding one year) until you reach the pisiform (which is usually visible between 9-10 years of age) ([link](#)))

3. Question

Which one of the following is the last ossification centre of the pelvis to appear

- 1. Ischium
- 2. Acetabulum
- 3. Pubis
- 4. Ilium

2

The ilium is the first ossification centre to appear at 8 weeks in utero. The ischium and pubis both appear at about 4-6 months in utero, whilst the 2 acetabular centres only appear at puberty. ([link](#))

4. Question

Which of the following ossification centres of the pelvis is the last to close

- 1. Acetabulum
- 2. Ilium
- 3. Ischium
- 4. Pubis

2

5. Question

Which one of the following ossification centres of the bones of the foot is the last to appear

- 1. Navicular
- 2. Lateral cuneiform
- 3. Anatomical sesamoids
- 4. Cuboid

3

The Cuboid ossification centre is present at birth, the Lateral cuneiform by 6 months, the Navicular by 2.5-5 years, with the anatomical sesamoids being the last to appear at 7-8 years of age. ([link](#))

6. Question

Which one of the following is the last ossification centre to appear around the ankle joint

- 1. Lateral malleolus
- 2. Calcaneum
- 3. Medial malleolus
- 4. Talus

3

The medial malleolus forms from the distal tibial epiphyses at 7-10 years, which is much later than the distal Fibula (appears at 6-12 months), Talus (appears at 6 months in utero) and Calcaneus (appears at 3 months in utero). ([link](#))

7. Question

Which one of the following ossification centres around the knee is the last to appear

- 1. Patella

- 2. Fibular head
- 3. Tibial plateau
- 4. Tibial tuberosity

4

The ossification centres of the patella appear at 3-5 years of age, approximately the same time as that of the fibular head (2-4 years of age). The tibial plateau appears at around the time of term birth, however the tibial tuberosity does not appear until 10-12 years of age. ([link](#))

390. All of the following statements regarding puncture wounds to the foot are true EXCEPT

- (A) despite thorough treatment, these wounds have a relatively high rate of complications
- (B) prophylactic antibiotics have been shown to reduce the risk of osteomyelitis
- (C) Pseudomonas is the most common organism causing osteomyelitis
- (D) approximately 8–50% of puncture wounds of the foot become infected
- (E) coring out the track of the puncture wound has not been proven to decrease the rate of infection

391. A 16-year-old boy complains of pain and swelling in his right hand after hitting a wall. All of the following statements regarding boxer's fractures are true EXCEPT

- (A) the metacarpal neck is the most frequently fractured part
- (B) metacarpal fractures of the long and index finger need to be reduced if there is more than 15 degrees of angulation
- (C) metacarpal fractures of the ring and small fingers do not need to be reduced if there is less than 30 degrees of angulation

- (D) most metacarpal fractures angle in the volar direction
- (E) a boxer's fracture refers to metacarpal neck fractures of the long and sometimes ring fingers

392. A 5-year-old boy falls and sustains a Salter-Harris type fracture of the radius. All of the following statements are true EXCEPT

- (A) Salter II fractures are the most common type
- (B) Salter III fractures involve the epiphyseal plate and show have a widened space between epiphysis and metaphysis
- (C) Salter V fractures are easily diagnosed by plain films
- (D) type I-III injuries have an excellent prognosis when properly reduced
- (E) Salter V fractures carry a poor prognosis due to disruption of the blood supply to the epiphyseal plate

393. An 80-year-old woman complains of right hip pain after tripping and falling on the sidewalk. All of the following regarding hip fractures are true EXCEPT

- (A) risk of avascular necrosis is less with an intertrochanteric fracture than with a femoral neck fracture
- (B) patients may be able to weight bear with a minimally displaced fracture
- (C) isolated femoral head fractures are relatively common
- (D) in addition to avascular necrosis, nonunion and emboli are feared complications of femoral neck fractures
- (E) all of the above are true

394. A 20-year-old man complains of severe right shoulder pain after being tackled playing football. He has a history of recurrent shoulder dislocation. Which of the following is true?

- (A) The most common direction of dislocation is posterior
- (B) Anterior-posterior (AP) and lateral radiographs are the best views to confirm the diagnosis

- (C) Inadequate muscle relaxation is the most common reason attempts at reduction fail
- (D) After reduction the patient should be placed in a shoulder immobilizer for 2 weeks
- (E) None of the above

395. A 32-year-old woman sustains a pelvic fracture after a motor vehicle accident. All of the following are true EXCEPT

- (A) up to 6 L of retroperitoneal blood may accumulate from a pelvic fracture
- (B) gynecologic injuries are common with pelvic fractures
- (C) pelvic fractures in children have a much higher rate of concomitant injuries than in adults
- (D) patients with rectal injuries from pelvic fractures should receive prophylactic antibiotics immediately
- (E) none of the above are true

396. A 35-year-old male skier falls and twists his knee with subsequent pain and swelling. All of the following are true EXCEPT

- (A) he is more likely to have injured the medial side of his knee than the lateral side
- (B) a negative anterior drawer sign rules out anterior cruciate ligament (ACL) injury with about 90% sensitivity
- (C) presence of a large hemarthrosis is most likely due to disruption of the ACL
- (D) peroneal nerve injuries are most commonly associated with lateral knee injuries
- (E) fat globules seen on aspiration of hemarthrosis indicate a fracture

397. Which of the following types of pelvic fractures is associated with a fracture of the acetabulum?

- (A) Type I

- (B) Type II
- (C) Type III
- (D) Type IV
- (E) Type V

398. A 45-year-old woman complains of severe hip pain after a head-on motor vehicle accident. The right leg is shortened, internally rotated, and adducted. The MOST likely diagnosis is

- (A) femoral neck fracture
- (B) posterior dislocation of the hip
- (C) anterior dislocation of the hip
- (D) intertrochanteric fracture
- (E) none of the above

399. All of the following statements about patellar injuries are true EXCEPT

- (A) patients with patellar fractures should be non-weight bearing for at least 4 weeks
- (B) widely displaced fragments of a patellar fracture indicate knee joint injury until proven otherwise
- (C) dislocation of the patella generally occurs in the lateral direction
- (D) reduction of patellar dislocations is accomplished by hyperextending the knee, flexing the hip, and pushing the patella back into place
- (E) patellar fractures are uncommon in children

400. All of the following statements regarding fractures of the humerus are true EXCEPT

- (A) midshaft humerus fracture often have associated radial nerve injuries
- (B) radial nerve dysfunction is usually caused by laceration of the nerve

- (C) minimally displaced proximal humerus fractures may be treated with analgesia, a shoulder immobilizer, and referral
- (D) humerus fractures commonly have delayed union
- (E) swelling of the hand and elbow are common after fractures of the humeral shaft

401. All of the following fractures are described correctly EXCEPT

- (A) Monteggia fracture: fracture of the proximal third of the ulna with dislocation of the radial head
- (B) Galeazzi's fracture: radial shaft fracture with dislocation of the distal radioulnar joint
- (C) Bennet's fracture: fracture of the base of the thumb metacarpal with involvement of the joint
- (D) Smith's fracture: distal radial fracture with volar displacement
- (E) all of the above fractures are described correctly

402. All of the following statements regarding scaphoid fractures are true EXCEPT

- (A) they are the most common of all carpal fractures
- (B) initial radiographs are often negative despite the presence of a fracture
- (C) a patient with snuffbox tenderness after trauma has a scaphoid fracture until proven otherwise
- (D) the more distal the fracture, the more likely the complication of avascular necrosis
- (E) they should be immobilized in a thumb spica

403. All of the following statements regarding ankle sprains are true EXCEPT

- (A) they are uncommon in young children
- (B) the most commonly sprained ligament is the anterior talofibular ligament
- (C) most injuries occur on the lateral side of the ankle

- (D) third-degree sprains may be diagnosed radiographically
- (E) there is often a significant disability while waiting for a sprain to heal

404. All of the following statements regarding Achilles tendon injuries are true EXCEPT

- (A) active plantar flexion of the foot rules out the diagnosis
- (B) it is often mistakenly diagnosed as an ankle sprain
- (C) the Thompson test is helpful in making the diagnosis
- (D) surgical repair is indicated only for young athletic patients whose strength in the leg is very important
- (E) the patient often reports hearing a “pop” at the time of injury

405. All of the following statements regarding radial head subluxation (nursemaid’s elbow) are true EXCEPT

- (A) an affected child will hold the arm partially flexed, pronated, and close to the body
- (B) history of a pull on the arm is present only 50% of the time
- (C) radiographs are indicated only if there is bony tenderness, an unclear history, or if multiple attempts at reduction fail
- (D) to reduce the subluxation, the elbow is extended, then supinated, feeling for a click over the radial head
- (E) after reduction, the child should be given a sling for comfort

406. All of the following regarding slipped capital femoral epiphysis are true EXCEPT

- (A) it is most common in obese or rapidly growing adolescent girls
- (B) radiographs may demonstrate an irregular widening of the epiphyseal line
- (C) the affected leg is shortened, externally rotated, and adducted
- (D) the most feared complication is avascular necrosis of the femoral head

(E) surgical intervention is often required

407. All of the following regarding acromio-clavicular (AC) separations are true EXCEPT

(A) the most common mechanism is a fall on an outstretched arm

(B) radiographic abnormalities are usually absent on shoulder films with first- and second-degree injuries

(C) third-degree injuries imply a complete disruption of the acromioclavicular, coronoid, and trapezoid ligaments

(D) most AC separations are treated with a shoulder immobilizer

(E) AC separations may be confused with shoulder dislocations clinically

408. All of the following statements regarding elbow dislocations are true EXCEPT

(A) the elbow is the most commonly dislocated joint in children under 10 years of age

(B) associated fractures are rare

(C) the most feared complication is damage to the neurovascular bundles that traverse the elbow

(D) all patients with elbow dislocations should be admitted for 24 hours

(E) compartment syndrome may be a complication

409. All of the following regarding metacarpophalangeal dislocations of the thumb are true EXCEPT

(A) they are commonly seen due to the relative weakness of the thumb ligaments

(B) if one is unable to reduce a dorsal dislocation, this is probably because the volar plate has been avulsed and is stuck in the joint

(C) dorsal dislocations where the phalanx is at a right angle to the metacarpal are more easily reduced than those parallel to the metacarpal

- (D) after reduction the thumb should be splinted for 3–4 weeks
- (E) specialty referral is indicated if two attempts at reduction fail

410. All of the following orthopedic injuries are correctly paired with their associated nerve injuries EXCEPT

- (A) femoral shaft fracture: peroneal nerve
- (B) acetabulum fracture: femoral nerve
- (C) shoulder dislocation: axillary nerve
- (D) lateral tibial plateau fracture: peroneal nerve
- (E) humeral shaft fracture: radial nerve

411. All of the following descriptions are true EXCEPT

- (A) Mallet finger: acute flexion of the distal interphalangeal joint
- (B) Boutonniere deformity: forced flexion of the proximal interphalangeal joint
- (C) Trigger finger: stenosing flexor tenosynovitis
- (D) Kienbock's disease: avascular necrosis of the carpal lunate bone
- (E) Game keeper's thumb: injury to the ulnar collateral ligament of the thumb

412. Which of the following compartments is MOST subject to compartment syndrome?

- (A) Anterior compartment of the leg
- (B) Quadriceps compartment of the thigh
- (C) Gluteal compartment of the buttock
- (D) Interosseous compartment of the hand
- (E) Posterior (triceps) compartment of the arm

413. All of the following are possible causes of compartment syndrome EXCEPT

- (A) snakebite
- (B) tight cast
- (C) exercise
- (D) eclampsia
- (E) fasciotomy

414. All of the following are indications for replantation of an amputated part EXCEPT

- (A) the amputated part is the thumb
- (B) the amputated part is an entire single digit, and not the thumb
- (C) the amputated part is multiple digits
- (D) there is a sharp, clean wound
- (E) the amputated part is well preserved

390	B	391	E	392	C	393	E
394	C	395	B	396	B	397	D
398	B	399	A	400	B	401	E
402	D	403	C	404	A	405	E
406	A	407	A	408	B	409	A
410	B	411	E	412	A	413	E
414	B						

Orthopedic Emergencies

Each question below contains five suggested responses. Choose the **ONE BEST** response to each question.

15-392 All of the following statements regarding bone remodeling are TRUE EXCEPT

- (A) young children have a greater capacity for remodeling than adults
- (B) remodeling is related to the degree of angulation
- (C) angulation near the end of a long bone will remodel more satisfactorily than angulation near the midshaft
- (D) angulation in the natural plane of the joint motion will remodel more successfully than angulation outside the plane of joint motion
- (E) injuries involving the epiphyseal plate are more likely to remodel successfully

[Show Answer](#)

15-393 Which of the following statements about lunate fractures is FALSE?

- (A) The most common mechanism is a fall on an outstretched hand
- (B) Lunate fractures are the third most common type of carpal fracture
- (C) The lunate occupies two thirds of the radial articular surface
- (D) X-rays reliably demonstrate the fracture
- (E) This fracture may be associated with avascular necrosis of the lunate

[Show Answer](#)

15-394 A 25-year-old female presents with right elbow pain after a fall while doing gymnastics. The elbow is deformed and flexed at 45 degrees. Plain radiographs show an elbow dislocation, with both radius and ulna displaced posteriorly. Which of the following neurovascular structures is most likely to be injured?

- (A) Axillary nerve
- (B) Radial nerve
- (C) Ulnar nerve
- (D) Radial artery
- (E) Brachial plexus

[Show Answer](#)

15-395 A 2-year-old male is brought to the ED by his parents for refusing to use his right arm. He was well until 30 min before, when his cousin tried to lift him up a curb by that arm. He now holds the elbow slightly flexed and pronated and will not use the injured arm. Which is the MOST appropriate initial approach?

- (A) Obtain emergent orthopedic consultation
- (B) Order plain radiographs of the elbow
- (C) Attempt to reduce the elbow by pronation and extension
- (D) Attempt to reduce the elbow by supination and flexion
- (E) Prepare to reduce the elbow under conscious sedation

[Show Answer](#)

15-396

All of the following statements about Volkmann's ischemic contracture are TRUE EXCEPT

- (A) Volkmann's ischemic contracture is a complication of supracondylar fracture
- (B) signs include refusal to open the hand in children, pain with passive extension of fingers, and forearm tenderness
- (C) local edema causes decreased venous outflow and arterial inflow, resulting in local tissue ischemia
- (D) muscle and nerve necrosis may occur, leading to permanent disability
- (E) absence of radial pulse is diagnostic

[Show Answer](#)

15-397

A 27-year-old male presents with left wrist pain after falling on an outstretched hand. He has an obvious deformity of the wrist but is neurovascularly intact. Xray shows a transverse distal radius fracture with dorsal angulation. On the lateral view, the ulna is displaced dorsally. Which of the following terms describes this fracture?

- (A) Galeazzi's fracture
- (B) Monteggia's fracture
- (C) Colles' fracture
- (D) Smith's fracture
- (E) Barton's fracture

[Show Answer](#)

15-398

Which of the following statements about sternoclavicular dislocations is FALSE?

- (A) The medial clavicular epiphysis is the last epiphysis of the body to close (at age 22-25 years)
- (B) CT is the imaging modality of choice
- (C) Anterior dislocations are more common than posterior dislocations
- (D) Closed reduction is frequently successful
- (E) Posterior dislocations are associated with injuries to thoracic structures

[Show Answer](#)

15-399

Which of the following is TRUE regarding scapular fractures?

- (A) Most are treated with open reduction and internal fixation
- (B) Approximately 50 percent are associated with intrathoracic injuries
- (C) They frequently result in long-term disability
- (D) They account for approximately 8 percent of all fractures
- (E) The mechanism of injury is from direct blow, trauma to the shoulder, or fall on an outstretched arm

[Show Answer](#)

15-400 A 26-year-old soccer player presents after a direct blow to the shoulder. On examination, she has tenderness over the acromioclavicular joint, but no step-off or deformity. X-rays show no fracture, subluxation, or dislocation. Which of the following is the most appropriate management?

- (A) Arrange immediate orthopedic follow-up for possible operative repair
- (B) Place the shoulder in a figure-of-eight brace, with orthopedic follow-up in 1 to 2 weeks
- (C) Place the shoulder in a simple sling, with instructions for early range of motion
- (D) Place the shoulder in a shoulder immobilizer for 2 to 3 weeks
- (E) Tell the patient that immobilization is not necessary but that she should apply ice and use analgesics as needed for pain control

[Show Answer](#)

15-401 Which of the following statements about anterior shoulder dislocations is FALSE?

- (A) Nerve injury occurs in 10 to 25 percent of acute dislocations
- (B) Most neural injuries involve the axillary nerve
- (C) Successful reduction occurs in 70 to 90 percent of cases, regardless of technique
- (D) Associated rotator cuff injuries occur in 80 percent of patients older than 60 years
- (E) Vascular injuries are rare but, when they occur, tend to involve the brachial artery

[Show Answer](#)

15-402 Which of the following mechanisms is most likely to result in an anterior glenohumeral dislocation?

- (A) Abduction, extension, and external rotation
- (B) Forceful internal rotation and adduction
- (C) Electric shock
- (D) Seizure
- (E) Direct force to the anterior shoulder

[Show Answer](#)

15-403 All of the following statements about fractures of the proximal humerus are TRUE EXCEPT

- (A) any fracture involving the surgical neck may result in compromised blood supply to the articular segment

- (B) fracture of the lesser tuberosity suggests a potential posterior shoulder dislocation
- (C) significant displacement of a greater tuberosity fragment implies a possible rotator cuff tear
- (D) markedly angulated surgical neck fractures are at risk for neurovascular damage
- (E) emergent orthopedic consultation is recommended for multipart fractures

[Show Answer](#)

15-404 Which type of pelvic fracture is MOST often associated with severe hemorrhage?

- (A) Anteroposterior compression
- (B) Vertical shear
- (C) Lateral compression
- (D) Crush injuries
- (E) Combination injuries

[Show Answer](#)

15-405 Which of the following statements about management of hemorrhage in pelvic fractures is FALSE?

- (A) Patients with double breaks in the ring require blood products more often than those with single breaks
- (B) Aggressive fluid and blood replacement is a mainstay of therapy
- (C) An external fixator may be useful to reduce bleeding in some pelvic fractures
- (D) Angiography and embolization can be done to control small bleeding sites
- (E) Laparotomy provides definitive therapy

[Show Answer](#)

15-406 Which of the following hip fractures is MOST likely to disrupt perfusion of the femoral head?

- (A) Subcapital fracture
- (B) Intertrochanteric fracture
- (C) Subtrochanteric fracture
- (D) Pubic ramus fracture
- (E) Avulsion of the greater trochanter

[Show Answer](#)

15-407 Which of the following statements regarding hip dislocations is FALSE?

- (A) The risk of avascular necrosis increases if reduction is delayed
- (B) Traumatic hip dislocations in children are rare
- (C) Reduction should be done as soon as possible and always within 6 h
- (D) In patients with anterior dislocations, the extremity is shortened and internally rotated

(E) Posterior dislocations are more common than anterior dislocations

[Show Answer](#)

15-408 A 13-year-old male is brought in by his parents for right hip stiffness and groin discomfort after activity. He feels well otherwise and denies fevers or chills. On examination he is ambulatory with a slight limp and mild discomfort with internal rotation. Which of the following is the MOST likely diagnosis?

- (A) Congenital hip dislocation
- (B) Septic arthritis
- (C) Transient synovitis
- (D) Legg-Calvé-Perthes disease
- (E) Slipped capital femoral epiphysis

[Show Answer](#)

15-409 Which of the following injuries is MOST likely to be associated with disruption of the cruciate ligaments?

- (A) Patellar fracture
- (B) Femoral condyle fracture
- (C) Avulsion of the tibial tuberosity
- (D) Tibial plateau fracture
- (E) Tibial spine fracture

[Show Answer](#)

15-410 The anterior drawer sign, Lachman's test, and the pivot shift are used to measure stability of which knee structure?

- (A) Medial collateral ligament
- (B) Lateral collateral ligament
- (C) Anterior cruciate ligament
- (D) Posterior cruciate ligament
- (E) Medial meniscus

[Show Answer](#)

15-411 A 35-year-old male presents after a significant hyperextension injury to the right knee while playing soccer. On examination the knee is severely unstable in both anteroposterior and lateral directions. A palpable hematoma is present in the popliteal fossa. Plain films demonstrate no bony abnormality. Which of the following tests must be performed emergently?

- (A) Magnetic resonance imaging of the knee
- (B) Arteriography
- (C) Bone scan
- (D) CT of the knee

(E) Electromyography

[Show Answer](#)

15-412 What is the MOST common site for a compartment syndrome?

- (A) Anterior compartment of the lower leg
- (B) Peroneal compartment of the lower leg
- (C) Deep posterior compartment of the lower leg
- (D) Volar compartment of the forearm
- (E) Dorsal compartment of the forearm

[Show Answer](#)

15-413 Which of the following is the most common ligament injured during ankle sprain?

- (A) Anterior talofibular ligament
- (B) Posterior talofibular ligament
- (C) Calcaneofibular ligament
- (D) Deltoid ligament
- (E) Anterior tibiofibular ligament

[Show Answer](#)

15-414 A 35-year-old female presents with posterior ankle pain, which occurred suddenly while playing volleyball. Thompson's test is positive. What is the MOST likely diagnosis?

- (A) Posterior talofibular ligament injury
- (B) Achilles tenosynovitis
- (C) Achilles tendon rupture
- (D) Posterior talotibial dislocation
- (E) Calcaneal fracture

[Show Answer](#)

15-415 A 45-year-old male presents with foot pain after an automobile accident. The examination shows tenderness, swelling, and ecchymosis over the midfoot. X-ray shows fracture of the base of the second metatarsal and lateral displacement of the second, third, fourth, and fifth metatarsals. What is the optimal management of this patient?

- (A) Posterior splint, with orthopedic follow-up as needed
- (B) Urgent orthopedic consultation for possible open reduction and internal fixation
- (C) Splint the patient in equinus and follow up with orthopedics in 2 to 3 days
- (D) Cast the foot and follow up with orthopedics in 2 to 3 days
- (E) Hard-sole shoe, weight bearing as tolerated, follow-up in orthopedics as needed

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Show All Answers

(392) The answer is E

Injury to the epiphyseal plate is a poor prognostic indicator. Specific predictors of satisfactory remodeling include youth, proximity of the fracture to the end of the bone, and angulation in the plane of natural joint motion.

(Chapter 259)

(393) The answer is D

Diagnosis of lunate fractures can be difficult because wrist x-rays may or may not show the abnormality. Missed diagnosis or improper management may result in avascular necrosis of the lunate (Kienbock's disease). The most common mechanism is a fall on an outstretched hand.

(Chapter 262)

(394) The answer is C

Neurovascular complications occur in 8 to 21 percent of patients with elbow dislocations, the most frequent injury being the ulnar nerve. Vascular complications occur in 5 to 13 percent, with the brachial artery being most commonly injured. The axillary nerve is at risk after anterior shoulder dislocation. Supracondylar humeral fractures are associated with radial nerve and artery injuries.

(Chapter 261)

(395) The answer is D

Subluxation of the radial head (nursemaid's elbow) is common among children 1 to 4 years old. It occurs with sudden traction on the hand, with the elbow extended and the forearm pronated. During forceful traction, fibers of the annular ligament become trapped between the radial head and the capitellum. To reduce the subluxation, the examiner's thumb should be placed over the patient's radial head, with the other hand on the patient's wrist. The forearm is then supinated, and the elbow is flexed. Reduction is successful when a palpable "click" is felt. Orthopedic consultation is not necessary if the history and physical are consistent with the diagnosis and reduction is successful. Plain radiographs are not diagnostic. Systemic sedation is not typically required to reduce nursemaid's elbow.

(Chapter 261)

(396) The answer is E

Volkman's ischemic contracture is the most serious complication of supracondylar fracture. Local edema compromises tissue perfusion, which, if unrelieved, leads to tissue necrosis and permanent disability. Diagnosis is based on signs and symptoms such as refusal to open the hand, pain with passive extension of the fingers, and forearm tenderness. Lack of a radial pulse without these signs does not necessarily indicate ischemia but may represent disruption of vascular structures.

(Chapter 261)

(397) The answer is A

Galeazzi's fracture, sometimes called *reverse Monteggia's fracture*, describes a fracture of the distal third of the radial shaft with associated distal radioulnar joint dislocation. The distal radioulnar joint injury can be subtle, with the anteroposterior radiograph showing only slightly increased distal radioulnar joint space. On the lateral view, the ulna is displaced dorsally. Monteggia's fracture-dislocation is a fracture of the proximal third of the ulna associated with radial head dislocation. Colles' fracture refers to a distal radius fracture with dorsal angulation. Fractures of the distal radius with volar angulation are Smith's fractures (or *reverse Colles'*). Barton's fracture is a fracture of the dorsal or volar rim of the distal radius, in which the carpal bones are displaced in the direction of the fracture.

(Chapter 262)

(398) The answer is D

In reducing sternoclavicular dislocations, closed reduction is usually attempted first, but operative intervention is often required. The medial clavicular epiphysis is the last to appear (age 18 years) and the last to close (age 22-25 years). As a result, physeal injuries may be misdiagnosed as a dislocation. Routine radiographs may not be diagnostic, and computed tomography (CT) is the imaging procedure of choice. Anterior dislocations are more common than posterior dislocations. Posterior dislocations may impinge on thoracic structures, causing pneumothorax, and compression or laceration of the great vessels, trachea, or esophagus.

(Chapter 263)

(399) The answer is E

Most scapular fractures are treated nonsurgically, with a sling for immobilization. Such fractures require high energy, and more than 80 percent are associated with thoracic and shoulder girdle injuries. Long-term disability is typically the result of associated injuries, not of the fracture itself. Scapular injuries are rare, accounting for fewer than 1 percent of fractures. The mechanism is most commonly a direct blow to the scapula, trauma to the shoulder, or fall on an outstretched arm.

(Chapter 263)

(400) The answer is C

The patient has a type I acromioclavicular joint injury. Although various straps and braces have been used to reduce the dislocation, none have proved successful. A simple sling is most convenient and effective. Patients should be instructed to rest, apply ice, use analgesics, and begin early range-of-motion exercises to prevent a frozen shoulder. Mild acromioclavicular joint injuries do not require operative repair.

(Chapter 263)

(401) The answer is E

Although vascular injuries are rare, they tend to occur in elderly patients and involve the axillary artery. Signs of axillary artery injury include absent radial pulse, axillary hematoma, ecchymosis of the lateral chest wall, and an axillary bruit. Neural injuries occur in 10 to 25 percent of acute dislocations, most often secondary to traction neuropraxia. Axillary nerve sensation must be assessed before and after reduction because it is the most commonly injured nerve. The injury is typically transient and tends to resolve spontaneously. Successful reduction occurs in 70 to 90 percent of cases, regardless of reduction technique. Rotator cuff injury is a frequent complication in patients older than 60 years.

(Chapter 263)

(402) The answer is A

Shoulder dislocation is the most common major joint dislocation. Approximately 98 percent of glenohumeral dislocations are anterior. Abduction, extension, and external rotation comprise the classic mechanism. The other listed possibilities are likely to cause a posterior dislocation.

(Chapter 263)

(403) The answer is A

Any fracture involving the anatomic neck or the articular surface may result in compromise of the blood supply to the articular segment. Ischemic necrosis of the articular segment may ultimately require insertion of a humeral head prosthesis for these relatively rare fractures.

(Chapter 263)

(404) The answer is B

Hemorrhage is a major cause of death in patients with pelvic fractures. Of those with vertical shear injuries, approximately 75 percent suffer severe hemorrhage. Retroperitoneal bleeding is an inevitable complication, and up to 4 L of blood can accumulate in this space. Other complications of vertical shear injuries include bladder rupture (15 percent) and urethral injuries (25 percent).

(Chapter 265)

(405) The answer is E

Patients with double breaks in the ring require blood products more often than those with single breaks. Patients with significant injuries require aggressive volume resuscitation with fluid and blood replacement. An external fixator device can help control hemorrhage. In patients who are exsanguinating, angiography permits embolization of smaller vessels. Laparotomy can release a tamponade and precipitate uncontrolled hemorrhage.

(Chapter 265)

(406) The answer is A

Displaced subcapital fractures of the femoral head and neck can compromise the femoral neck vessels through shearing or compression from intracapsular hemarthrosis. The blood supply through the ligamentum teres may not be adequate to supply the entire femoral head. Avascular necrosis occurs in 15 percent of nondisplaced fractures and in 90 percent of completely displaced fractures. Fractures below the capsule (intertrochanteric and subtrochanteric) rarely disrupt important vessels. Pubic ramus fractures do not involve the femoral head.

(Chapter 265)

(407) The answer is D

Patients with posterior dislocations present with the extremity shortened and internally rotated. Those with anterior dislocations present with the extremity shortened and externally rotated. Posterior dislocations account for 80 to 90 percent of hip dislocations. Prompt reduction is important to avoid avascular necrosis. General anesthesia may be required.

(Chapter 265)

(408) The answer is E

Slipped capital femoral epiphysis occurs primarily in obese male children aged 10 to 16 years. Symptom onset is insidious. Patients often complain of hip stiffness, mild limp, and groin discomfort after activity. Initial radiographs may be normal initially but subsequently may show a posterior slip of the epiphyseal plate. The patient should be made non-weight bearing, and orthopedic consultation should be obtained.

(Chapter 132)

(409) The answer is E

Isolated injuries of the tibial spine are uncommon and usually result in damage to the cruciate ligaments. The injury is caused by an anterior-posterior force directed against the flexed proximal tibia. This may cause incomplete or complete avulsion of the tibial spine, with or without displacement. If the fracture is nondisplaced, it is treated by immobilization in full extension. Displaced fractures may require open reduction and internal fixation.

(Chapter 266)

(410) The answer is C

All three tests measure stability of the anterior cruciate ligament. The anterior drawer sign has been used for a long time, but it is not very sensitive. The test is performed with the hip flexed at 45 degrees and the knee flexed at 90 degrees. The examiner forwardly displaces the tibia from the femur. A displacement of greater than 6 mm relative to the opposite knee is considered positive. The Lachman's test is similar but is more sensitive. The test is done with 20 degrees of flexion at the knee, with the knee on a pillow. The femur is stabilized, and an anterior force is applied against the tibia. A displacement of more than 5 mm or a soft, mushy endpoint suggests an injury to the anterior cruciate ligament. In the pivot shift test, valgus stress and internal rotation is applied, and then the examiner slowly begins to flex the knee. A visible, audible, or palpable reduction may occur when the anterior subluxation is reduced.

(Chapter 266)

(411) The answer is B

The patient's history is suggestive of a knee dislocation, which may have spontaneously reduced in the field. Knee dislocations should be suspected in patients with gross instability in multiple directions. Frequently they reduce spontaneously. A high index of suspicion is important because these injuries are often associated with popliteal artery injuries (50 percent incidence) and peroneal nerve injuries. If knee dislocation is suspected, an

arteriogram must be performed emergently.
(Chapter 266)

(412) The answer is A

The anterior compartment of the leg is the most common site of compartment syndrome. A tibial fracture is the usual etiology. Other causes include trauma without associated fracture, electrical injury, infectious disease (e.g., myositis), hyperthermia, hypothermia, toxins, snake bite, polymyositis, arterial embolism, seizures, and prolonged immobility that may occur after stroke or drug overdose. A high index of suspicion is important because irreversible muscle damage can occur in 4 to 6 h. Symptoms include pain with passive range of motion, paresthesias, and tense or rock-hard compartments. Poor capillary refill and pulselessness are late findings. The treatment of compartment syndrome is emergency fasciotomy.

(Chapter 267)

(413) The answer is A

More than 90 percent of all ankle sprains involve the lateral ligaments. Of lateral ligament injuries, 90 percent involve the anterior talofibular ligament, with 65 percent of these sprains being isolated and 25 percent with concomitant injury to the calcaneofibular ligament. If both the anterior talofibular ligament and the calcaneofibular ligament are disrupted, the anterior drawer sign will be positive.

(Chapter 268)

(414) The answer is C

Achilles tendon rupture is often missed by the physician on initial examination, and it may be misdiagnosed as an ankle sprain. Tendon rupture tends to occur with forceful dorsiflexion of the ankle. There is edema of the distal calf and a palpable defect in the tendon 2 to 6 cm proximal to the calcaneus. Thompson's test is positive when the foot fails to plantar flex with calf compression or squeezing. It is diagnostic of Achilles tendon rupture.

(Chapter 268)

(415) The answer is B

The patient has a fracture-dislocation of the tarsal-metatarsal joint, known as Lisfranc's joint. A fracture at the base of the second metatarsal is almost pathognomonic of a disrupted joint. Treatment is difficult and may require open reduction and internal fixation. It is important to obtain orthopedic consultation as early as

possible.
(Chapter 269)