
THE JOURNAL OF BONE & JOINT SURGERY

CONTINUING MEDICAL EDUCATION

CME

REVIEW QUESTIONS

JULY, AUGUST, SEPTEMBER
2009

THIS CME EXAM IS ALSO AVAILABLE AT JBJS.ORG AS AN INTERACTIVE ONLINE EXAM.

THE DEADLINE TO SUBMIT YOUR ANSWERS FOR GRADING
THIS SET OF QUESTIONS IS JANUARY 15, 2010.

OBJECTIVES

The objectives of this CME program are:

- To provide the general orthopaedic surgeon with an ability to assess his or her continuing competence in orthopaedics through the acquisition of contemporary scientific information.
- To provide a broad-based review and update of the major subspecialty areas in orthopaedics.
- To make *The Journal* reader aware of new advances in orthopaedic surgical techniques and technology.

DISCLOSURE

- James D. Heckman, MD, has no financial relationships or interests to disclose.

INSTRUCTIONS

In order to benefit most from this educational experience and qualify for Continuing Medical Education credit, please observe the following instructions:

1. Read the learning objectives listed on the Response Form and be certain that they meet your individual learning needs.
2. These CME questions have been derived from the information presented in the July, August, and September issues of the 2009 American volume of *The Journal of Bone and Joint Surgery* (Vol. 91-A). A careful study of each article should yield the best response to each question.
3. Record your answers and complete all portions of the attached Response Form in the back of this document. The online subspecialty CME activities repeat some questions that appear in the quarterly general CME activities. If you are participating in both activities and claiming CME credits, you must consider this duplication when determining the number of credits you claim for each activity. However, to claim up to ten credits to satisfy self-assessment examination requirements mandated by the Maintenance of Certification process, you must take the *online* JBJS quarterly examination.
4. In order for the American Academy of Orthopaedic Surgeons to document your participation in the CME activity, Academy Fellows must provide their AAOS membership number in the designated area on the Response Form.
5. In addition to providing the answers to the CME questions, you must complete the examination evaluation questions. These questions are found on the Response Form. The way you answer these evaluation questions will not in any way affect the score that you achieve.

6. The written quarterly CME activity cannot be used to satisfy SAE requirements as mandated by the ABOS. To claim SAE credit, you must successfully participate in the electronic version of this activity.
7. All completed answer sheets will be graded, and you will be advised of the results of this examination within four weeks after it is received. In order to qualify for CME credit, a score of more than 50% correct must be achieved on the examination. The charge must be paid at the time that the answer sheet is submitted. **The deadline to submit your answers for grading this set of questions is January 15, 2010.**

1. **A fifty-five-year-old, otherwise healthy woman is scheduled to undergo arthroscopic rotator cuff repair under general anesthesia. The patient will receive 20 mL of 1% ropivacaine that will be injected as a bolus dose into the glenohumeral joint and the subacromial space approximately fifteen minutes prior to insertion of the arthroscope. In addition, she will receive an intraoperative intravenous bolus of 40 mg of parecoxib. In an attempt to obtain more postoperative comfort for the patient, you consider adding a regimen of 0.75% ropivacaine delivered to the shoulder by an elastomeric pump at a rate of 5 mL/hr. In a study that compared postoperative infusion of ropivacaine with placebo infusion, the authors found that ropivacaine infusion resulted in:**
 - A. better maximum pain relief in the first twelve hours postoperatively
 - B. better maximum pain relief in the second twelve hours postoperatively
 - C. reduced use of opioid or oral analgesia
 - D. decreased hospital stay
 - E. none of the above
2. **A seventy-year-old man is a candidate for a right total knee arthroplasty. He fears that he may be allergic to bone cement and wants to consider a cementless design. Trabecular metal is currently being used in certain total knee designs. In a study in which radiostereometric analysis was used to compare the fixation of a trabecular metal tibial implant with that of a cemented tibial implant, the authors found that a subset of trabecular metal implants subsided and migrated in the early postoperative period, but all stabilized by one year. The dominant mode of migration was:**
 - A. lateral lift-off
 - B. internal rotation
 - C. medial tilt
 - D. posterior tilt
 - E. anterior tilt
3. **A fifty-year-old man with symptomatic degenerative disc disease is a candidate for posterolateral lumbar interbody fusion. The surgeon has recommended use of rhBMP-2 on an absorbable collagen sponge as a bone-graft substitute to avoid donor site morbidity associated with autogenous bone harvesting. Recent studies have shown that successful use of this agent requires:**
 - A. the optimal concentration and dose
 - B. the proper site of implantation
 - C. a compression-resistant matrix
 - D. all of the above
4. **A seventy-year-old man from Chicago is a candidate for total hip arthroplasty and wonders what kind of bearing surface he will receive. In an analysis of the Nationwide Inpatient Sample database, 112,000 total hip arthroplasties performed in the U.S. between October 1, 2005, and December 31, 2006, were analyzed to determine patterns in the selection of the type of bearing surface. Patients who received a metal-on-metal bearing were most likely to be:**
 - A. sixty-five years of age or older

- B. a woman
C. from the northeast U.S.
D. insured by Medicare
E. insured by private insurance
- 5. A sixty-eight-year-old insulin-dependent diabetic woman is a candidate for left total hip arthroplasty because of progressive symptomatic osteoarthritis of the hip. The patient is aware that a diagnosis of diabetes is associated with a higher likelihood of postoperative complications. In a recent study, the authors looked at the relationship between the type of diabetes mellitus, glycemic control, and complications of surgery. They found that glycemic control:**
- A. did not affect the odds of having a complication in any patient
B. reduced the risk of complications in Type-I but not Type-II diabetes
C. reduced the risk of complications in Type-II but not Type-I diabetes
D. reduced the risk of complications in both Type-I and Type-II diabetes
- 6. A seventy-eight-year-old woman underwent correction of hallux valgus deformity with a distal soft-tissue procedure combined with a proximal crescentic osteotomy of the first metatarsal. Preoperative dorsoplantar weight-bearing radiographs showed a hallux valgus angle of 45°, an intermetatarsal angle of 21°, and a grade-VII medial sesamoid position (as classified with the system of Hardy and Clapham). At ten weeks postoperatively, radiographs showed a hallux valgus angle of 12°, an intermetatarsal angle of 7°, and a grade-VI medial sesamoid position. At twenty-seven months, radiographs showed the recurrence of hallux valgus with a hallux valgus angle of 32° and an intermetatarsal angle of 12°. Which of the following is the most likely risk factor for postoperative recurrence of hallux valgus in this patient?**
- A. preoperative hallux valgus angle of >40°
B. preoperative intermetatarsal angle of >20°
C. undercorrection of the intermetatarsal angle
D. undercorrection of the hallux valgus angle
E. incomplete reduction of the sesamoids
- 7. Third-body wear can adversely affect the outcome of total hip arthroplasty by causing increased polyethylene wear, osteolysis, and component loosening. In a long-term follow-up study that compared the use of cobalt-chromium cable with the use of stainless-steel wire to reattach the osteotomized greater trochanter, the authors studied whether there was a difference in rates of revision for aseptic loosening of the acetabular component between the two groups. They found that:**
- A. the rate of revision in the cable group was twice that in the wire group
B. the rate of revision in the cable group was three times that in the wire group
C. the rate of revision in the wire group was twice that in the cable group
D. the rate of revision in the wire group was three times that in the cable group
E. the rate of revision was the same in the two groups
- 8. A sixty-five-year-old woman with osteopenia fell on the right shoulder and sustained a Neer three-part proximal humeral fracture. With the patient under anesthesia, you obtain a reduction of the fracture that leaves the alignment of the proximal part of the humerus in 25° of varus angulation. According to a recent study, the preferred operative treatment involves use of a:**
- A. fixed-angle locked plate
B. intramedullary rod
C. total shoulder arthroplasty
D. hemiarthroplasty
- 9. A thirteen-year-old girl with a history of congenital scoliosis is being evaluated for surgical correction. Radiographic evaluation reveals failure of vertebral segmentation at the T4-T8 levels. The spinal cord is estimated to be smaller than that in patients with a normal thoracic spine. Small spinal cord size has been associated with neurological sequelae following surgical correction. Another condition in which a small spinal cord has been observed is:**
- A. Klippel-Feil syndrome
B. multiple sclerosis
C. long-standing spinal cord compression
D. all of the above
- 10. A two-week-old girl is referred by her pediatrician because the pediatrician detected subluxation of the right hip during a well-baby newborn examination. As the pediatric orthopaedic consultant, you are aware of a decision analysis model that has compared the health benefits of strategies for evaluating developmental dysplasia of the hip. In answer to the pediatrician's request for information regarding the ideal workup for the patient, you can tell her that the authors of one study recommended physical examination screening for all newborns but selective use of ultrasonography for patients:**
- A. with a positive physical examination
B. born by means of breech delivery
C. with a positive family history of developmental dysplasia of the hip
D. all of the above
- 11. Two patients who sustained a left hip fracture one year ago return for evaluation. Both use a cane and complain of difficulty when arising from a chair. The first patient is a seventy-year-old man who also has painful osteoarthritis of the right knee. The other patient is a seventy-eight-year-old woman who complains of continuing pain in the left hip and the left knee. On which side or sides will these patients likely demonstrate a strength deficit?**
- A. the man and woman will both have a deficit only on the left side
B. the man will have a deficit only on the left side, and the woman will have one on both sides
C. the man will have a deficit only on the right side, and the woman will have one only on the left side
D. the man will have a deficit on both sides, and the woman will have one only on the left side
E. the man and woman will both have a deficit on both sides
- 12. A twenty-day-old male infant is referred because of a diagnosis of right obstetric brachial plexopathy. On examination, there is complete paralysis of the proximal upper-extremity muscles. Distally, he has active finger flexion but no active wrist extensors. In a recent study, bilateral motor nerve-conduction studies were useful in providing prognostic information. For these studies to be most useful:**
- A. motor conduction velocities should be determined after the age of three months
B. amplitudes of motor potentials should be determined after the age of three months
C. motor conduction velocities should be determined now
D. amplitudes of motor potentials should be determined now
- 13. A sixty-year-old woman fell on her outstretched hand and sustained a comminuted fracture of the radial head. The fracture is deemed to be unreconstructable, and the patient agrees to undergo a radial head arthroplasty. A complication of this procedure is overlengthening. A recent cadaver study has shown that a reliable indication of the "overstuffing" that leads to this complication is:**
- A. postoperative radiographic incongruity of the ulno-humeral joint
B. postoperative radiographic incongruity of the radiocapitellar joint
C. intraoperative fluoroscopic image showing an increase in width of the lateral aspect of the lateral ulnohumeral joint space with the implant in place
D. intraoperative fluoroscopic symmetry of the medial ulno-humeral joint with the implant in place
- 14. A three and one-half-year-old girl has a history of progressive bowleg deformity and in-toeing. Physical ex-**

- amination confirms bilateral genu varum of 10° with an internal thigh-foot angle of 20° on each side. Standing full-length radiographs of the lower extremities demonstrate beaking of the proximal tibial metaphysis bilaterally with a medial mechanical axis deviation of 25 mm on the right side and a medial mechanical axis deviation of 30 mm on the left side. Given a presumptive diagnosis of early-onset Blount disease, the most appropriate management for this patient is:**
- use of a nighttime Denis Browne bar with reverse-last shoes
 - bilateral use of a hip-knee-ankle orthosis with a medial upright and drop-lock hinges
 - bilateral hemiepiphyseodesis of the medial-proximal part of the tibia
 - observation with follow-up radiographs in six months
 - bilateral proximal tibial valgus osteotomy
- 15. A sixteen-year-old male football player presents to your office with symptoms of medial knee pain and swelling of eight weeks' duration. He has finished the football season but continues to have pain despite relative rest and activity modification. Radiographs reveal a large osteochondritis dissecans lesion on the posterolateral aspect of the medial femoral condyle. Magnetic resonance imaging confirms a separate but nondisplaced osteochondritis dissecans lesion measuring about 1.5 cm². The patient and his parents agree to arthroscopic evaluation. At the time of surgery, the osteochondritis dissecans lesion is found to be unstable with a good osseous base; no other pathological findings are noted. What is the most appropriate initial treatment for this patient?**
- removal of the fragment with marrow stimulation
 - removal of the fragment and débridement alone
 - débridement of the base of the lesion and fixation of the fragment
 - osteochondral autograft
 - observation
- 16. A fifty-eight-year-old man underwent cervical spine fusion with use of allograft at C5-C6 and C6-C7 one year ago. He continues to complain of pain, and radiographs show nonunion at both levels. He continues to smoke one pack of cigarettes a day. He has heard that bone morphogenetic protein (BMP) can be used to facilitate fusion in spine surgery. In a recent Specialty Update on spine surgery, the authors stated which of the following about the use of rhBMP-2 for multiple-level anterior cervical spine fusion?**
- use of rhBMP-2 would be considered an off-label use in this patient
 - use of rhBMP-2 has been associated with dysphagia
 - use of rhBMP-2 has been associated with hematoma
 - the success rate of multiple-level anterior cervical fusion with use of rhBMP-2 is lower than desired
 - all of the above
- 17. A fifty-four-year-old man presents to you following a fall. He has pain and swelling around the wrist, and radiographs reveal a dorsally displaced fracture of the distal part of the radius. Surgical treatment is discussed. According to a recent study, which of the following treatment methods is more likely to result in a better range of motion and better outcome scores in the early post-operative period?**
- closed reduction alone
 - closed reduction and percutaneous pin fixation
 - open reduction and internal fixation with a volar plate
 - external fixation alone
 - external fixation and percutaneous pin fixation
- 18. You will be the principal investigator in a randomized controlled trial that will compare two types of interventions to treat dorsally displaced closed fractures of the distal part of the radius. In planning the study, you read a recently published assessment of the quality of 112 randomized controlled trials. The authors recommended that, with regard to the evaluation of complications, the anticipated complications in the study should be defined:**
- prior to the start of the study
 - at the first time point at which they occur
 - after all complications are recorded
 - after the study is completed but before the evaluation of the data
- 19. A seventy-year-old woman fell on her outstretched hand and sustained a closed, dorsally displaced fracture of the right radius. A comparison of Medicare data from 1996 to 1997 and 1998 to 2005 indicated an increasing trend to treat these fractures with:**
- closed reduction and cast immobilization
 - external fixation
 - pin fixation
 - open reduction with a volar locking plate
 - open reduction with a dorsal locking plate
- 20. A sixty-five-year-old athletic woman has painful degenerative arthritis of the right knee. She has 10° of varus malalignment when standing. The active range of motion is 135° of flexion and -5° of extension. It is very important to her to maintain as much flexion as possible, and she asks whether a so-called high-flexion knee design would afford her a better chance of obtaining maximum flexion. You can tell her that, in a study of Korean patients who received a standard posterior cruciate ligament-retaining implant in one knee and a high-flexion posterior cruciate ligament-retaining implant in the other, there was no significant difference in motion between the two knees at three years after the operation and both groups had excellent flexion. The factors that may have influenced the final flexion in that group of patients include:**
- a preponderance of women
 - a low body mass index
 - a good preoperative range of motion
 - accurate restoration of the joint line
 - all of the above
- 21. A twenty-seven-year-old man who was wearing a helmet while driving a motorcycle was sideswiped by a sports utility vehicle and brought to the emergency room by emergency medical technicians within one hour after the accident. After initial resuscitation and appropriate trauma surveys, the patient undergoes plain radiography, which reveals fractures of the proximal part of the right humerus, distal part of the left radius, left tibial plateau, and right tibial plafond. Radiographs of the spine reveal an unstable L2 vertebral body fracture. Which of the following locations for a computed tomography examination would subject this patient to the highest effective dose of radiation?**
- right shoulder
 - left wrist and hand
 - right knee
 - right foot and ankle
 - lumbar spine
- 22. A thirty-five-year-old woman has an eight-week history of progressive weakness of the right biceps muscle and shoulder pain radiating to the right thumb. In addition, she reports that she had the onset of headaches about two months ago with no previous history of headache. Cervical traction and nonsteroidal anti-inflammatory drugs did not relieve the symptoms or signs, and a selective cervical nerve-root block relieved the pain in the shoulder and provided mild relief of the headache for only three hours. On examination today, you find the right biceps strength to be 4/5, and there is decreased sensation in the right C6 dermatome. Magnetic resonance imaging shows a large right disc herniation at C5-C6. Which of the following treatments is likely to result in resolution of the right upper-extremity symptoms and signs and the headache?**
- observation and nonsteroidal anti-inflammatory drugs
 - posterior C5-C6 laminoforaminotomy
 - occipital nerve block
 - anterior cervical discectomy and fusion at C5-C6
 - implantation of a spinal cord stimulator
- 23. A sixty-two-year-old woman has left posterolateral**

- tator cuff deficiency with pain, a restricted range of motion, and reduced abduction force. What magnetic resonance imaging finding is most predictive of a poor postoperative clinical outcome after latissimus dorsi tendon transfer?**
- fatty infiltration of the supraspinatus muscle
 - fatty infiltration of the teres minor
 - fatty infiltration of the teres major
 - incomplete tear of the subscapularis tendon
 - stage-2 osteoarthritic changes of the glenohumeral joint
- 24. The mother of a nine-year-old boy noticed, during the recent baseball season, that he seemed "clumsy" when he ran. Several members of the family, including the boy's father, are known to have multiple hereditary exostoses. On examination, the boy is seen to have several osseous prominences on the lower extremities. The joints have a full range of motion, and he has normal motor strength and normal sensation. Radiographs of the lower limbs demonstrate multiple exostoses. What study is the most likely to establish possible intraspinal involvement by this hereditary disease?**
- a bone scan
 - a magnetic resonance imaging scan of the entire spinal cord
 - a computed tomography scan of the lower extremities
 - a magnetic resonance imaging scan of the brain
 - gait analysis
- 25. A seventy-two-year-old insulin-dependent diabetic is scheduled to undergo total shoulder arthroplasty. In an effort to reduce the possibility of infection, meticulous sterile technique, perioperative antibiotics, and a surgical skin preparation solution are utilized. What surgical preparation solution was found to be most efficacious in eliminating bacteria from the skin around the shoulder?**
- povidone-iodine (0.75% iodine scrub and 1.0% iodine paint)
 - DuraPrep (0.7% iodophor and 74% isopropyl alcohol)
 - ChlorPrep (2% chlorhexidine gluconate and 70% isopropyl alcohol)
 - Techni-Care (3% chloroxylenol)
- 26. A three-year-old boy is referred to your institution because of congenital shortening of the right lower extremity. On physical examination, the femur has an atypical shape on palpation, the ipsilateral knee is unstable, and there is telescopic movement of the proximal part of the femur. Plain radiographs show that the femoral head is located in the acetabulum, but the femoral shaft is proximally dislocated. The femoral shaft and femoral head are joined by a fibrocartilaginous mass with irregular calcifications (Pappas type-IV [Aitken-B] proximal femoral focal deficiency). What is the characteristic vascular finding associated with this type of proximal femoral focal deficiency as seen on computed tomographic angiography?**
- hypertrophy of the external iliac artery
 - hypertrophy of the deep femoral artery
 - reduced diameter of the femoral artery
 - pseudoaneurysm of the femoral artery adjacent to the fibrocartilaginous mass
- 27. Radiostereometric analysis is a useful method for studying certain aspects of the stability of total joint implants. The best indication for its use is to study which of the following?**
- bone remodeling around glenoid components
 - amount of osseointegration of uncemented glenoid components
 - small amounts of implant migration
 - bone formation around uncemented implants
 - bone density around uncemented implants
- 28. A forty-five-year-old woman presents to a hand surgeon for a second opinion regarding lateral pain in the right elbow that had been present for five months. She used to play tennis and work out at the gym but has stopped doing these activities. She works as an administrative assistant and does a lot of typing. Although she continues to work, she worries that typing is aggravating her**
- condition and is now convinced that something is seriously wrong with her arm. Her husband has recently lost his job, and finances are tight. She has a hard time waking up in the morning, sleeps a lot, and has stopped socializing with her friends. She asks whether surgery for the lateral elbow pain might provide some pain relief. She wants her arm fixed and for the pain to go away, so that she can get back to her normal life. The best initial course of action for this patient is to:**
- tell her that she will get better and that there is nothing for you to do
 - prescribe some pain medication and see her when necessary
 - tell her that her depression and stress are causing her pain and refer her to a psychiatrist
 - explain her pain misconceptions and the role that stress is playing in her illness
 - perform exploratory surgery to see why she continues to have pain
- 29. A fifty-year-old man sustained a knee injury while skiing. Findings on physical examination are consistent with a rupture of the anterior cruciate ligament, and he agrees to undergo reconstruction of the ligament in a few weeks, after the swelling has subsided. After the reconstruction, he begins a physical therapy program and asks you for a prescription for nonsteroidal anti-inflammatory drugs to help with pain relief and postoperative swelling. You tell him that the administration of nonsteroidal anti-inflammatory drugs in the perioperative period may adversely affect soft-tissue healing (and bone-healing) by which of the following mechanisms?**
- an inhibitory effect on angiogenesis and cell proliferation
 - upregulation of prostaglandin E2 levels within fracture calluses
 - hypertrophy of osteoblasts in early phases of bone-healing
 - increased collagen organization within a healing tendon
 - inhibition of microcirculation in skeletal muscle from secondary inflammatory tissue damage
- 30. An eighteen-year-old high-school senior is playing his final year of varsity baseball for his high school. He is a left-handed pitcher with a fast ball that has been measured at 85 mph (138 kph). His father, who is also his coach, believes that he needs more arm speed to be able to compete at the college level and arranges for a consultation with an orthopaedist to request that a surgical procedure be performed on his son's left elbow. The son has had no elbow or upper-extremity problems throughout his career. On examination, the left upper extremity is found to be normal in all respects, and plain radiographs show the shoulder and elbow to be normal as well. The consulting orthopaedist informs the father that the results of the examination are normal. He further explains that he will not perform any enhancement procedure of this type as he considers it to be morally wrong and potentially harmful to the eighteen-year-old. In ethical terms, the orthopaedist's response can best be described as:**
- practicing unjustifiable paternalism
 - exercising his right of conscience
 - expanding the limitations of informed consent
 - adhering to proscriptive utilitarianism
- 31. A thirty-five-year-old man sustains a mid-diaphyseal femoral fracture in a motorcycle collision and presents to the emergency department at 11:30 PM. Intramedullary nail fixation of the fracture in the middle of the night, rather than first thing in the morning, is associated with what potential complication?**
- nonunion
 - malunion
 - infection
 - reoperation to remove painful hardware
 - deep venous thromboembolism
- 32. A sixty-six-year-old woman presents for a routine postoperative checkup one year after a total hip arthroplasty for osteoarthritis. She is an unemployed college graduate and has a body mass index of 28 kg/m². Her**

- postoperative course was uncomplicated. In addition to better preoperative and postoperative scores on standardized scales for the assessment of symptoms and function, which of the following is most likely to be related to whether her expectations of the surgery have been fulfilled?
- being able to cut her toenails
 - being able to participate in social activities
 - not having a postoperative limp
 - having achieved postoperative rehabilitation milestones in a shorter amount of time
33. A seventy-year-old man is admitted late Tuesday evening following a fall in which he sustained a displaced intertrochanteric femoral fracture. Resident A, who is in the middle of a twenty-four-hour call period, records a history, performs a physical examination, and admits the patient. The following morning, the patient is seen by the general medicine service and is cleared for surgery that afternoon. Resident A hands off care of the patient to Resident B prior to surgery. Resident B is not on call that night. According to current Accreditation Council for Graduate Medical Education (ACGME) duty-hour restrictions, when would Resident A be able to next care for this patient?
- he can assist with the surgery on this patient
 - he can assume care on the first postoperative day
 - he can assume care immediately following the surgery
 - he can no longer participate in the patient care
34. An elderly woman presents to the emergency department with a substantially displaced distal radial fracture. She undergoes closed reduction and splint application. She presents to your clinic ten days later with radiographs showing maintenance of reduction and acceptable alignment. You explain the major treatment options—i.e., continued closed treatment with a cast or early open reduction and internal fixation with a volar plate. According to decision analysis models based on patient questionnaires, which of the following is the most important factor influencing a patient's decision to choose cast immobilization over surgical treatment?
- sex
 - an age of more than sixty-four years
 - risk of complex regional pain syndrome
 - risk of a functional deficit
35. A twenty-three-year-old woman who played competitive soccer throughout high school and college sustained a tear of the anterior cruciate ligament while playing in a recreational soccer league. She underwent an intensive rehabilitation program but continued to have episodes of giving-way, and nine months after the accident she plans to undergo anterior cruciate ligament reconstruction. She has been in good health, and her only medication is birth control pills. She is more likely to have a severe injury of the meniscus or the articular cartilage because:
- she is under twenty-five years of age and female
 - more than six months have elapsed since the injury
 - she has played soccer for more than six years
 - she is taking birth control pills
36. With regard to total knee arthroplasty design options for a healthy, active seventy-nine-year-old man, what is the primary advantage of a posterior-stabilized rotating-platform design over a posterior-stabilized all-polyethylene tibial design?
- decreased prevalence of osteolysis
 - better range of motion
 - increased long-term survival
 - more intraoperative options
 - lower cost
37. A twenty-six-year-old woman is referred to the orthopaedic surgeon because of left groin pain and "popping" with prolonged standing and activity that have worsened over the past year. The medical history is notable for "treatment of a hip problem with bracing" when the patient was an infant without further follow-up. Physical examination shows left hip flexion to 120° compared with 110° on the right. She also has pain similar to her typical pain with maximal flexion, adduction, and internal rotation of the left hip. Anteroposterior, false-profile, and maximal abduction anteroposterior plain radiographs of the hips demonstrate lateral and anterior center-edge angles of 14° and 5°, respectively, with a minimum of 4 mm of joint space, excellent congruency, and no radiographic signs of arthritis in the hip. A magnetic resonance imaging scan demonstrates an incomplete undersurface antero-lateral labral tear of the left hip. Which of the following is the best diagnosis and treatment plan?
- hip flexor tendinitis with a radiographically normal hip; physical therapy
 - labral tear in left hip; arthroscopic débridement
 - left femoroacetabular impingement; arthroscopic or open procedure if necessary to eliminate impingement
 - left acetabular dysplasia; periacetabular osteotomy with arthrotomy to address labral pathology
 - left hip dysplasia; physical therapy and eventual total hip arthroplasty when arthritis becomes severe
38. Four years previously, a sixty-four-year-old man with diabetes mellitus underwent a total knee arthroplasty that was complicated by an early postoperative wound dehiscence, which was treated with irrigation, débridement, a liner change, and a course of intravenous antibiotics. He presents with a one-year history of increased ipsilateral knee pain. The physical examination is notable for a red, warm knee joint and a painful range of motion. The results of aspiration and laboratory studies are consistent with chronic infection, and this is confirmed by subsequent intraoperative cultures. The chance of an intraoperative Gram stain being positive in such a case is approximately:
- <10%
 - 25%
 - 50%
 - 75%
 - ≥90%
39. A fifty-five-year-old female homemaker presents with a two-year history of carpal tunnel syndrome without a known cause. The electrophysiologic test is positive, but no muscle atrophy is seen. Although the patient continues to have symptoms that are not relieved by conservative treatment, she thinks that she can tolerate them and hesitates to undergo an operation. If she asks you whether she should have surgery, the best answer from the patient's point of view is:
- you have to have an operation because of the risk of nerve deterioration
 - you have to have an operation because the symptoms will never be relieved by conservative treatment
 - you can choose to have an operation any time when you cannot tolerate the symptoms
 - you should not have an operation because you are hesitating to do so
 - you should not have an operation because you have no muscle atrophy
40. The intention-to-treat principle means that all patients should be included in the analysis according to:
- the treatment they received
 - the treatment to which they were allocated regardless of actual treatment, crossover, or drop-out
 - the treatment to which they were allocated only if they actually received it
 - the treatment to which they were allocated, not including patients lost to follow-up
41. Clinicians can measure shoulder laxity with an anterior drawer test, with Grade I indicating that the humeral head does not subluxate over the glenoid rim; Grade II, that the humeral head can be subluxated but reduces spontaneously; and Grade III, that the humeral head stays dislocated out of the glenoid. Which of the following is true regarding anterior shoulder laxity when a patient is examined while under anesthesia?
- Grade-II anterior laxity confirms a diagnosis of instability

- B. Grade-II anterior laxity is more common than Grade-I or III laxity
- C. Grade-II anterior laxity should be considered pathologic
- D. Grade-II anterior laxity should be treated with capsular tightening
- 42. In reconstruction of the anterior cruciate ligament, selection of the location for the tibial tunnel in the sagittal plane can be a challenge for the surgeon, and correct selection of the femoral tunnel position is a critical step in the procedure. A more horizontal placement of the graft (at the ten o'clock rather than the standard eleven o'clock position) will:**
- A. improve the results of the pivot-shift test
- B. improve the results of the Lachman and anterior drawer tests
- C. improve the Lysholm and Tegner scores
- D. provide more stability in landing and pivoting
- E. produce slightly decreased tibial rotation
- 43. A sixteen-year-old boy presents with a six-month history of increasing pain in the left knee. He has no history of trauma, fever, or other disease. The pain was initially related to sports and running activities. He now complains of everyday pain in the left knee after a few minutes of walking. Examination reveals a mild joint effusion, a normal range of motion, and tenderness on palpation of the inner aspect of the proximal part of the tibia. Radiographs of the left knee show an osteolytic oval bone lesion occupying the internal half of the proximal tibial epiphysis. The lesion is limited by a thin regular sclerotic rim and shows intralesional calcifications. It is located within the epiphysis and does not cross the growth plate. Which of the following is the most likely diagnosis?**
- A. osteosarcoma
- B. chondroblastoma
- C. acute osteomyelitis
- D. Ewing sarcoma
- E. fibrous dysplasia
- 44. A thirty-five-year-old woman presents to the orthopaedic surgeon because of a nine-month history of sharp pain in the left groin. The pain began insidiously, has slowly increased in intensity, and is accentuated during activity. Physical examination shows hip joint flexion to 115° and internal rotation to 15° to 20°. A weight-bearing anteroposterior pelvic radiograph shows a center-edge angle of Wiberg of 18° in the left hip. The left hip joint appears to be congruent. If a periacetabular osteotomy is selected as the surgical procedure, which of the following factors is currently the best established predictor of failure (i.e., conversion to total hip replacement)?**
- A. an acetabular anteversion angle of <10° on a preoperative computed tomography scan
- B. signs of advanced osteoarthritis on conventional preoperative radiographs
- C. the age of the patient at the time of surgery
- D. a postoperative center-edge angle of Wiberg outside the interval of 30° to 40°
- 45. A four-year-old boy presents to the emergency department with his mother after a fall while playing at the park. He is tearful and reluctant to actively move the right elbow. Physical examination shows no elbow deformity and a normal passive range of motion of the elbow without crepitus. There is no discrete tenderness on palpation about the elbow. Anteroposterior and lateral radiographs reveal no fat-pad signs, but the radiologist and the emergency room physician are concerned that the anterior humeral line passes through the anterior third of the capitellum on the lateral radiograph. Which of the following is the most likely diagnosis?**
- A. flexion-type supracondylar fracture
- B. extension-type supracondylar fracture
- C. a normal elbow
- D. transphyseal distal humeral fracture
- E. a dislocated radial head
- 46. Which of the following statements regarding motor nerve reconstruction as compared with sensory nerve reconstruction is correct?**
- A. when performed within one year after the injury, motor nerve and sensory nerve reconstructions are identical in terms of timing of the intervention and the outcomes
- B. sensory nerve reconstruction is fundamentally different from motor nerve reconstruction as time-dependent degradation and irreversible ultrastructural changes occur at the sensory nerve end plate
- C. motor nerve reconstruction is fundamentally different from sensory nerve reconstruction as there are time-dependent degradation and ultrastructural changes of the muscle and irreversible changes that occur at the motor end plate
- D. sensory and motor nerve reconstruction can be performed up to two years after the injury without compromising outcome
- 47. A fifty-two-year-old right-hand-dominant man crashed his motorcycle into a tree. He complains of neck pain, labored breathing, and severe pain in the right shoulder. Physical examination reveals abrasions over the posterior aspect of the shoulder and the acromion and a slumped appearance to the right shoulder. The results of a sensory examination of the ipsilateral extremity are normal. He has a neck collar in place and acute tenderness over the right hemithorax with subcutaneous crepitation. Radiographic studies reveal an extra-articular scapular fracture with 40° of angular deformity on the scapular Y view and 3 cm of medialization of the glenoid relative to the lateral border of the scapula. There are eight ipsilateral displaced rib fractures and a small pneumothorax. Your surgical approach to this fracture should access which two osseous landmarks on the scapula in order to effect a reduction and apply balanced fixation?**
- A. the spine of the acromion and the inferior angle
- B. the glenoid neck and the superior vertebral margin
- C. the glenoid and the superomedial angle
- D. the scapular body and the coracoid process
- E. the acromion process and the lateral border
- 48. A twenty-five-year-old right-hand-dominant baseball pitcher complains of right shoulder pain that began four weeks after he returned from spring training. The patient also reports a clunking sound emanating from the shoulder whenever he throws, which he associates with pain. The patient recalls no recent trauma or associated numbness or tingling. Routine shoulder radiographs and magnetic resonance imaging scans are negative for any obvious bone or soft-tissue lesions. The most likely diagnosis is:**
- A. a SLAP tear
- B. snapping scapula syndrome
- C. thoracic outlet syndrome
- D. subacromial impingement
- E. biceps tendinitis
- 49. A twenty-four-year-old woman is seen by a physician because of a primary patellar dislocation sustained while playing soccer. Physical examination shows an effusion with a positive patellar apprehension test and a normal quadriceps angle. The findings on magnetic resonance imaging are consistent with a loose body and a tear of the medial patellofemoral ligament from its femoral attachment. In addition to addressing the loose body, what procedure should be performed to reestablish patellar stability?**
- A. lateral retinacular release
- B. anteromedialization of the tibial tubercle
- C. reconstruction of the medial patellofemoral ligament and anteromedialization of the tibial tubercle
- D. repair of the medial patellofemoral ligament
- E. medial capsular imbrication
- 50. The most effective way to standardize kinematic measurements between motion analysis laboratories is:**
- A. use of the same motion analysis software program
- B. use of infrared markers
- C. use of a minimum of six motion sensors
- D. use of standard marker placement on patients

RESPONSE FORM

ACCREDITATION STATEMENT

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the American Academy of Orthopaedic Surgeons (AAOS) and *The Journal of Bone and Joint Surgery* (JBJS). The AAOS is accredited by the ACCME to provide continuing medical education for physicians. The AAOS designates this educational activity for up to 10 hours of category-1 credit toward the AMA Physicians' Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

The deadline to submit your answers for grading this set of questions is January 15, 2010.

EXAMINATION EVALUATION (MANDATORY)

Did the July through September 2009 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of spine surgery, orthopaedic trauma, and orthopaedic rehabilitation? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of spine surgery, orthopaedic trauma, and orthopaedic rehabilitation? Yes No
3. Make you aware of new advances in orthopaedic surgical techniques and technology? Yes No

Comments (please comment on the quality of the questions and their relationship to your practice): _____

*Note: These objectives will change every quarter.

ANSWER KEY

Black out the correct answers

- | | | |
|---------------|---------------|---------------|
| 1. A B C D E | 18. A B C D | 35. A B C D |
| 2. A B C D E | 19. A B C D E | 36. A B C D E |
| 3. A B C D | 20. A B C D E | 37. A B C D E |
| 4. A B C D E | 21. A B C D E | 38. A B C D E |
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| 6. A B C D E | 23. A B C D E | 40. A B C D |
| 7. A B C D E | 24. A B C D E | 41. A B C D |
| 8. A B C D | 25. A B C D | 42. A B C D E |
| 9. A B C D | 26. A B C D | 43. A B C D E |
| 10. A B C D | 27. A B C D E | 44. A B C D |
| 11. A B C D E | 28. A B C D E | 45. A B C D E |
| 12. A B C D | 29. A B C D E | 46. A B C D |
| 13. A B C D | 30. A B C D | 47. A B C D E |
| 14. A B C D E | 31. A B C D E | 48. A B C D E |
| 15. A B C D E | 32. A B C D | 49. A B C D E |
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