
THE JOURNAL OF BONE & JOINT SURGERY
CONTINUING MEDICAL EDUCATION

CME

REVIEW QUESTIONS

OCTOBER, NOVEMBER, DECEMBER
2004

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THE DEADLINE TO SUBMIT YOUR ANSWERS FOR GRADING THIS SET OF QUESTIONS IS APRIL 15, 2005.

PURPOSE

The purposes 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.

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 October, November, and December issues of the American volume of *The Journal of Bone and Joint Surgery* (Volume 86-A, Numbers 10, 11, and 12). A careful study of each article should yield the best response to each question.
3. Read each question carefully, identify the best answer, and record that answer on the CME Response Form in the back of this document.
4. To receive CME credit, it is absolutely essential that you complete all portions of the attached Response Form and answer each question.
5. 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.
6. 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.
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. A charge of \$30 per quarter, or \$110 per year, 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 April 15, 2005.**

1. The two most important factors in predicting outcome in patients with Legg-Calvé-Perthes disease were found to be:

- A. the type of treatment and age of the patient
- B. the type of treatment and gender of the patient
- C. the age of the patient and the lateral pillar classification
- D. the lateral pillar classification and the Stulberg classification
- E. the age and gender of the patient

2. Which of the following was found to be the strongest predictor of functional outcome one year after total knee arthroplasty?

- A. preoperative mental health status
- B. age
- C. gender
- D. preoperative functional status
- E. comorbid medical conditions

3. Which of the following syndromes is most frequently associated with radial deficiency and thumb hypoplasia?

- A. Down syndrome
- B. Holt-Oram syndrome
- C. Streeter dysplasia
- D. trichorhinophalangeal syndrome
- E. Rett syndrome

4. In a comparison of a group of patients who received electrohydraulic shock-wave therapy for chronic plantar fasciitis with a placebo group, the treatment group had significantly better results with regard to:

- A. self-assessment of morning heel pain at twelve months
- B. self-assessment of activity-related pain at twelve months
- C. need for repeat procedures
- D. reduction in use of pain medications
- E. complications of treatment

5. In a randomized prospective study comparing anterior-posterior gliding mobile bearing knee and rotating-platform mobile bearing knee prostheses, there was no significant difference in the range of motion at one year postoperatively. Which of the following statements is the most probable explanation for this finding?

- A. physiological femoral rollback was not restored in knees with an anterior-posterior gliding mobile bearing implant
- B. the tibial reclination was comparable in the two groups
- C. rotating platforms have posterior constraint
- D. the preoperative range of motion was equal in the two groups
- E. the posterior cruciate ligament was resected in knees with a rotating platform

- 6. The application of transosseous low-intensity ultrasound following osteotomy of the tibia in a sheep model led to:**
- malunion of the osteotomy site
 - nonunion of the osteotomy site
 - reduction of the nonunion rate
 - reduction of the time for healing of the osteotomy site
 - inferior biomechanical properties of the generated callus
- 7. In hematogenous osteomyelitis of long bones, a single pathogenic organism is almost always recovered from the bone. Which of the following is most commonly isolated in adults?**
- Streptococcus pyogenes*
 - Haemophilus influenzae*
 - Staphylococcus aureus*
 - Mycobacterium tuberculosis*
 - Escherichia coli*
- 8. Which of the following is the most important epidemiological factor in predicting the development of posttraumatic adult respiratory distress syndrome?**
- presence of a thoracic injury
 - genetic predisposition of the patient to inflammatory hyperreactivity
 - severity of the injury as quantified by the Injury Severity Score
 - age of the patient
 - mechanism of injury
- 9. Which cost-containment measure did United States hospitals implement in the 1980s to drive down the cost of primary hip replacement and was it successful?**
- implant cost reduction, and it was not successful in reducing cost
 - hospital stay reduction, and it was successful in reducing cost
 - implant cost reduction, and it was successful in reducing cost
 - hospital stay reduction, and it was not successful in reducing cost
 - none of the above
- 10. Of the following imaging modalities, which was shown to have the best diagnostic accuracy for detection of a loose acetabular component?**
- plain radiography
 - subtraction arthrography
 - nuclear arthrography
 - bone scintigraphy
 - magnetic resonance imaging
- 11. Optimum implant sizing and positioning in total shoulder arthroplasty for inflammatory arthritis was associated with which of the following?**
- less pain
 - better function
 - better range of motion
 - restoration of glenohumeral alignment
 - all of the above
- 12. There have been several clinical studies on proximally hydroxyapatite-coated femoral stems with follow-up exceeding ten years. These studies indicate that the bone changes:**
- consist of proximal bone densification with loss of bone density at the middle and distal levels around the stem
 - demonstrate progressive distal osteolysis after longer periods of follow-up
 - consist of bone densification at the middle and distal levels of the bone surrounding the stem
 - consist of bone densification at the middle level around the stem with loss of bone proximally and distally
 - are complete at two years after implantation
- 13. Which of the following answers is correct concerning very small asymptomatic stage-I osteonecrotic lesions of the hip?**
- they never collapse
 - pain always precedes progression to stage II
 - most of the lesions collapse after five years of follow-up
 - collapse occurs before symptoms
 - small lesions never require surgery for pain
- 14. In a severely affected patient with cerebral palsy, which of the following interventions is least associated with a decrease in hip pain?**
- improving general hip motion
 - preventing hip joint flexion contractures
 - maintaining a neutral sitting position
 - decreasing the amount of time spent sitting in a chair
 - decreasing the amount of spasticity
- 15. How much lengthening or shortening of the proximal radial length is required for the development of substantial alterations in both kinematics and contact pressure in the radiocapitellar articulation?**
- any shortening or lengthening compared with the normal situation
 - 1 mm
 - 2.5 mm
 - 5 mm
 - >5 mm
- 16. Which of the following does not contribute to fatigue crack growth in cortical bone allografts?**
- gamma radiation sterilization
 - plate-screw fixation of the graft

- C. intramedullary fixation of the graft
 D. increased age
 E. increased collagen cross-linking
- 17. The optimal technique for securing an extensor mechanism allograft during revision total knee arthroplasty was found to be:**
- A. tight tensioning with the knee in 90° of flexion
 B. tight tensioning with the knee in 45° of flexion
 C. without obtaining full knee extension
 D. tight tensioning with the knee in full extension
 E. with the allograft patella resurfaced
- 18. When compared with a porous-coated surface, the use of a hydroxyapatite coating on a proximally modular revision hip stem was found to:**
- A. improve the postoperative Harris hip score
 B. increase the chance for bone ingrowth in Paprosky type-I and II bone defects
 C. decrease the risk of periprosthetic fracture
 D. decrease the prevalence of distal osteolysis
 E. increase the chance for bone ingrowth in Paprosky type-III bone defects
- 19. A comparison of arthroplasty and internal fixation for the treatment of displaced femoral neck fractures in elderly patients showed which of the following to be true:**
- A. compared with internal fixation, arthroplasty reduces the risk of revision surgery by 77%
 B. compared with arthroplasty, internal fixation significantly reduces the risk of mortality
 C. arthroplasty is best performed as a unipolar hemiarthroplasty without cement
 D. infection rates after arthroplasty are significantly reduced compared with those after internal fixation
 E. the prevalence of pulmonary embolism is higher after arthroplasty
- 20. In a comparison of the clinical results of bone-patellar tendon-bone and double-looped hamstring tendon grafts in reconstruction of the anterior cruciate ligament, what was the most frequently reported symptom in patients treated with the bone-patellar tendon-bone graft:**
- A. residual anterior knee laxity
 B. kneeling discomfort
 C. joint stiffness
 D. patellofemoral pain
 E. knee swelling
- 21. Children with presumed adolescent idiopathic scoliosis and subtle abnormalities on clinical history, physical examination, or radiographic examination of the spine may have an occult lesion of the central nervous system. Which of the following was most likely to be associated with an abnormal magnetic resonance image of the central nervous system?**
- A. back pain
 B. headache
 C. abnormal abdominal reflexes
 D. urinary tract infection
 E. absent apical segment lordosis
- 22. A biomechanical study of cadavera showed that distal humeral varus deformity results in all of the following except:**
- A. increased strain in the lateral ulnar collateral ligament
 B. eventual posterolateral instability of the elbow
 C. ulnohumeral joint space widening when the elbow is stressed
 D. subluxation of the joint with strain when the varus deformity is $\geq 25^\circ$
 E. none of the above since cubitus varus of the elbow is essentially a cosmetic deformity with no long-term sequelae
- 23. Which of the following is the best indication for including arthrodesis as an adjunct to decompressive surgery for lumbar spinal stenosis?**
- A. decompression performed through bilateral laminotomies
 B. mild degenerative scoliosis ($<15^\circ$) in an elderly patient
 C. severe multilevel stenosis
 D. degenerative spondylolisthesis
 E. decompression requiring removal of $<50\%$ of the facet joints bilaterally
- 24. In a study that assessed the use of botulinum toxin as an adjunct to serial cast treatment of children with cerebral palsy, which of the following was found to be most likely?**
- A. combined cast treatment and botulinum toxin injection hastens resolution of contractures
 B. spasticity recurs earlier after combined cast treatment and botulinum toxin injection
 C. combined cast treatment and botulinum toxin injection is indicated only for dynamic contractures
 D. combined cast treatment and botulinum toxin injection is more effective in decreasing equinus during gait than is cast treatment alone
 E. more severe contractures resolve following combined cast treatment and botulinum toxin injection than following cast treatment alone
- 25. Absence of which clinical sign or signs most reliably rules out the need to perform radiographic external rotation stress examination of the ankle following isolated fibular fracture?**
- A. weak posterior tibialis function
 B. isolated medial tenderness

- C. medial-sided tenderness to palpation in association with medial-sided ecchymosis
 D. swelling of the ankle
 E. medial-sided swelling and tenderness to palpation
- 26. What factor did sensitivity analysis show to be the most critical in determining the cost-effectiveness of total ankle arthroplasty?**
- A. the cost of total ankle arthroplasty
 B. the complication rate following total ankle arthroplasty
 C. the complication rate following ankle fusion
 D. the function and survival of the total ankle prosthesis
 E. the discount rate
- 27. The performance of hydroxyapatite-coated acetabular components has generally not been as satisfactory as that of hydroxyapatite-coated femoral components. Which of the following factors has been shown to improve cup performance?**
- A. use of thick hydroxyapatite coatings
 B. use of coatings that rapidly dissolve in the body
 C. line-to-line reaming of the acetabulum
 D. restriction of hydroxyapatite fixation to DeLee-Charnley Zones I and II
 E. a cup surface that provides mechanical interlock with bone
- 28. Spontaneous resolution of asymptomatic osteonecrosis of the femoral head was found to be associated with:**
- A. younger age of the patient
 B. a small lesion
 C. low steroid dosage
 D. absence of tobacco usage
 E. female gender
- 29. A seventy-year-old woman fell on her outstretched left hand and sustained an extra-articular fracture of the distal part of the radius. Using local anesthesia, you perform a successful, anatomical reduction and immobilize the fracture in a plaster cast. Under what circumstance would you perform a Kirschner wire osteosynthesis?**
- A. a loss of reduction after four days
 B. persistent pain in the forearm
 C. an accident one week later resulting in a hip fracture
 D. a concomitant injury of the ipsilateral humerus
 E. Parkinson disease
- 30. Regarding Legg-Calvé-Perthes disease and thrombosis, which of the following statements is correct?**
- A. there is no etiologic relationship between Legg-Calvé-Perthes disease and thrombosis
 B. both familial and acquired risk factors for thrombosis have been shown to be associated with Legg-Calvé-Perthes disease
 C. Legg-Calvé-Perthes disease is associated with systemic thrombosis
 D. the recommended treatment for Legg-Calvé-Perthes disease is anticoagulation with heparin
 E. there are no studies associating Legg-Calvé-Perthes disease with an increased risk of thrombosis
- 31. A fifty-year-old woman presented with pain and tenderness at the radial styloid of the left wrist of one month's duration. The pain was aggravated when the thumb was clasped in the palm and the wrist was forced into ulnar deviation. A diagnosis of de Quervain disease was made. The most effective initial treatment of this condition was found to be:**
- A. nonsteroidal anti-inflammatory drugs
 B. nonsteroidal anti-inflammatory drugs and splinting
 C. local steroid injection alone
 D. local steroid injection and nonsteroidal anti-inflammatory drugs
 E. surgical release
- 32. Historically, open reduction and internal fixation of open calcaneal fractures has been fraught with disastrous complications. This past year, three series including a total of eighty-eight open calcaneal fractures were reviewed in The Journal of Bone and Joint Surgery Specialty Update on Trauma. The combined complication rates after treatment in these three series revealed:**
- A. a rate of eventual amputation of 6%
 B. a rate of chronic osteomyelitis of 11%
 C. a rate of secondary operations of 35%
 D. a rate of deep infection of $\geq 6\%$
 E. A and C
- 33. Accurate classification of radiographs of patients with Legg-Calvé-Perthes disease is important for patient management, interpretation of studies, and comparison of results because:**
- A. the disease is extremely variable in its presentation and natural history
 B. many erroneous studies exist
 C. little evaluation of classification systems has been done
 D. classification depends on the stage of the disease
 E. there are too few classification schemes
- 34. Which branch of the axillary nerve lies closest to the inferior portion of the glenoid rim and is therefore most vulnerable to damage**

- during surgery involving the inferior aspect of the shoulder capsule?**
- anterior deltoid motor branch
 - posterior deltoid motor branch
 - branch to subscapularis
 - teres minor and superior lateral cutaneous innervation branch
 - teres minor branch
- 35. Which of the following statements most likely characterizes the ipsilateral radius of a child with reconstructable thumb deficiency (type 1, 2, or 3A)?**
- the radius is absent (type 4)
 - the radial head is dislocated
 - the radius is severely deficient (type 3)
 - the radius is normal or mildly deficient (type N, O, or 1)
 - the severity of the thumb deficiency is not associated with the severity of radial deficiency
- 36. Demineralized bone matrix contains all of the following except:**
- acid-extracted bone
 - collagen
 - noncollagenous proteins
 - bone morphogenetic proteins
 - osteoprogenitor cells
- 37. The elbow has both static and dynamic stabilizers against valgus torque. Muscle-splitting approaches to the medial aspect of the elbow have been developed to help maintain the dynamic stabilizing function of the flexor-pronator mass when the medial ulnar collateral ligament is being reconstructed. On the basis of biomechanical studies, which structures are the primary static and dynamic stabilizers, respectively?**
- anterior bundle of the medial ulnar collateral ligament and the pronator teres
 - anterior bundle of the medial ulnar collateral ligament and the flexor digitorum superficialis
 - anterior bundle of the medial ulnar collateral ligament and the flexor carpi ulnaris
 - posterior bundle of the medial ulnar collateral ligament and the flexor carpi ulnaris
 - posterior bundle of the medial ulnar collateral ligament and the pronator teres
- 38. The factor most likely to be associated with a poor long-term outcome following proximal row carpectomy is:**
- age of less than thirty-five years
 - preoperative diagnosis of Kienböck disease
 - failure to perform a radial styloidectomy
 - patient occupation
 - postoperative evidence of radiocapitate arthritis
- 39. In a study on cadaveric elbows, the maximum amount of the ulna that could be re-**
- moved without increasing strain in the medial collateral ligament was found to be:**
- 0 mm
 - 3 mm
 - 6 mm
 - 9 mm
 - varied according to articular anatomy
- 40. Various pathogenic bacteria can cause necrotizing fasciitis and sepsis. Which of the following scenarios strongly suggests *Vibrio* as the causative organism?**
- road debris from a motor-vehicle accident
 - common cold
 - a recent history of exposure to seawater or shellfish
 - urinary tract infection
 - alcoholism
- 41. All of the following patients might be reasonable candidates for a proximal femoral valgus-producing intertrochanteric osteotomy, EXCEPT:**
- an active fifty-year-old woman with a nonunion of a Pauwels type-III femoral neck fracture
 - a twenty-eight-year-old man with mild osteoarthritis of the hip who is more comfortable with the hip in abduction than in adduction on examination
 - a fifty-five-year-old man with osteoarthritis and joint-space loss at the superolateral edge of the hip joint
 - a forty-five-year-old man with 2 cm of posttraumatic shortening of the ipsilateral lower limb who is otherwise asymptomatic
 - a thirty-year-old woman with osteonecrosis affecting the superolateral aspect of the femoral head, with a Kerboul necrotic angle of 120°
- 42. The optimal method for diagnosing osteonecrosis in asymptomatic patients is:**
- taking the patient's history
 - technetium bone-scanning
 - radiography
 - computerized tomography
 - magnetic resonance imaging
- 43. Which of the following represents the most likely change in the gap detection threshold six weeks after a carpal tunnel release?**
- improved tactile sensitivity in the index finger
 - improved tactile sensitivity in the index and small fingers
 - improved tactile sensitivity in the small finger
 - no change in the tactile sensitivity of the index finger
 - improved tactile sensitivity in the index finger but worse tactile sensitivity in the small finger
- 44. Expected-value decision analysis of prophylactic pinning as compared with observation**

- of the contralateral hip after unilateral slipped capital femoral epiphysis led to which of the following conclusions?**
- observation is favored in all cases
 - prophylactic pinning is favored in all cases
 - observation is generally favored; however, prophylactic pinning is favored when the probability of a contralateral slip is >27%
 - prophylactic pinning is generally favored; however, observation is favored when the probability of a contralateral slip is >27%
 - prophylactic pinning is generally favored; however observation is favored when the utility of uncomplicated prophylactic pinning is >9.8
- 45. Which of the following factors is the most important when selecting a patient with high-grade metaphyseal osteosarcoma of the knee for a partial epiphyseal preservation?**
- metaphyseal intramedullary and soft-tissue tumor extension
 - no intrachemotherapy tumor progression and clear tumor margins, without involvement of the epiphysis, on magnetic resonance imaging
 - no epiphyseal tumor extension detectable with radioisotope scanning and computer tomography
 - a patient with an open growth plate who is less than ten years old
 - a patient without an open growth plate who is more than fifteen years old
- 46. Minimizing gap formation after tendon repair is important because:**
- a gap is a sign of a poor-quality repair
 - tendons with gaps heal more slowly
 - gaps of ≥ 2 mm can be associated with clinically important increases in gliding resistance
 - gaps cause adhesions
 - even a 1-mm gap significantly increases gliding resistance compared with a repair with no gap
- 47. The major disadvantage of the technique of lengthening of long bones over an intramedullary nail is:**
- risk of intramedullary infection
 - premature consolidation of callus
 - refracture
 - decreased range of motion
 - malalignment of the limb
- 48. Which of the following statements about advancement and separation of apical hole eliminators from the acetabular shell is least true:**
- the diagnosis of advancement is best made with an iliac oblique radiograph
 - separation of the hole eliminator is associated with pelvic osteolysis
 - advancement or separation of the hole eliminator does not affect patient function and satisfaction
 - separation of the hole eliminator is an indication for revision
 - advancement or separation of the hole eliminator can occur with linear wear rates of <0.1 mm per year
- 49. Rotator cuff repair in patients fifty years of age and younger is associated with long-term improvement in which of the following clinical parameters?**
- active abduction
 - external rotation
 - adduction
 - internal rotation
 - pain
- 50. If an os acromiale is obscured on the optimal single radiographic view, it can be detected on which of the following combinations of radiographic views of the shoulder?**
- anteroposterior and supraspinatus outlet
 - anteroposterior and apical oblique
 - anteroposterior and Stryker notch
 - supraspinatus outlet and apical oblique
 - supraspinatus outlet and Stryker notch
- Conflict of Interest**
The author of these CME questions does not have any financial conflict of interest with regard to the subject matter discussed in these review questions.

RESPONSE FORM

EXAMINATION EVALUATION

Did the January 2005 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of hip and trauma surgery and orthopaedic rehabilitation? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of the hip and trauma? 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.

SURVEY (optional)

1. Which of the following best describes your practice type?
 - General orthopaedics
 - General orthopaedics with subspecialty interest
 - Exclusively subspecialty
 - Resident or student
 - Researcher
 - Other: _____
2. What are your specialty interests? Please rank in order of importance (1 = highest importance).

___ Adult	___ Spine
___ Geriatric	___ Hand
___ Pediatric	___ Rheumatology
___ Rehabilitation	___ Foot and Ankle
___ Sports	___ Other: _____
___ Trauma	
3. Which is your number-one priority to read when you receive *The Journal* (American volume only) each month?
 - Commercial advertising
 - Current Concepts
 - Classified advertising
 - Letters to The Editor
 - Clinical scientific articles
 - Basic scientific articles
 - Orthopaedic Forum
 - Instructional Course Lectures

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 April 15, 2005.

QUESTIONS?

For payment questions, contact the Subscription Department at 781-449-9780, x140. For questions regarding submitted tests, contact Melissa Viola at 781-449-9780, x124. E-mail all other questions to cme@jbjs.org.

ANSWER KEY

Black out the correct answers

- | | | |
|---------------|---------------|-----------------------------------|
| 1. A B C D E | 18. A B C D E | 35. A B C D E |
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| 10. A B C D E | 27. A B C D E | 44. A B C D E |
| 11. A B C D E | 28. A B C D E | 45. A B C D E |
| 12. A B C D E | 29. A B C D E | 46. A B C D E |
| 13. A B C D E | 30. A B C D E | 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 E | 49. A B C D E |
| 16. A B C D E | 33. A B C D E | 50. A B C D E |
| 17. A B C D E | 34. A B C D E | CME Credits Claimed* _____ |

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