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THE JOURNAL OF BONE & JOINT SURGERY

CONTINUING MEDICAL EDUCATION

CME

REVIEW QUESTIONS

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APRIL, MAY, JUNE  
2007

THIS CME EXAM IS ALSO AVAILABLE AT JBJS.ORG AS AN INTERACTIVE ONLINE EXAM.  
CREDITS EARNED BY COMPLETING AND SUBMITTING THIS EXAM ONLINE CAN BE  
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THE DEADLINE TO SUBMIT YOUR ANSWERS FOR GRADING THIS SET OF QUESTIONS IS SEPTEMBER 15, 2007.

## 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 April, May, and June issues of the 2007 American volume of *The Journal of Bone and Joint Surgery* (Vol. 89-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. Upon successful completion of the examination, you may claim up to ten category-I CME credits. 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. 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 \$45 per quarter, or \$165 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 September 15, 2007.**

1. **Which of the following statements regarding pinning technique for completely displaced extension supracondylar humeral fractures in children is correct?**
  - A. two lateral-entry pins have greater torsional rigidity than medial and lateral entry pins in synthetic pediatric bone models
  - B. the risk of iatrogenic ulnar nerve injury with use of medial and lateral-entry pins has been found to be higher than that with use of lateral-entry pins in most studies
  - C. the risk of iatrogenic ulnar nerve injury can be reduced by placing the medial pin without a skin incision with the elbow in hyperflexion
  - D. the torsional rigidity of lateral-entry pinning constructs is not increased with the addition of a third pin
  - E. the optimal lateral-entry pinning construct is two closely spaced parallel pins, both within the lateral column of the distal part of the humerus
2. **Revision of early-generation resurfacing devices frequently proved to be difficult because:**
  - A. malalignment of components was common
  - B. patients with failed components often were elderly with multiple medical comorbidities
  - C. acetabular bone loss was often extensive as a result of cement fixation of the acetabular component combined with frequently extensive osteolysis from the large-diameter metal-against-polyethylene bearing couple
  - D. extraction of the femoral component was often technically challenging
  - E. limb-length inequality was often unavoidable because the failed resurfacing device frequently altered the level of the usual femoral neck osteotomy for placement of the stemmed prosthesis
3. **The largest structure over the posterior aspect of the knee is the:**
  - A. fabellofibular ligament
  - B. plantaris muscle
  - C. oblique popliteal ligament
  - D. anterior arm of the semimembranosus tendon
  - E. distal expansion of the semimembranosus tendon
4. **The Osteoporosis Self-Assessment Screening Tool (OST score) is based on:**
  - A. dual-energy x-ray absorptiometry measurement
  - B. risk-assessment questionnaire
  - C. height and weight ratio
  - D. age and weight of the patient
  - E. history of a low-energy fracture
5. **Antimicrobial coating of orthopaedic devices has the potential of preventing infection. Which of the following mechanisms explains the efficacy of antimicrobial-coated devices?**
  - A. achievement of therapeutic systemic levels of the coating antimicrobial agents
  - B. enhancement of host immune defense
  - C. inhibition of bacterial adherence to the device

- D. prevention of infection at sites distant from the implanted device
- E. allowance of organisms with low virulence to compete with virulent pathogens
- 6. Which of the following statements concerning the risk of injuries to the superior gluteal nerve and gluteus medius muscle during closed ante-grade insertion of a femoral nail through the piriformis fossa is most correct?**
- A. use of tissue protectors may totally eliminate the risk of gluteal muscle injury
- B. there is no risk of injury to the superior gluteal nerve when dissection is done carefully
- C. reamers cause more damage to the gluteal medius muscle in higher degrees of hip flexion and adduction
- D. increasing the angle of hip flexion and adduction decreases the risk of injury to the superior gluteal nerve and gluteus medius muscle
- E. positioning the patient supine on the fracture table allows higher degrees of hip flexion and adduction than are possible in the lateral decubitus position and therefore is associated with a lower risk
- 7. The most common cause of eumycotic mycetoma affecting the foot is:**
- A. *Exophiala jeanselmei*
- B. *Maduraella mycetomatis*
- C. *Aspergillus* species
- D. *Acremonium* species
- E. *Fusarium* species
- 8. The approximate overall complication rate associated with the use of a total-contact cast in the treatment of diabetic neuropathic ulcers is:**
- A. 1%
- B. 5%
- C. 10%
- D. 15%
- E. 20%
- 9. An orthopaedic surgeon who owns a large amount of stock in an orthopaedic device company is asked by the firm to conduct a clinical trial of a novel prosthesis. Which of the following would be considered unethical:**
- A. disclosing the conflict when seeking approval from his or her institutional review board
- B. accepting funding from the company in support of the research
- C. allowing the company to assume responsibility for analyzing and writing up the data
- D. prospectively registering the study at [www.clinicaltrials.org](http://www.clinicaltrials.org)
- E. disclosing the conflict when submitting the manuscript to a journal for publication
- 10. Stage-3 or 4 fatty infiltration of the teres minor muscle in patients who undergo reverse shoulder arthroplasty results in:**
- A. significantly greater passive external rotation of the shoulder at 0° of abduction
- B. a significantly lower subjective shoulder value and Constant score at the time of final follow-up
- C. a significantly lower subjective shoulder value but a higher Constant score at the time of final follow-up
- D. the inability to actively elevate the shoulder in the scapular plane
- E. a higher postoperative complication rate
- 11. In a study comparing the integrity of an arthroscopic double-row rotator cuff repair with the functional outcome:**
- A. no correlation was observed between shoulders with a defect and intact shoulders in terms of function
- B. most of the shoulders with a defect were functionally deteriorated compared with intact shoulders
- C. shoulders with a large defect were functionally equivalent to those with a small defect
- D. shoulders with a large defect were functionally equivalent to intact shoulders
- E. shoulders with a small defect were functionally equivalent to intact shoulders
- 12. The presence of positive outcome bias within the published literature will lead to:**
- A. overestimation of the size of treatment effects in meta-analyses
- B. an increase in the percentage of negative findings in the published literature
- C. inappropriate relationships between industry and research groups
- D. preference for negative studies in peer review
- E. a decrease in the number of manuscripts accepted by the peer-review process
- 13. What is the mechanism by which intermittent pneumatic compression of the calf achieves protection against deep vein thrombosis?**
- A. antismelling effect
- B. muscle training effect
- C. massaging apparatus
- D. increase of the venous flow
- E. inhibition of platelets
- 14. A seventy-six-year-old man has aseptic loosening of a right total hip replacement and undergoes revision surgery. Tissues from around the failed implant were sent for pathological examination. Which of the following cell types is responsible for initiating the inflammatory response to wear debris?**
- A. osteoclasts and T-cells
- B. macrophages
- C. B-cells
- D. sheets of fibroblasts
- E. osteoblasts
- 15. The abductor lurch common to transfemoral amputees is due to:**
- A. inadequate physical therapy
- B. inadequate stump wrapping
- C. inability to achieve ischial weight-bearing

- D. disengagement of the adductor magnus muscle function  
E. inadequate soft-tissue envelope
- 16. For individual patients, the impact of preoperative psychological distress on the pain or function outcome up to two years following total knee replacement can best be characterized as:**
- A. not clinically important  
B. moderately clinically important  
C. dramatically important  
D. clinically important for the first year but not after the first year  
E. prognostic of an ultimately poor result
- 17. Which of the following combinations of factors has been shown to be the most important in classifying an osteochondritis dissecans lesion of the humeral capitellum as stable or unstable?**
- A. age and radiographic grade  
B. sport played and open capitellar growth plate  
C. sport played and range of elbow motion  
D. range of elbow motion and radiographic grade  
E. age and open capitellar growth plate
- 18. Compared with patients with a failure of an arthroscopic rotator cuff repair, patients with an intact repair have:**
- A. less pain  
B. less pain and better strength  
C. better strength and a better range of motion  
D. less pain and a better range of motion  
E. no clinical difference
- 19. In patients with Blount disease, which of the following risk factors correlates most strongly with the severity of varus malalignment of the tibia?**
- A. female gender  
B. bilateral involvement  
C. black race  
D. body-mass index of >40  
E. adolescence
- 20. What is the main advantage of using polymerase chain reaction and reverse line blot hybridization rather than routine culture for identifying orthopaedic infections?**
- A. there is less chance of a false-positive result  
B. it is a quick test that can be done during surgery  
C. it is cheap because the same protocol is used for all bacteria  
D. the potential to detect low-grade infections with fastidious bacteria  
E. fewer bacteria are needed for a positive result because the test is more sensitive
- 21. Which of the following conditions is a predictor for the development of chronic pain following orthopaedic surgery?**
- A. utilization of a preventive multimodal analgesic regimen  
B. severe unrelieved acute postoperative pain  
C. utilization of regional anesthesia and analgesia techniques  
D. the combination of regional analgesia and multimodal oral adjuvants such as nonsteroidal anti-inflammatory drugs, gabapentin, and ketamine  
E. optimal pain control preoperatively and postoperatively
- 22. The term "myelopathy hand" typically includes all of the following symptoms except:**
- A. loss of dexterity  
B. radiating pain in the palm  
C. finger escape sign  
D. intrinsic muscle wasting  
E. tardy grasp-and-release of the fist
- 23. Which of the following factors was found to be most important in decreasing the quality of the result following arthroscopic biceps tenotomy or tenodesis for the treatment of an irreparable rotator cuff tear?**
- A. size of the tear  
B. location of the tear  
C. shape of the tear  
D. age of the patient  
E. absence or atrophy of the teres minor
- 24. Accurate forecast of future demands for hip and knee arthroplasty is critical for policy decisions and surgeon training. Which factor was least important in these forecasting models:**
- A. use of a flexible rate of surgery  
B. availability of historical records of surgery  
C. accurate data on the future growth of the population  
D. inclusion of subpopulation demographic breakdown  
E. inclusion of type of payer (e.g., Medicare, private insurance)
- 25. Which of the following factors would improve the cost-effectiveness of low-molecular-weight heparin relative to no additional prophylaxis?**
- A. an increase in the price of low-molecular-weight heparin  
B. an increase in the price of home care  
C. an increase in the risk of bleeding with low-molecular-weight heparin  
D. a decrease in the risk of death following pulmonary embolism  
E. an increase in the baseline rate of symptomatic venous thromboembolism
- 26. A fifty-five-year-old woman presents with persistent pain localized to the left knee joint two years after a total knee arthroplasty. She reports episodes of knee swelling but no fever or chills. On physical examination, the left knee is slightly larger than the right knee, with 0° to 100° of extension-flexion. There is no instability, but she has pain with palpation and with a range of motion. Laboratory tests reveal a white blood-cell count of  $6.25 \times 10^9/L$ , an erythrocyte sedimentation rate of 55 mm/hr, and a C-reactive protein level of 2.8 mg/L**

**(normal, <0.8 mg/L). Synovial fluid aspirated from the left knee is straw-colored with a white blood-cell count of  $16.9 \times 10^9/L$  (normal, < $0.2 \times 10^9/L$ ); 99% of the cells were segmented, and 1% were monocytes. No bacteria are seen on Gram stain, and there is no growth of bacteria on culture. Radiographs of the left knee showed prominent lucency at the bone-cement interface along the tibial and patellar prostheses. The treatment should include:**

- A. open débridement, replacement of the polyethylene insert, retention of the prosthesis, and intravenous antibiotics for six weeks
- B. referral of the patient to a pain clinic for pain management
- C. removal of all prosthetic components, débridement, placement of an antibiotic-impregnated cement spacer, a course of intravenous antibiotics, and delayed arthroplasty
- D. open débridement, replacement of the polyethylene insert, retention of the prosthesis if there is no loosening of the implants, followed by a course of intravenous antibiotics
- E. one-stage exchange arthroplasty and a course of intravenous antibiotics

**27. For a patient presenting with a limb-threatening type-III open tibial diaphyseal fracture, which of the following management options was associated with the worst functional outcome?**

- A. amputation
- B. limb salvage with simple wound coverage (delayed primary wound closure or split-thickness skin-grafting) and external fixation
- C. limb salvage with simple wound coverage (delayed primary wound closure or split-thickness skin grafting) and intramedullary nailing
- D. limb salvage with a muscle flap for wound coverage and external fixation
- E. limb salvage with a muscle flap for wound coverage and intramedullary nailing

**28. An orthopaedic surgery resident is called to assess a seven-year-old boy who has sustained a distal radial fracture as the result of a fall from the monkey bars. The fracture pattern is deemed appropriate for treatment with closed reduction with the patient under sedation. When a mini-c-arm fluoroscopy unit is used to assess the acceptability of reduction, which of the following would place the resident at greatest risk for unnecessary radiation exposure?**

- A. failure to limit total imaging time to less than five minutes
- B. orienting the fluoroscopic beam in an upright position relative to the patient
- C. setting exposure factors to the automatic mode
- D. failure to maintain a distance of at least 2 ft (0.6 m) from the direct path of the fluoroscopic beam
- E. inadvertent contact with the direct path of the fluoroscopy beam

**29. In a series of patients who presented with Enneking stage-IIIB dedifferentiated peripheral chondrosarcoma:**

- A. all died within one year after the time of diagnosis
- B. the one-year survival rate was 60%
- C. all died of disease at an average of twenty months after the time of diagnosis
- D. all had a poor response to the neoadjuvant chemotherapy
- E. the overall survival rate was better than that for patients with an Enneking stage-IIB lesion

**30. Which of the following substances found in periprosthetic tissue from patients with aseptic loosening has been shown to increase wear-particle-induced inflammation and osteolysis in cell culture and in mice models?**

- A. bone morphogenetic protein
- B. endotoxin
- C. osteoprotegerin
- D. hydroxyapatite
- E. osteocalcin

**31. In most individuals, the distal biceps tendon:**

- A. usually consists of two tendons that are bound with loose areolar tissue down to their insertion
- B. is one tendon
- C. inserts into the proximal part of the radius by means of the lacertus fibrosis
- D. has a bursa that communicates with the elbow joint
- E. inserts into the proximal part of the ulna

**32. The Cervical Spine Injury Severity Score:**

- A. classifies cervical spine injuries
- B. quantifies stability following injury
- C. includes skeletal and neurologic injury
- D. requires magnetic resonance imaging
- E. is related to the mechanism of injury

**33. The onset of postoperative ulnar neuropathy is most common after operative fixation of a fracture of which structure?**

- A. humeral diaphysis
- B. distal part of the humerus
- C. olecranon
- D. radial head
- E. coronoid process

**34. In a recent study, patients who benefitted the most from a small-incision total hip replacement were those who:**

- A. had multiple comorbidities
- B. were motivated to become independently functional with an active therapy program rather than undergo a passive recovery
- C. were most concerned with the cosmetic result
- D. were most concerned with reducing the length of the stay in the hospital
- E. were unaware that there is a difference in incision lengths

**35. Following a posterior wall fracture of the acetabulum, residual functional deficits as determined by the Musculoskeletal Function Assessment (MFA) questionnaire mainly involve:**

- A. the hip joint alone
- B. the hip joint and general mobility

- C. all indices except self-care and family relationships  
 D. all indices except hand and fine motor  
 E. all indices
- 36. Which of the following major complications had the highest odds ratio for occurring following simultaneous bilateral total knee arthroplasty, as compared with unilateral or staged bilateral total knee arthroplasty, in a meta-analysis?**
- A. deep venous thrombosis  
 B. a cardiac event  
 C. death  
 D. pulmonary embolism  
 E. periprosthetic infection
- 37. Multiple osteochondromas can occur at the distal part of the ulna and frequently cause forearm deformity (relative ulnar shortening, radial bowing, ulnar slip of the carpus, and radial head dislocation) in children. Which of the following treatments is most appropriate for the correction of a deformity consisting of relative ulnar shortening and a bowed radius without radial head dislocation caused by a large tumor at the distal part of the ulna in a five-year-old child?**
- A. tumor excision and ulnar lengthening  
 B. tumor excision and radial hemiepiphyodesis  
 C. tumor excision and radial osteotomy  
 D. tumor excision alone  
 E. tumor excision, ulnar lengthening, and radial hemiepiphyodesis
- 38. Regarding the anatomy of the brachialis muscle, which of the following statements is true?**
- A. the brachialis muscle has a deep head on the distal-lateral aspect of the humerus and a superficial head on the anterior aspect of the humerus  
 B. both heads of the brachialis muscle are supplied by the musculocutaneous nerve  
 C. the two heads of the brachialis muscle should not be split during the performance of a surgical exposure at the anterolateral aspect of the humerus as this may denervate the muscle  
 D. the deep head of the brachialis muscle inserts into the proximal part of the radius  
 E. there is no internervous plane between the two heads of the brachialis
- 39. In a retrieval study of polyethylene tibial components, which of the following was found NOT to be associated with loss of polyethylene thickness?**
- A. age of patient  
 B. shelf age of polyethylene  
 C. postoperative knee alignment  
 D. preoperative knee alignment  
 E. sterilization of the polyethylene in air with gamma irradiation
- 40. Which of the following techniques may be advantageous for patients with a history of complex regional pain syndrome who require orthopaedic surgery?**
- A. administration of general anesthesia supplemented with intraoperative opioids  
 B. use of intravenous regional anesthesia with lidocaine  
 C. use of a regional nerve block that provides for a perioperative sympathectomy  
 D. use of a surgical technique that may increase the risk of nerve damage  
 E. preemptive administration of a celiac plexus block
- 41. A patient complaining of difficulty with walking and fine motor skills is found to have a spastic gait, global hyperreflexia, and a positive Hoffmann sign bilaterally. Which of the following intramedullary signal changes on magnetic resonance imaging correlates with the most severe histopathologic findings?**
- A. low signal intensity on T1-weighted images and normal signal intensity on T2-weighted images  
 B. low signal intensity on T1-weighted images and high signal intensity on T2-weighted images  
 C. normal signal intensity on T1-weighted images and high signal intensity on T2-weighted images  
 D. high signal intensity on T1-weighted images and low signal intensity on T2-weighted images  
 E. high signal intensity on T1-weighted images and high signal intensity on T2-weighted images
- 42. The most important step for avoiding postoperative loss of fixation following percutaneous pinning of supracondylar humeral fractures in children is:**
- A. use of two lateral pins  
 B. use of a medial pin  
 C. postoperative cast immobilization with the elbow in 90° of flexion  
 D. careful performance of an intraoperative stability test after pinning  
 E. use of pins of at least 0.062 in (1.57 mm) in diameter
- 43. The lateral attachments of the oblique popliteal ligament are to the:**
- A. fabella and posterior aspect of lateral femoral condyle  
 B. fabella and tibia at the lateral aspect of posterior cruciate ligament facet  
 C. plantaris muscle and popliteofibular ligament  
 D. lateral gastrocnemius tendon and fabellofibular ligament  
 E. lateral femoral condylar and fibular styloid
- 44. Which statement best characterizes the cost-effectiveness of extending prophylaxis with low-molecular-weight heparin for four weeks beyond hospital discharge following total hip arthroplasty in patients who have received in-hospital prophylaxis?**
- A. the regimen provides a clear clinical and economic benefit, saves lives, and reduces overall costs  
 B. the regimen provides a probable benefit, modestly reduces the number of lives lost, and results in a minimal increase in cost

- C. the regimen provides a debatable benefit, modestly reduces the number of lives lost, and results in a considerable increase in cost
- D. the regimen provides no benefit or reduction in the number of lives lost and considerably increases cost
- E. the regimen is harmful, increases adverse outcomes, and considerably increases cost
- 45. Which of the following factors is least likely to influence the infection rate associated with open fractures?**
- A. patient comorbidities
- B. administration of antibiotics
- C. thorough débridement
- D. type of wound closure
- E. severity of injury as assessed with the Gustilo-Anderson classification
- 46. Which of the following factors explains why local antibiotics were more effective than systemic antibiotics for prophylaxis against surgical wound infection in a rat model?**
- A. a lower dose achieved equivalent results in terms of arresting infection
- B. local antibiotics result in lower systemic levels and a higher concentration of antibiotics in the wound cavity
- C. calcium sulfate alone seems to have some antibiotic properties
- D. local bacitracin seems to be as effective as systemic gentamicin for infection prophylaxis
- E. local antibiotics lead to higher systemic levels, creating the increased threat of side effects
- 47. Lateral bending of the cervical spine produces coupled axial rotation movements. Which levels respond with the greatest axial rotations under lateral bending?**
- A. cephalad levels (occiput-C2)
- B. C2-C3
- C. middle levels (C3-C5)
- D. most caudad levels (C6-T1)
- 48. The likely benefit of bone-bridging (the Ertl procedure) in transtibial amputation is:**
- A. it enables end-bearing (direct load transfer)
- B. it compensates for a poor soft-tissue envelope
- C. it creates an enlarged surface area for weight-bearing (load transfer)
- D. it closes the marrow cavity (Ertl effect)
- E. it stabilizes the soft-tissue envelope
- 49. The pathogenesis of toxic shock syndrome is:**
- A. bacterial production of endotoxin
- B. acute traumatic injury
- C. coagulopathy
- D. soft-tissue necrosis
- E. renal dysfunction
- 50. The greatest vascular insult during a surgical hallux valgus repair occurs during the performance of the:**
- A. reduction of the hallux valgus angle
- B. medial capsulotomy
- C. lateral release
- D. adductor tenotomy
- E. distal metatarsal osteotomy
- 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 July 2007 CME Review Questions meet these educational objectives\*:

1. Provide a broad-based review and update specifically in the areas of foot and ankle and tumor surgery and pediatric orthopaedics?  Yes  No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of pediatrics, tumors, and foot and ankle surgery?  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 September 15, 2007.

**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 |
| 2. A B C D E  | 19. A B C D E | 36. A B C D E |
| 3. A B C D E  | 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 |
| 5. A B C D E  | 22. A B C D E | 39. A B C D E |
| 6. A B C D E  | 23. A B C D E | 40. A B C D E |
| 7. A B C D E  | 24. A B C D E | 41. A B C D E |
| 8. A B C D E  | 25. A B C D E | 42. A B C D E |
| 9. A B C D E  | 26. A B C D E | 43. A B C D E |
| 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   |
| 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 |               |

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