
The Journal of Bone & Joint Surgery
Continuing Medical Education

CME

Review Questions

October, November, December
2001

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 83-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 \$25 per quarter, or \$95 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 will be April 15, 2002.**

1. **Bulk autologous femoral head bone grafts used in association with uncemented sockets for reconstruction in patients with developmental hip dysplasia were associated with:**
 - A. a high rate of infection at the site of the prosthetic hip
 - B. good acetabular component fixation and good clinical results in the majority of patients
 - C. complete bone graft resorption in most cases
 - D. a high rate of dislocation of the prosthetic hip
 - E. difficulty in obtaining good acute fixation of the acetabular component but good outcomes in patients in whom good fixation was obtained
2. **During percutaneous pinning of the proximal part of the humerus, which of the following is advised during insertion of the greater tuberosity pins to minimize the risk of iatrogenic injury to the axillary nerve and the posterior humeral circumflex artery?**
 - A. internal rotation of the shoulder and pin penetration to a point along the medial aspect of the humeral shaft ≥ 20 mm from the inferior extent of the humeral head
 - B. internal rotation of the shoulder and pin penetration to a point along the medial aspect of the humeral shaft < 20 mm from the inferior extent of the humeral head
 - C. external rotation of the shoulder and pin penetration to a point along the medial aspect of the humeral shaft ≥ 20 mm from the inferior extent of the humeral head
 - D. external rotation of the shoulder and pin penetration to a point along the medial aspect of the humeral shaft < 20 mm from the inferior extent of the humeral head
 - E. neutral rotation of the shoulder and avoidance of pin penetration of the medial aspect of the humeral shaft
3. **Which of the following features is more suggestive of streptococcal necrotizing myositis than pyomyositis?**
 - A. a high fever of 41°C
 - B. neutropenia
 - C. early and rapid development of severe pain and tenderness
 - D. subcutaneous gas seen on plain radiographs
 - E. necrosis of overlying skin
4. **Kernicterus in newborn or premature infants treated with sulfonamides is due to:**
 - A. enhanced synthesis of bilirubin
 - B. displacement of bonded bilirubin from albumin
 - C. inhibition of bilirubin degradation
 - D. inhibition of urinary excretion of bilirubin
 - E. inflammation of the bile duct
5. **Which of the following statements most accurately describes the current status of the**

- treatment of idiopathic stiffness following total knee arthroplasty?**
- a combined program of aggressive active and passive motion is superior to surgery
 - inflation of the knee joint with saline solution containing steroids and manipulation of the knee under anesthesia is superior to other methods
 - isolated tibial insert exchange and arthrolysis provides the only reliable results
 - complete revision of the prosthesis is necessary
 - there is no reliable nonoperative or surgical method currently available to treat this difficult problem
- 6. Which of these malignant tumors is associated with the best overall survival rate?**
- dedifferentiated chondrosarcoma
 - primary chondrosarcoma
 - Ewing sarcoma
 - classic osteosarcoma
 - parosteal osteosarcoma
- 7. A new helpful test for diagnosis of tarsal tunnel syndrome involving physical examination of the ankle and foot has been described. The symptoms of tarsal tunnel syndrome are intensified by:**
- plantar flexion-inversion of the foot and ankle combined with plantar flexion of the toes
 - dorsiflexion-eversion of the foot and ankle combined with dorsiflexion of the toes
 - dorsiflexion-inversion of the foot and ankle combined with dorsiflexion of the toes
 - plantar flexion-eversion of the foot and ankle with neutral position of the toes
 - neutral position of the hindfoot with eversion of the forefoot and dorsiflexion of the toes
- 8. The volume of total hip replacements performed annually by the hospital and by the surgeon may influence the outcome of total hip replacement surgery. Which of the following statements correctly describes the association between hospital and surgeon volume and dislocation within ninety days after elective primary total hip replacement in the Medicare population?**
- hospitals and surgeons who perform a LOWER volume of total hip replacements each year have LOWER dislocation rates
 - hospitals and surgeons who perform a HIGHER volume of total hip replacements each year have LOWER dislocation rates
 - hospitals that perform a HIGHER volume of total hip replacements each year have LOWER dislocation rates; surgeon volume does not influence dislocation following primary elective total hip replacement
 - Surgeons who perform a HIGHER volume of total hip replacements each year have LOWER dislocation rates; hospital volume does not influence dislocation following primary elective total hip replacement
 - whether the surgeon is fellowship-trained is the most important variable in determining the complication rate following total hip replacement
- 9. Radiography of the wrist in a thirty-year-old man reveals an incidental osteolytic lesion within the capitate. Which of the following conditions is the least likely cause?**
- avascular necrosis
 - nonunion with a cyst
 - malignant tumor
 - simple bone cyst
 - another benign bone tumor
- 10. When a treatment outcome is poor, the response of the physician providing a second opinion to the patient should be:**
- "I think this was malpractice"
 - "The outcome does not look good, but I will look into the situation"
 - "Everything looks fine"
 - "I can't believe this is how they treated you"
 - "Your body has an allergy to the implant and has rejected it"
- 11. Ossification of the posterior longitudinal ligament can cause compressive myelopathy requiring treatment with *en bloc* cervical laminoplasty. Postoperative progressive ossification is the most likely long-term outcome in which group of patients?**
- young patients with mixed or continuous ossification
 - young patients with segmental ossification
 - older patients with mixed or continuous ossification
 - older patients with segmental ossification
 - patients who already had end-stage upper neuron disease associated with continuous ossification
- 12. Bone osteolysis about the prosthetic components is the primary process leading to premature failure of total hip arthroplasty. Second-generation cementless arthroplasty has minimized this problem by:**
- redesign of the acetabular component to incorporate a collar that limits migration of small particles
 - use of new high-density polyethylenes for the acetabular bearing
 - use of circumferential ingrowth surfaces on the proximal portion of the femoral prosthesis
 - redesign of the distal part of the femoral stem
 - use of more precise broaches to produce a precision fit of the components

- 13. For clinical research involving measurements of the symptoms and disabilities of athletic patients with disorders of the knee, the Activities of Daily Living scale is:**
- reliable, but not valid or responsive
 - valid, but not reliable or responsive
 - reliable and valid, but not responsive
 - valid and responsive, but not reliable
 - reliable, valid, and responsive
- 14. Which of the following penicillins is resistant to penicillinase:**
- ampicillin
 - methicillin
 - carbenicillin
 - ticarcillin
 - benzathine penicillin G
- 15. Which statement best describes the comparison of the subjective outcome following arthrodesis with that following ligament reconstruction and tendon interposition for the treatment of thumb carpometacarpal osteoarthritis?**
- results of ligament reconstruction and tendon interposition are superior to those of arthrodesis with regard to pain, function, and overall satisfaction
 - results of arthrodesis are superior to those of ligament reconstruction and tendon interposition with regard to pain, function, and overall satisfaction
 - results of arthrodesis are similar to those of ligament reconstruction and tendon interposition with regard to pain, function, and overall satisfaction
 - while ligament reconstruction and tendon interposition is superior to arthrodesis with regard to pain relief, arthrodesis is superior with regard to functional improvement
 - while ligament reconstruction and tendon interposition is superior to arthrodesis with regard to pain relief and functional improvement, the two procedures are equal with regard to overall patient satisfaction
- 16. Aneurysmal bone cysts larger than 5 cm that exhibit large areas of destruction and threaten the integrity of the acetabulum or sacroiliac joint are best managed by:**
- intralesional curettage
 - selective arterial embolization
 - preoperative arterial embolization, excision-curettage, and bone-grafting
 - radiation therapy
 - preoperative radiation followed by intralesional curettage
- 17. Comparison of the long-term results of ceramic-on-polyethylene bearing surfaces with those of metal-on-polyethylene bearing surfaces in total hip arthroplasty has shown that ceramic-on-polyethylene has:**
- increased loosening rates
 - increased osteolysis rates
 - increased revision rates
 - decreased wear rates
 - decreased survival rates
- 18. Which of the following statements regarding the risk of postoperative dislocation of a type-3 Kudo unlinked total elbow prosthesis is most correct?**
- complete transection of the ulnar collateral ligament substantially increases the risk
 - complete transection of the radial collateral ligament substantially increases the risk
 - excision of the radial head substantially increases the risk
 - preservation of the coronoid process is essential to prevent dislocation
 - none of the above factors play a significant role in postoperative instability
- 19. Type-II (beta) errors in the analysis of a randomized prospective clinical trial are best described by the following statement:**
- the probability of concluding that there is no difference between two study groups when a difference actually exists (i.e., a false-negative finding)
 - the probability of concluding that there is a difference between two study groups when no difference actually exists (i.e., a false-positive finding)
 - the probability of concluding that there is a difference between two study groups when a difference actually exists
 - the probability of concluding that there is no difference between two study groups when no difference actually exists
 - the probability of detection bias being introduced into the study
- 20. Which of the following clinical and laboratory findings is not a manifestation of Noonan syndrome?**
- chromosomal abnormality
 - cubitus valgus
 - webbing of the neck
 - thoracic scoliosis and lordosis
 - malignant hyperthermia
- 21. A six-year-old boy with sickle-cell anemia has a two-day history of pain over the middle of the right tibia with no history of trauma. The most useful study to help differentiate between bone infarction and acute osteomyelitis is:**
- erythrocyte sedimentation rate
 - plain radiography
 - computerized tomography

- D. sequential radionuclide bone-marrow and bone scans
E. magnetic resonance imaging
- 22. Pathogens in musculoskeletal infection that are often resistant to multiple different antimicrobial agents include all of the following except:**
- A. *Staphylococcus aureus*
B. *Staphylococcus epidermidis*
C. enterococci
D. *Pseudomonas aeruginosa*
E. Group-A streptococci
- 23. Following revision total hip arthroplasty, which acetabular construct is the most durable after ten years of follow-up?**
- A. cemented all-polyethylene component
B. cemented metal-backed component
C. acetabular cage reconstruction
D. cementless component
E. cemented constrained component
- 24. In the selection of patients for treatment of chronic leg and/or foot pain with transtibial amputation, which of the following are important to optimize the outcome:**
- A. an anatomically discrete cause of pain
B. pain for less than five years
C. a patient who has exhausted all surgical means of treatment
D. a patient who has exhausted all medical means of treatment
E. a patient who has been adequately assessed both mentally and emotionally
- 25. Aneurysmal bone cysts adjacent to the acetabulum require early surgical intervention primarily to prevent:**
- A. avascular necrosis of the femoral head
B. early degenerative hip disease
C. extension to the intrapelvic neurovascular structures
D. medial migration of the femoral head due to pathological fracture of the acetabulum
E. intraoperative bleeding
- 26. In a prospective randomized trial comparing postoperative radiation with a six-week course of indomethacin to prevent heterotopic ossification following surgical treatment of acetabular fractures, indomethacin was found to be:**
- A. equally effective but it had a much higher incidence of complications
B. less effective
C. more effective
D. equally effective with no complications
E. more effective and much less expensive
- 27. Situations in which the use of vancomycin is believed to be appropriate or acceptable by the Centers for Disease Control include all of the following except:**
- A. treatment of serious infection due to beta-lactam-resistant gram-positive organisms
B. treatment of infection due to gram-positive microorganisms in patients who have a serious allergy to beta-lactam antimicrobials
C. treatment of infection due to methicillin-sensitive *Staphylococcus aureus* in patients with renal failure when the decision is based on dosing convenience
D. life-threatening *Clostridium difficile* colitis
E. prophylaxis as recommended by the American Heart Association for endocarditis for certain procedures in patients at high risk for endocarditis
- 28. In adults with a painful bunion, a chevron osteotomy, exostectomy, and adductor release:**
- A. does not improve function as well as treatment with a functional foot orthosis
B. can decrease pain but cannot improve function better than treatment by "watchful waiting"
C. can improve function but cannot decrease pain better than treatment by "watchful waiting"
D. improves function and decreases pain better than does the use of functional foot orthoses
E. is less beneficial in terms of pain relief than is treatment with a functional foot orthosis
- 29. Which of the following factors is associated with an increased risk of mortality within thirty days after elective total hip arthroplasty?**
- A. osteoarthritis as the reason for the arthroplasty
B. revision surgery
C. male gender
D. female gender
E. cemented acetabular component
- 30. Compared with a control patient, a patient who has had a successful pregnancy after a total hip arthroplasty will likely have which of the following?**
- A. greater risk of infection
B. greater risk of loosening
C. greater risk of dislocation
D. greater range of motion of the hip
E. greater risk of thromboembolism
- 31. Compared with hand-packing techniques, contemporary cementing techniques for implantation of the femoral component in a total hip arthroplasty should provide:**
- A. more predictable filling of the femoral canal with cement
B. fewer air bubbles in cement
C. better centralization of the prosthesis

- D. fewer femoral component fractures
- 32. Modular tibial trays are a standard part of most contemporary total knee implant systems and are widely used in both primary and revision total knee arthroplasty. Which of the following statements about modular tibial trays is true:**
- modular tibial trays limit a surgeon's intra-operative flexibility in the choice of final polyethylene thickness
 - polyethylene wear debris from the nonarticular surface of modular tibial trays can be the cause of marked tibial osteolysis
 - well-fixed modular tibial trays must be removed at the time of revision total knee arthroplasty
 - modular tibial trays coupled with thin tibial polyethylene inserts have uniformly low rates of wear
 - modular tibial trays inserted with bone cement are immune from problems with osteolysis
- 33. Which of the following preoperative conditions is most likely to adversely influence the outcome of hemiarthroplasty for the treatment of glenohumeral arthritis associated with severe rotator cuff disease?**
- previous anterior acromioplasty
 - previous rotator cuff repair
 - greater extent of rotator cuff tear
 - greater extent of humeral head collapse
 - greater extent of glenoid erosion
- 34. Ossification of the posterior longitudinal ligament of the spine is a disease that may cause severe myelopathy due to progression of the ossification. Which of the following factors has been shown to have a significant association with the severity of ossification?**
- rheumatoid arthritis
 - osteoporosis
 - serum calcium level
 - severity of glucose intolerance
 - insulin secretory response
- 35. During a surgical approach to the lateral aspect of the elbow, what portion of the lateral collateral ligament can be sectioned without inducing posterolateral rotatory instability (provided the annular ligament is intact)?**
- only the anterior half
 - only the posterior half
 - either the anterior or the posterior half
 - the entire ligament
- 36. Multiagent chemotherapy has greatly improved the survival associated with most malignant bone tumors. For which of the following tumors is this not true?**
- classic osteosarcoma
 - Ewing sarcoma
 - primary chondrosarcoma
 - telangiectatic osteosarcoma
- 37. Type-II (beta) errors in comparative clinical studies typically reflect which of the following?**
- a narrow 95% confidence interval
 - an excessive sample size
 - an insufficient sample size
 - an erroneous false-positive study conclusion
 - inappropriate criteria for randomization
- 38. The most distinctive clinical feature of dominant endosteal hyperostosis is:**
- multiple fractures
 - deformity of long bones
 - muscle weakness
 - cranial nerve palsy
 - elongation of the mandible
- 39. Recurrent dislocation following total hip arthroplasty can be difficult to manage. Some authors have advocated revision to a bipolar prosthesis to address this complication. The most frequent problem with this technique has been reported to be:**
- recurrent dislocation
 - infection
 - protrusio acetabuli
 - poor clinical hip rating and pain
 - excessive wear of the bipolar component
- 40. What is the greatest limitation of the use of recombinant adenovirus-mediated gene therapy for the treatment of osteolysis?**
- wild-type adenovirus can be generated and causes infectious disease
 - liver toxicity
 - a dominant host immune response to the vector exacerbates osteolysis and eliminates target gene expression in two weeks
 - a young healthy volunteer was killed by recombinant adenovirus in a clinical trial
 - recombinant adenoviruses infect osteoblasts and inhibit osteogenesis
- 41. When compared with no treatment, one daily subcutaneous injection of reviparin after knee arthroscopy results in:**
- an increased incidence of leg thrombi
 - an increased incidence of pulmonary emboli
 - no change in the incidence of deep venous thrombosis
 - fewer pulmonary emboli
 - a marked increase in bleeding complications
- 42. An eighty-one-year-old man with Paget disease of the pelvis and precarious health undergoes total hip arthroplasty. During removal of the trial femoral head, it becomes dislodged and shifts into a retroperitoneal posi-**

- tion that is inaccessible through the hip wound. There is no evidence of neurovascular, gastrointestinal, or genitourinary compromise. The most appropriate action is to:**
- call for a general surgeon to perform an immediate laparotomy to remove the trial head
 - close the hip and postoperatively notify your liability insurance carrier
 - plan to leave the component in place but later discuss its removal with the patient
 - obtain a surgery consultation postoperatively in order to schedule a delayed endoscopic removal
 - consult with the manufacturer to determine the material composition of the component and then test for allergies to its composite materials. Plan to remove it if the patient is allergic to it
- 43. Frozen shoulders in three different groups of patients (idiopathic, following a fracture, or after surgery) were treated with arthroscopic capsular release. Compared with the other two groups, the patients in whom the frozen shoulder followed surgery had an equivalent outcome for:**
- pain relief
 - patient satisfaction
 - functional activity
 - range of motion
 - shoulder score
- 44. In the treatment of low-back pain, external spinal skeletal fixation:**
- provides permanent relief of pain
 - has no significant complications
 - may provide short-term pain relief while *in situ*
 - allows effective selection of patient candidates for fusion surgery
 - has no role in patient management
- 45. Loosening of the acetabular component of a total hip replacement can be diagnosed on the basis of radiolucent lines. The minimal thickness for diagnosis is:**
- 2-mm postoperative gap
 - 1-mm postoperative gap
 - 1-mm progressive radiolucent line in any zone more than two years postoperatively
 - 1-mm radiolucent lines in two zones at one year postoperatively
 - 2-mm radiolucent lines in three zones immediately postoperatively
- 46. Intramedullary nailing of a fracture of the femur in a patient with multiple injuries:**
- is contraindicated in the presence of a documented pulmonary injury
 - should be deferred for several days until the patient's condition has stabilized
 - can be performed antegrade, retrograde, with reaming, or without reaming, depending on the clinical situation
 - should be avoided if the fracture is open
 - leads to an increased incidence of thromboembolic complications
- 47. In the treatment of carpal scaphoid fractures, when compared with cast treatment, surgical repair with a Herbert screw:**
- is just as effective
 - decreases long-term pain
 - eventually leads to markedly increased grip strength
 - in the long-term results in a better range of motion of the wrist
 - results in a shorter period of sick leave
- 48. Multiple regression analysis is a statistical technique that measures:**
- an association between many dependent variables and a single independent variable
 - an association between many independent variables and a single independent variable
 - an association between dependent variables only
 - an association between independent variables only
 - an association between many independent variables and a single dependent variable
- 49. A bioplar radial head prosthesis:**
- can completely restore valgus stability of the elbow after radial head resection
 - significantly improves valgus stability in 80° of forearm pronation after radial head resection and release of the medial collateral ligament
 - typically provides an arc of motion between the prosthetic head and stem in excess of 105°
 - provides no significant advantage over a monoblock prosthesis with regard to elbow range of motion
 - Significantly improves valgus stability in 80° of forearm supination after radial head resection and release of the medial collateral ligament
- 50. Fibrin sealant has been shown to be a useful adjunct in many surgical procedures. The use of fibrin sealant in total knee arthroplasty results in:**
- an increased incidence of pulmonary embolism
 - more rapid mobility of the patient postoperatively
 - decreased bloody drainage
 - decreased postoperative pain
 - an increased incidence of wound infection
- 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 2002 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of orthopaedic trauma, hip surgery, and musculoskeletal rehabilitation? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of hip surgery and fracture care 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. Is this your own copy of *The Journal*?
 Yes No
2. Which of the following best describes your practice type?
 General orthopaedics
 General orthopaedics with subspecialty interest
 Exclusively subspecialty
 Resident or student
 Researcher
 Other: _____
3. 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	
4. Which is your number-one priority to read when you receive *The Journal* (American volume only) each month?

<input type="checkbox"/> Commercial advertising	<input type="checkbox"/> Current Concepts
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<input type="checkbox"/> Clinical scientific articles	<input type="checkbox"/> Basic scientific articles
<input type="checkbox"/> Orthopaedic Forum	<input type="checkbox"/> Instructional Course Lectures

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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.

QUESTIONS?

Please contact the CME Division of *The Journal of Bone and Joint Surgery* at 781 449 9780 x143.

ANSWER KEY

Black out the correct answers

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|---------------|---------------|---------------|
| 1. A B C D E | 18. A B C D E | 35. A B C D |
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| 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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