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THE JOURNAL OF BONE & JOINT SURGERY  
CONTINUING MEDICAL EDUCATION

CME

REVIEW QUESTIONS

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JANUARY, FEBRUARY, MARCH  
2003

## 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 January, February, and March issues of the American volume of *The Journal of Bone and Joint Surgery* (Volume 85-A, Numbers 1, 2, and 3). 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 is June 15, 2003.**

1. **A three-year-old child presents with a 65° thoracic curve due to congenital scoliosis with five fused ribs on the concave side. He is unable to keep up with his peer group in play activities. The respiratory rate is elevated above normal for his age. The fused hemithorax is small and stiff on physical examination. The next step in the evaluation of this child to better define the cause of the thoracic insufficiency syndrome is:**
  - A. lateral bending anteroposterior radiographs
  - B. standard pulmonary function studies
  - C. computed tomography scan of the chest
  - D. spiral tomography of the spine
  - E. pulse oximetry
2. **A fifty-seven-year-old man presents with knee pain. He denies having catching or locking symptoms. Radiographs reveal moderate joint-space narrowing and a few osteophytes. If magnetic resonance imaging is performed, what is the chance that a meniscal tear will be found?**
  - A. 20%
  - B. 40%
  - C. 60%
  - D. 90%
3. **What is the most important effect of pre-heating a femoral stem used for a total hip arthroplasty with cement?**
  - A. time of cement polymerization is increased
  - B. temperature of cement polymerization is increased
  - C. porosity at the stem-cement interface is decreased
  - D. fatigue strength of the cement-bone interface is increased
  - E. porosity at the cement-bone interface is decreased
4. **Which statement concerning autologous chondrocyte transplantation is true?**
  - A. autologous chondrocyte transplantation results in complete, mechanically stable resurfacing of the defect with a fibrous, hyaline-like tissue, which is tightly united with the surrounding cartilage
  - B. patients treated with autologous chondrocyte transplantation have a faster recovery of knee function than those treated with osteochondral transplantation
  - C. articular cartilage lesions of the patella are the preferred indication for autologous chondrocyte transplantation
  - D. neither autologous chondrocyte nor autologous osteochondral transplantation is limited by donor-site availability
  - E. autologous chondrocyte transplants cannot be discriminated from healthy cartilage arthroscopically after twenty-four months

- 5. During a hand surgeon's career, the chance of him or her performing wrong-site surgery is approximately:**
- 0.1%
  - 1%
  - 5%
  - 10%
  - 20%
- 6. Recovery from injury of the femoral nerve associated with a displaced acetabular fracture is most dependent on which of the following factors?**
- acetabular fracture type
  - timing of surgical nerve exploration
  - type of nerve injury (traumatic or iatrogenic)
  - time from nerve injury
  - timing of electrodiagnostic studies
- 7. When do most dislocations, deep wound infections, and pulmonary emboli occur in patients treated with primary or revision total hip replacement?**
- during the index hospitalization for the hip replacement
  - between discharge from the acute care hospital and four weeks postoperatively
  - from five to thirteen weeks postoperatively
  - from fourteen to twenty-five weeks postoperatively
  - the risk of these complications is essentially the same throughout the first six postoperative months
- 8. Following primary total hip arthroplasty, the risk of which of the following postoperative complications does NOT increase with age?**
- death
  - infection
  - pulmonary embolus
  - hip dislocation
  - readmission to the hospital because of a musculoskeletal complication
- 9. The mortality rate within ninety days following primary total knee arthroplasty is:**
- 0% to 0.5%
  - 0.6% to 0.9%
  - 1% to 2%
  - 2.1% to 2.9%
  - 3.0% to 3.9%
- 10. Which of the following factors is associated with a decreased likelihood of recurrence of infection after total hip arthroplasty in adult patients who had childhood infection of the hip?**
- normal erythrocyte sedimentation rate and elevated C-reactive protein level
  - positive intraoperative bacterial culture
  - more than ten white blood cells per high-power field on histological section
  - quiescent period of more than ten years between the infection and total hip arthroplasty
  - diabetes mellitus
- 11. The most common complication associated with treatment of distal humeral nonunion in the elderly with open reduction and internal fixation and extensile release of contracture is:**
- ulnar neuropathy
  - infection
  - heterotopic bone
  - progressive loss of range of motion
  - compartment syndrome in the forearm
- 12. After internal fixation of an ankle fracture, the postoperative treatment should be carried out with:**
- a cast, as the prevalence of nonunion is higher in patients who are treated functionally
  - a functional brace, as recovery of ankle function is faster than that associated with cast treatment
  - a cast or functional brace, as these two types of treatment have comparable long-term outcomes
  - a cast, as the long-term outcome after treatment with a functional brace is worse because of the higher prevalence of early postoperative complications
  - a functional brace, as functionally treated patients return to work after a shorter period of time than do those treated with cast
- 13. In the surgical treatment of nonunions of the distal part of the femur, the addition of allograft struts to open reduction and internal fixation provides:**
- additional support to host bone
  - cortical bone for screw purchase
  - an osteoinductive stimulus
  - rigid internal fixation
  - all of the above
- 14. If the posterior cruciate ligament is retained in total knee arthroplasty:**
- resurfacing of the patella is contraindicated
  - there is a higher prevalence of postoperative anterior knee pain
  - anterior knee pain is unlikely to be made worse
  - a metal-backed patellar component should be utilized
  - kneeling is more likely to be painful
- 15. Which of the following additional procedures is most commonly needed to perform total hip arthroplasty successfully in patients with diastrophic dysplasia?**
- shortening osteotomy of the femur
  - adduction tenotomy
  - flexor tenotomy

- D. autologous bone-grafting to the roof of the acetabulum
- E. autologous bone-grafting to the medial wall of the acetabulum
- 16. Isolated revision of the patellar component following total knee arthroplasty is:**
- A. associated with a high rate of complications and reoperations
- B. dependent on lateral retinacular release to succeed
- C. indicated for patellar subluxation and anterior knee pain following total knee arthroplasty
- D. successful in most cases regardless of the alignment of the other components of the total knee arthroplasty
- E. ideally performed with use of a cemented all-polyethylene patellar component
- 17. When selecting a rotating hinge total knee implant for a patient with global ligament instability and a severe flexion gap laxity, which of the following implant design features is most likely to provide a stable, dislocation-free reconstruction:**
- A. a long, minimally tapered central rotational stem
- B. a short, maximally tapered central rotational stem
- C. a long, maximally tapered central rotational stem
- D. linked axle bushings
- E. independent axle bushings
- 18. Which of the following factors is most predictive of subsequent failure of an all-polyethylene patellar component that has been retained during revision tibiofemoral arthroplasty?**
- A. the interval from the primary patellar implantation to the revision arthroplasty
- B. patellar component morphology
- C. manufacturer mismatch between the femoral component and the all-polyethylene patellar component
- D. oxidation of the patellar component
- E. geometrical mismatch between the patellar and femoral components
- 19. Which of the following is true concerning the outcome of total knee arthroplasty in patients with a prior fracture of the tibial plateau?**
- A. wedges or bone grafts to augment osseous deficiencies are needed in <5% of cases
- B. Knee Society scores improve to the same level as do scores for patients treated with total knee arthroplasty for primary osteoarthritis
- C. a reoperation, for any reason, is performed after the total knee arthroplasty in approximately one in five patients
- D. exposure during the total knee arthroplasty is routine, and extensile techniques are rarely needed
- E. patients generally achieve substantially improved flexion
- 20. What is the most common complication of the Lapidus procedure for correction of a hallux valgus deformity?**
- A. recurrent hallux valgus
- B. nonunion of the tarsometatarsal fusion
- C. hallux varus
- D. dorsalis pedis injury
- E. avascular necrosis of the first metatarsal head
- 21. The most important advantage of using calcium phosphate cement rather than impacted autograft for treating experimental intra-articular depression fractures is:**
- A. the cement is injectable
- B. the autograft is resorbed
- C. the cement maintains anatomic reduction
- D. the cement is removed by osteoclast-type cells
- E. the cement polymerizes at body temperature
- 22. A common etiology of fixed sagittal imbalance is:**
- A. a Harrington scoliosis fusion to L4
- B. a single-level lumbar fusion
- C. a two-level thoracic fusion
- D. a three-level thoracic laminectomy
- E. a two-level lumbar laminectomy
- 23. When an apparent fracture of the capitellum and trochlea turns out to be more complex than standard radiographs suggested, the following structure is also usually fractured or injured:**
- A. coronoid process of the ulna
- B. radial head
- C. medial epicondyle
- D. lateral epicondyle
- E. anterior band of the medial collateral ligament complex
- 24. Snyder Type-I SLAP lesions are highly associated with which of the following:**
- A. Bankart and Hill-Sachs lesions
- B. loose bodies and arthritis
- C. supraspinatus tears
- D. infraspinatus tears
- E. subscapularis tears
- 25. Compared with non-cross-linked acetabular liners sterilized with gas plasma, liners subjected to terminal sterilization with gamma radiation in air were found to have a reduction in the average in vivo wear rate at 5.2 years postoperatively of:**
- A. 0
- B. 1/5

- C. 1/3
- D. 1/2
- E. 3/4

**26. Which of the following factors most reliably predicts survival rates more than ten years after a tibial osteotomy for varus gonarthrosis?**

- A. stabilization of the tibia by means of a plate and screws
- B. a female patient more than sixty years of age at the time of surgery
- C. a male patient more than sixty years of age at the time of surgery
- D. obtaining a one-year postoperative valgus angle in the 8° to 16° range
- E. a patient who does not participate in athletics

**27. Which of the following factors is the most important in assessing the risk of secondary reconstructive surgery for the management of residual hip dysplasia after reduction of a dislocated hip?**

- A. previous use of a Pavlik harness
- B. side of dislocation
- C. use of prereduction traction
- D. age of the patient at reduction
- E. use of adductor tenotomy at reduction

**28. Which of the following factors is most likely to improve the clinical outcome of open reduction and internal fixation of an acute fracture of the scaphoid waist?**

- A. amount of compressive force generated by the fixation
- B. internal fixation with use of a Kirschner wire
- C. internal fixation with use of a noncannulated screw
- D. internal fixation with use of a cannulated screw
- E. location of the screw within the proximal scaphoid fragment

**29. Which of the following surgical approaches for performance of periacetabular osteotomy has been shown to increase the risk of prolonged abductor weakness?**

- A. transtrochanteric exposure
- B. classic Smith-Petersen exposure
- C. modified Smith-Petersen exposure
- D. ilioinguinal exposure
- E. direct anterior exposure

**30. Risk factors for peripheral vascular disease, such as atherosclerosis or diabetes, might also contribute to degeneration of the rotator cuff by:**

- A. impairing the vascular supply of the supraspinatus tendon
- B. reducing general activity of the patient
- C. side effects of medications
- D. inducing osteoarthritis in the shoulder joint
- E. changing the acromial shape

**31. Which of the following complications will most likely result in failure after opening wedge high tibial osteotomy for osteoarthritis of the knee?**

- A. fibular osteotomy nonunion
- B. patellar subluxation
- C. collapse or subsidence of the interposed grafts
- D. retention of osteophytes
- E. lateral ligamentous laxity

**32. The preoperative factor that is associated with a less favorable result after total shoulder arthroplasty is:**

- A. posterior glenoid erosion
- B. humeral head subluxation
- C. rotator cuff tear
- D. patient age
- E. all of the above

**33. After blunt spinal cord compression, progressive spinal cord damage associated with mechanisms of the secondary injury cascade has been linked to which of the following?**

- A. sustained tissue displacement
- B. size of the lesion on magnetic resonance imaging
- C. impact velocity
- D. amplitude of somatosensory evoked potentials
- E. anatomic location of the injury

**34. Assessment of femoral anteversion is required for clinical decision-making for children with cerebral palsy. What limits the accuracy of two and three-dimensional computed tomography scans for the measurement of femoral anteversion?**

- A. positional variables, such as alignment of the femur in the computed tomography scanner
- B. anatomical variables, such as increased neck-shaft angle
- C. the age of the child with cerebral palsy being scanned
- D. the presence of hip dysplasia
- E. the ambulatory status of the child with cerebral palsy being scanned

**35. Failure of all-polyethylene tibial components is most likely due to:**

- A. polyethylene thickness
- B. techniques of polyethylene manufacture
- C. geometry of the prosthesis articulation
- D. method of polyethylene sterilization
- E. shelf life of the polyethylene

**36. In a survivorship analysis of more than 11,000 total knee arthroplasties, the most durable results were found:**

- A. in males
- B. in patients with osteoarthritis

- C. in association with a posterior cruciate-retaining implant design  
 D. in association with cementless fixation  
 E. in patients between fifty-six and seventy years old
- 37. A large herniated disc through a small anular defect (fragment-fissure type) should be expected to have the following postoperative outcome:**
- A. a higher rate of reherniation than other types of herniation  
 B. a higher rate of postoperative infection  
 C. a high rate of clinical success and a low rate of reherniation  
 D. a delayed recovery and longer postoperative sick leave  
 E. a higher reoperation rate than other types of herniation
- 38. A prospective study that assesses the cost per quality-adjusted life year gained from total hip replacement would be best categorized as what type of economic analysis?**
- A. case-control study  
 B. cost-minimization (identification) analysis  
 C. cost-effectiveness analysis  
 D. cost-utility analysis  
 E. cost-benefit analysis
- 39. Which of the following postoperative radiographic factors is the most important in determining the result following periacetabular osteotomy for a dysplastic hip?**
- A. center-edge angle  
 B. acetabular roof angle  
 C. head lateralization index  
 D. joint congruency  
 E. false-profile index
- 40. In radiographic assessment of hallux valgus, the axis of the first metatarsal can be drawn in different ways. Which of the following methods is most effective for increasing measurement accuracy?**
- A. drawing a line on standardized, weight-bearing radiographs  
 B. drawing a line bisecting the diaphysis of the first metatarsal at two levels  
 C. drawing a line from the center of the head to the center of the base of the first metatarsal  
 D. drawing a line connecting the center between the medial and lateral sesamoids and the center of the base of the first metatarsal  
 E. drawing a line from the base of the first metatarsal to the base of the proximal phalanx
- 41. Which of the following factors is the most important for providing accurate estimates of polyethylene wear following total hip replacement?**
- A. comparison of supine and standing radiographs  
 B. single-limb-stance radiographs  
 C. good-quality anteroposterior pelvic radiographs  
 D. oblique (Judet) radiographs of the hip  
 E. good-quality anteroposterior and lateral radiographs of the hip
- 42. Extended trochanteric osteotomy provides wide exposure of the femoral canal during revision total hip arthroplasty. Which of the following factors is associated with an improved rate of healing of the osteotomized bone fragment?**
- A. dissection of the vastus lateralis to visualize anatomic reduction of the osteotomy  
 B. combined trochanteric and diaphyseal cable fixation  
 C. male gender  
 D. use of an abduction orthosis  
 E. fewer prior revisions
- 43. Femoral notching has been shown to decrease distal femoral torsional load to failure. Which of the following variables, when examined together, most closely predict the torsional load to failure of notched femora?**
- A. anterior cortical thickness and distal femoral bone mineral density  
 B. posterior polar moment of inertia and Singh index  
 C. posterior polar moment of inertia and distal femoral bone mineral density  
 D. anterior cortical thickness and Singh index  
 E. distal femoral bone mineral density and Singh index
- 44. In the second five years after injury, most patients with a fracture of the tibial plafond have:**
- A. pain-free ankle function and no posttraumatic arthritis  
 B. a need for ankle arthrodesis  
 C. ankle pain, decreased function, and posttraumatic arthritis  
 D. pain-free ankle function despite posttraumatic arthritis  
 E. deteriorating function compared with function two years after injury
- 45. A hospital would like to undertake an economic analysis to determine whether to expand or contract an existing preoperative blood donation program. What type of costs should be considered in the analysis?**
- A. average cost-benefit ratios  
 B. marginal cost-benefit ratios  
 C. fixed costs only  
 D. variable costs only  
 E. direct costs only
- 46. In arthroscopic rotator cuff repair, which of the following surgical factors differentiates**

- the advanced mini-open repair (mini-open assisted arthroscopic repair) from the traditional mini-open repair (arthroscopically assisted open repair)?**
- arthroscopic subacromial decompression
  - lateral deltoid split
  - complete releases of rotator cuff tear adhesions
  - intra-articular diagnostic visualization
  - bone tendon fixation
- 47. The quality of reduction of posterior wall acetabular fractures can be best determined by which of the following radiographic examinations?**
- one anteroposterior plain pelvic radiograph
  - two Judet 45° oblique plain pelvic radiographs
  - one anteroposterior and two Judet 45° oblique plain pelvic radiographs
  - a two-dimensional computed tomography scan
  - one anteroposterior and two Judet 45° oblique plain pelvic radiographs and a two-dimensional computed tomography scan
- 48. What is the main cause of failure of bipolar arthroplasty?**
- osteolysis
  - dissociation
  - dislocation
  - acetabular cartilage deterioration
  - femoral subsidence
- 49. A ten-year follow-up study of the cementless Zweymüller Alloclassic system revealed that the most likely cause for cup loosening was:**
- vertical cup position and acetabular wear of  $\geq 1$  mm
  - deficient acetabular bone stock
  - activity level
  - small cup diameter
  - uncontained threads
- 50. Which of the following cytokines has NOT been involved in the development of scar formation after flexor tendon injury:**
- transforming growth factor-beta
  - basic fibroblast growth factor
  - platelet-derived growth factor
  - tumor necrosis factor
  - insulin-like growth factor
- 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 April 2003 CME Review Questions meet these educational objectives\*:

1. Provide a broad-based review and update specifically in the areas of shoulder surgery, trauma, and hand surgery?  Yes  No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of shoulder surgery, trauma, and hand 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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**QUESTIONS?**

Please contact the CME Division of *The Journal of Bone and Joint Surgery* at 781-449-9780 x124.

**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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| 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 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 |
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