
The Journal of Bone & Joint Surgery
Continuing Medical Education

CME

Review Questions

January, February, March
2002

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 84-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 will be July 15, 2002.**

1. **Magnetic resonance imaging of fibrolipomatous hamartoma of the nerve is diagnostic, obviating the need for biopsy. Both T1 and T2-weighted images show longitudinally oriented, cylindrical regions of signal voids. Which of the following tissues represents the signal voids?**
 - A. fatty tissue
 - B. arteries
 - C. veins
 - D. nerve fascicles and surrounding fibrosis
 - E. fascial bands
2. **To minimize stresses in the polyethylene insert on the tibial side of a total knee arthroplasty, the recommended minimal thickness of the insert is:**
 - A. 3 mm
 - B. 6 mm
 - C. 13 mm
 - D. 15 mm
 - E. 17 mm
3. **The recommended initial treatment for an infant with a congenital clubfoot is:**
 - A. early comprehensive soft-tissue release to allow for early remodeling of the deformed tarsal bones
 - B. range-of-motion exercises until the child is large enough for a comprehensive soft-tissue release
 - C. serial manipulation and casts
 - D. preliminary Achilles tenotomy followed by serial manipulation and casts
 - E. observation until the severity of the involvement is established, followed by limited surgical correction, depending upon what requires correction
4. **Reverse oblique intertrochanteric fractures in the elderly are most successfully treated with which of the following methods:**
 - A. Ilizarov-type external fixation
 - B. compression hip screw
 - C. 95° fixed-angle screw-plate
 - D. intramedullary fixation device
 - E. hemiarthroplasty
5. **Which of the following factors is most important in prognosticating whether a child with lumbosacral agenesis will walk:**
 - A. spinopelvic fusion
 - B. dislocation of the hips
 - C. distal articulation of the lumbar spine
 - D. muscle contractures
 - E. scoliosis
6. **Which factor is most important when selecting the best procedure for local control in patients with osteosarcoma who have sustained a pathologic fracture?**
 - A. anatomic location

- B. fracture displacement
C. response to chemotherapy
D. tumor size
E. histologic subtype
- 7. Developmental dysplasia of the hip is one of the most common causes of secondary osteoarthritis. To prevent osteoarthritis, eccentric rotational acetabular osteotomy should be considered for young patients. Which of the following factors is not a prerequisite for this operation?**
- A. center-edge angle of less than 15° and discontinuity of Shenton's line
B. terminal stage of osteoarthritis
C. age between fifteen and sixty years
D. joint congruity and femoral head coverage in maximum abduction
E. unsuccessful nonoperative treatment for at least six months
- 8. With regard to decreasing symptoms, improving function, and allowing a full return to pre-injury activity, a successful anterior cruciate ligament reconstruction is best achieved by:**
- A. autogenous bone-patellar tendon-bone graft
B. semitendinosus and gracilis graft
C. semitendinosus and gracilis graft with loose extra-articular reinforcement
D. any of the above three techniques
E. allograft
- 9. When using a jumbo femoral head to treat recurrent dislocation following total hip replacement, what minimum ratio of the femoral head diameter to the acetabular shell diameter appears critical to optimize hip stability?**
- A. less than 0.2
B. less than 0.5
C. greater than 0.5
D. greater than 1
E. greater than 2
- 10. All of the following are relative indications for treatment of a displaced acetabular fracture with an acute total hip arthroplasty EXCEPT:**
- A. displaced comminuted fracture involving more than 40% of the femoral head
B. T-type acetabular fracture with acetabular protrusion
C. impaction of the acetabulum involving more than 40% of the articular surface
D. full-thickness abrasive loss of more than 40% of the articular surface of the femoral head
E. acetabular fracture with articular comminution producing more than ten fragments
- 11. An eighty-one-year-old man has undergone biopsy of a femoral mass that is consistent with Ewing sarcoma on immunohistochemical analysis. Which of the following tests will best aid in confirmation of the diagnosis?**
- A. cytogenetic analysis looking for a t(11:22) balanced translocation
B. cell culture with analysis of growth characteristics
C. gross examination of the tissue specimen for texture and tissue quality
D. repeat biopsy from the periphery of the tumor
E. epithelial membrane antigen test
- 12. Revision surgery after primary soft-tissue release for congenital clubfoot is needed in approximately what percentage of cases:**
- A. 2
B. 10
C. 50
D. 75
E. 90
- 13. Which of the following is not associated with spear tackler's spine?**
- A. spearing
B. cervical lordosis
C. narrow cervical spinal canal
D. posttraumatic radiographic changes
E. axial energy input
- 14. Which of the following features of developing bones and epiphyses allows for magnetic resonance imaging of vascular phenomena?**
- A. articular, epiphyseal, and physeal cartilage are all well supplied by blood vessels in cartilage canals
B. the secondary ossification centers are the only parts of the developing epiphyses that are vascularized
C. the epiphyseal cartilage is vascularized even before formation of the secondary ossification centers
D. the epiphyses receive the bulk of their blood supply via transphyseal vessels from the well-vascularized metaphyseal regions
E. epiphyseal and physeal cartilage is poorly vascularized
- 15. The most common reason for failure of the acetabular and femoral components of cemented Charnley total hip replacements after twenty-five years of follow-up is:**
- A. component fracture
B. infection
C. dislocation
D. aseptic component loosening
E. polyethylene wear
- 16. Ultrasonography has been shown to be a useful adjunctive tool in monitoring the reduction of distal extra-articular radial fractures. Which of the following is not one of its advantages?**
- A. dynamic observation and immediate feedback

- during the reduction
- B. rapid monitoring of the radius in multiple planes
- C. real-time measurement of the conventional radiographic criteria for reduction such as radial shortening and palmar tilt
- D. decrease in the number of reduction attempts and consequent reduction of trauma to the surrounding soft tissue
- E. more frequent availability in developing countries than low-radiation portable fluoroscopy
- 17. Which of the following bone-grafting materials is osteoconductive, osteoinductive, and osteogenic:**
- A. demineralized bone matrix
- B. coralline hydroxyapatite
- C. calcium sulfate
- D. autologous cancellous bone
- E. autologous bone marrow
- 18. Fractional lengthening of the iliopsoas tendon for iliopsoas snapping hip has what potential advantage over a complete surgical release?**
- A. lower recurrence of snapping
- B. preservation of hip flexion strength
- C. less extensive surgical dissection
- D. earlier return to activity
- E. preservation of hip external rotation strength
- 19. A seventeen-year-old high-school football player has a congenital fusion at the third and fourth cervical levels. Which of the following findings is the most important basis for recommending that he give up football?**
- A. a posterior hairline fracture that is low on the neck
- B. a Pavlov-Torg ratio of 0.9
- C. an anteroposterior canal diameter of 12 mm
- D. 2 mm of anterior displacement of the fourth and fifth cervical vertebrae on a lateral flexion-extension radiograph
- E. a 12° cervical-thoracic scoliosis
- 20. Which of the following best represents the pattern of gait, in terms of stride length, arc of pelvic rotation, and shape of the ground-reaction force curve, of a patient who has had resection of the sciatic nerve of one lower extremity?**
- A. long stride length, increased arc, two peaks
- B. short stride length, reduced arc, plateau
- C. long stride length, reduced arc, two peaks
- D. short stride length, increased arc, plateau
- E. short stride length, increased arc, triple sinusoidal curves
- 21. Volitional co-contraction of the muscles crossing the knee increases the shear stiffness of the knee by:**
- A. 0%
- B. 10% to 20%
- C. 50% to 60%
- D. 200% to 400%
- E. 1000%
- 22. The addition of a flexor tenosynovectomy to the surgical procedure of an open carpal tunnel release for a fifty-three-year-old, otherwise healthy woman would lead to what expected outcome, compared with the outcome without a flexor tenosynovectomy?**
- A. increased postoperative morbidity
- B. improved relief of symptoms
- C. improved hand function
- D. no difference in outcome
- E. improved return of sensation but no change in any altered motor function
- 23. Both manual manipulation and finger-trap traction may be used for the reduction of Colles fractures. Which of the following statements is correct regarding their efficacy?**
- A. both methods achieve a successful reduction in the majority of cases, but manual manipulation is associated with a significantly higher rate of redisplacement during cast immobilization
- B. finger trap traction achieves a successful reduction more frequently than manual manipulation, but both methods are associated with redisplacement of the majority of fractures during cast immobilization
- C. both methods achieve a successful reduction in the majority of cases, but both are associated with redisplacement of the majority of fractures during cast immobilization
- D. finger-trap traction achieves a successful reduction less frequently than manual manipulation, but manual manipulation is associated with a significantly higher rate of redisplacement during cast immobilization
- E. both methods achieve a successful reduction in the vast majority of cases
- 24. In contrast to surgical repair, cast treatment for a patient with an acute complete Achilles tendon rupture:**
- A. decreases the duration of sick leave
- B. leads to more reruptures
- C. yields better quality-of-life measures during the first two months after surgery
- D. yields better long-term patient satisfaction
- E. is more expensive
- 25. Septic osteomyelitis of the ischia:**
- A. is a very frequent event after pelvic surgery
- B. is a common complication of ischial enthesitis in patients with ankylosing spondylitis
- C. leads to unbearable pain in the buttocks within several days
- D. cannot lead to erosions at the insertions of the hamstrings

- E. can show significant clinical improvement when treated with steroids
- 26. The primary advantage of bioabsorbable polylevulactic acid screws over metallic screws in the fixation of disruptions of the syndesmosis of the ankle is:**
- they can be inserted with use of a percutaneous surgical technique
 - the polylevulactic acid has an osteoinductive effect that accelerates fracture union
 - subsequent screw removal is not necessary
 - immediate weight-bearing is possible
 - a strong inflammatory reaction about the screw leads to early loosening, which permits physiologic motions between the distal parts of the fibula and tibia
- 27. For treatment of a synovial pseudarthrosis of the humerus, the most appropriate graft is autologous cancellous bone in addition to plate fixation. If autologous bone is not available, the most appropriate grafting material is:**
- fibular strut graft
 - allograft corticocancellous chips
 - demineralized bone matrix
 - ceramic bone graft substitute
 - bone marrow aspirate
- 28. Venous thromboembolic disease is a major complication of total hip arthroplasty. Which of the following factors has been shown to decrease the incidence of this complication?**
- institution of immediate partial weight-bearing after the operation
 - keeping the operative time as short as possible
 - vacuum-suction prophylaxis against fat and bone marrow embolism during the operation
 - administration of aspirin before the operation
 - avoiding the use of cell-saver blood recovery during surgery
- 29. Which of the following preoperative factors is the most important in the prediction of the need for blood transfusion after prosthetic hip and knee surgery?**
- weight of the patient
 - results of a preoperative coagulopathy panel
 - sex of the patient
 - preoperative hemoglobin level
 - age of the patient
- 30. In a healthy, active sixty-eight-year-old man who has symptomatic isolated loosening of the acetabular component and a well-fixed femoral stem following unilateral total hip arthroplasty, management should consist of:**
- conservative treatment with anti-inflammatories and use of a cane
 - nonoperative treatment until the femoral component loosens, and then revision of both components
 - administration of alendronate and limitation of activities to encourage restabilization of the loose component
 - revision with retention of the femoral component and revision of the acetabular component
 - revision of both the femoral and the acetabular component to facilitate exposure and to improve the outcome for the acetabulum
- 31. What is the most common adverse outcome following arthroscopic débridement of the osteoarthritic knee in patients fifty years of age or older?**
- deep-vein thrombosis
 - infection
 - early failure of the procedure requiring repeat arthroscopic débridement
 - early failure of the procedure requiring high tibial osteotomy
 - early failure of the procedure requiring total knee arthroplasty
- 32. The structure that is most often confused with the iliopsoas tendon during a standard iliofemoral approach is:**
- femoral nerve
 - femoral vein
 - lateral femoral cutaneous nerve
 - medial femoral circumflex artery
 - spermatic cord in males
- 33. Which of the following factors does not contribute to the differences in the liner wear rate and the rate of osteolysis between non-modular acetabular components and modular acetabular components in total hip arthroplasty?**
- liner-shell conformity
 - polyethylene liner thickness
 - liner-shell micromotion
 - liner shelf life
 - sterilization process
- 34. Which of the following factors is most responsible for motivating surgeons to avoid an open operative repair of an acute rupture of the Achilles tendon?**
- patients' limited level of participation in sports activities following open repair
 - little likelihood of achieving a good-quality tendon repair
 - problems with wound-healing
 - patients' dissatisfaction with the appearance of the surgical scar
 - increased incidence of peripheral nerve injury
- 35. The long-term clinical outcomes after Salter innominate osteotomy for the treatment of**

- developmental dysplasia of the hip in children is significantly influenced by:**
- the age of the patient at the time of the operation
 - the addition of an intertrochanteric osteotomy
 - the severity of any postoperative avascular necrosis of the femoral head
 - the sex of the patient
 - the type of fixation used to stabilize the osteotomy
- 36. High-quality plain radiographs are often inadequate to rule out a suspected cervical spine injury in a child because of the variability of radiographic findings in children. Which of the following techniques has been found to best demonstrate spinal injury in an obtunded, unconscious child with suspected cervical spine injury and normal radiographic findings?**
- additional lateral radiographs with flexion and extension of the cervical spine
 - lateral tomography
 - computed tomography with three-dimensional reconstruction
 - computed tomography with myelography
 - magnetic resonance imaging
- 37. A twenty-two-year-old woman had a radiograph of the cervical spine made in an emergency room after a minor collision. She was found to have a congenital fusion of the second, third, and fourth cervical levels, but a week later in your office she is asymptomatic and her physical examination is unremarkable. You should order:**
- a computed tomographic scan of the cervical spine
 - an intravenous pyelogram
 - an electromyogram and neurological consultation
 - an ultrasound evaluation of the renal system
 - a repeat radiograph of the cervical spine
- 38. Which of the following factors is the most important in predicting favorable results of arthroscopic synovectomy in an elbow affected by rheumatoid arthritis?**
- the volume of excised synovial tissue
 - the degree of preoperative joint destruction as seen on radiographs
 - whether posterior synovectomy as well as anterior synovectomy is done
 - the type of disease-modifying anti-rheumatic drug (DMARD) that the patient is taking at the time of surgery
 - the type of postoperative rehabilitation program
- 39. Which of the following causes of elbow stiffness in children responds most favorably to open surgical treatment?**
- septic arthritis of the elbow
 - intra-articular fracture of the distal part of the humerus
 - extra-articular fracture of the distal part of the humerus
 - complex elbow fracture-dislocation
 - multiple operations on the elbow
- 40. In comparison with the parapatellar approach, the subvastus approach for total knee arthroplasty:**
- shortens hospital stay
 - results in slightly greater blood loss
 - allows the patient to resume unassisted straight-leg raises sooner
 - necessitates more postoperative pain medication
 - results in more limited knee flexion at four weeks postoperatively
- 41. The most common cause of early failure following total knee arthroplasty is:**
- infection
 - arthrofibrosis
 - anterior knee pain
 - subluxation
 - patella baja
- 42. The main reason for revision of an alumina-on-alumina total hip arthroplasty in the long term is:**
- fracture of the alumina femoral head
 - fracture of the alumina acetabular component
 - periprosthetic osteolysis
 - loosening of the femoral component
 - loosening of the acetabular component
- 43. An eighteen-year-old football player sustained a hyperextension injury to the cervical spine accompanied by four-extremity paresthesias. His spinal cord-vertebral body ratio is 0.7. It is predictable that:**
- he will have repeated "burners"
 - there is a 56% risk of recurrence of cervical cord neurapraxia
 - he is at greater risk of permanent paralysis than an asymptomatic player is
 - this is an absolute contraindication to continued participation in football
 - subsequent repeated episodes will eventually result in neurological impairment
- 44. At the time of total hip arthroplasty in adults with congenital dislocation and severe dysplasia of the hip, the most common anatomical abnormalities observed are:**
- excessive retroversion of the femoral neck and deficiency of the superoposterior portion of the acetabulum
 - anterior position of the greater trochanter with acetabular protrusion
 - excessive anteversion of the femoral neck with a superolaterally deficient acetabulum

- D. severe coxa vara with anterior erosion of the acetabulum
 E. severe coxa valga with superior deficiency of the acetabulum
- 45. Definitive treatment of fungal osteomyelitis most commonly requires which of the following?**
 A. lifetime suppressive antibiotics
 B. repeated surgical débridements and intravenous antifungal therapy
 C. intravenous antifungal therapy alone
 D. amputation
 E. extensive débridement only with secondary wound-healing
- 46. The availability of modular components of the prosthetic knee replacement has provided opportunities for tibial insert exchange. It appears that the patient who might benefit most from tibial insert replacement has:**
 A. a well-aligned and stable knee with extensive wear debris
 B. a well-aligned knee with a worn tibial insert and instability
 C. a knee with concurrent wear debris from a metal-backed patella
 D. a knee with asymmetrical wear medially and a varus deformity
 E. a posterior stabilized tibial component
- 47. A painful heel is a common orthopaedic syndrome. Its cause, however, remains enigmatic. The efficacy of which of the following procedures has not been investigated in a randomized controlled trial?**
 A. topical corticosteroids administered by iontophoresis
 B. stretching of the plantar fascia
 C. dorsiflexion night splints
 D. surgical release of the plantar fascia
 E. application of extracorporeal shock waves
- 48. Children who are less than eight years old have unique features of the cervical spine when compared with adults. Which of the following features are not found in children under eight years old?**
 A. relative muscle weakness
 B. decreased laxity of ligaments
 C. wedge-shaped vertebral bodies
 D. horizontal orientation of shallow facet joints
 E. increased vertical height of the uncinate processes
- 49. Which of the following cells are particularly sensitive to treatment with ultra-high molecular weight polyethylene particles in vitro, producing nitrous oxide and prostaglandin E₂, potent mediators known to be involved in transducing signals between neighboring cells?**
 A. mature osteoblasts
 B. fibroblasts
 C. chondrocytes
 D. mesenchymal stem cells
 E. perimycytes
- 50. Particle-induced osteolysis is the most common cause of implant loosening after joint replacement. Alendronate, a bisphosphonate, may slow or reverse the osteolysis. Which of the following statements best describes the mechanism of action of alendronate?**
 A. increases the catabolism of microparticles
 B. prevents formation of Howship lacunae
 C. blocks osteoclastic resorption
 D. increases osteoblast recruitment
 E. increases bone turnover
- 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 2002 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of the hand, shoulder and elbow, and foot and ankle? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of upper-extremity and foot and ankle problems? 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?
 - Commercial advertising
 - Current Concepts
 - Classified advertising
 - Letters to The Editor
 - Clinical scientific articles
 - Basic scientific articles
 - Orthopaedic Forum
 - Instructional Course Lectures

ACCREDITATION STATEMENT

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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

- | | | |
|---------------|---------------|---------------|
| 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 |
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| 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 |
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| 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 |
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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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