
The Journal of Bone & Joint Surgery
Continuing Medical Education

CME

Review Questions

October, November, December
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 October, November, and December issues of the American volume of *The Journal of Bone and Joint Surgery* (Volume 84-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 is April 15, 2003.**

1. **In patients who have sustained an open tibial fracture and are treated with intramedullary nail fixation and routine soft-tissue management, the factor most closely associated with achieving bone union and reducing the frequency of secondary interventions is:**
 - A. history of not smoking
 - B. age of the patient
 - C. type-IIIa Gustilo-Anderson classification of fracture wound severity
 - D. treatment with 0.75 mg/mL of rhBMP-2
 - E. treatment with 1.50 mg/mL of rhBMP-2
2. **Which factor is most likely to reduce the relative agreement between a patient and a doctor with regard to rating the degree of hip pain following total hip arthroplasty?**
 - A. the gender of the patient
 - B. the type of assessor (consultant versus trainee physician)
 - C. the presence of comorbid joint problems or health problems
 - D. the time period following surgery when the pain was rated
 - E. whether the patient rated the pain in the presence or absence of an assessor
3. **Which of the following statements regarding the role of BMPs in the healing of fracture nonunions is true? Nonunion is influenced by:**
 - A. deficient BMP-2 expression
 - B. deficient BMP-7 (OP-1) expression
 - C. abnormal BMP-receptor expression
 - D. increasing noggin (BMP-inhibitor) expression
 - E. relationship of BMP to nonunion healing is still unknown
4. **Which of the following best describes the relationship between utilization of orthopaedic services (office visits and surgical procedures) and age and gender for adults enrolled in a capitated insurance plan?**
 - A. men and women utilize orthopaedic services at equivalent rates throughout adulthood
 - B. men utilize orthopaedic services at higher rates than women throughout adulthood
 - C. women utilize orthopaedic services at higher rates than men throughout adulthood
 - D. women utilize orthopaedic services at higher rates than men in early adulthood and men utilize orthopaedic services at higher rates than women in later adulthood
 - E. men utilize orthopaedic services at higher rates than women in early adulthood and women utilize orthopaedic services at higher rates than men in later adulthood
5. **Which of the following is the most significant benefit to using intra-articular lidocaine rather than intravenous sedation when reducing a dislocated shoulder?**
 - A. less pain

- B. shorter stay in the emergency department
 C. greater rate of successful reduction
 D. lower prevalence of nerve damage
 E. greater ease of reduction
6. **Computerized tomography can be used to quantify proximal humeral retroversion before shoulder arthroplasty. Which of the following factors has been demonstrated to be clinically relevant?**
- A. the cut passing through the center of the humeral head is the best one to measure the orientation of the humeral head
 B. there is a significant variation of the retroversion between the right and left sides of the same patient
 C. there is a significant difference between the angular orientation of the epicondylar axis and the angular orientation of the line perpendicular to the forearm axis
 D. measurement of proximal humeral retroversion during surgery by palpating the epicondylar axis is more accurate than calculation with computerized tomography
 E. using the forearm as a goniometer is a more accurate method to determine proximal humeral retroversion than is computerized tomography
7. **Which is the most important factor explaining why fully displaced avulsion fractures of the tibial insertion of the anterior cruciate ligament are usually irreducible by closed methods and require open reduction and internal fixation?**
- A. interposition of the anterior horn of the medial meniscus
 B. interposition of the anterior horn of the lateral meniscus
 C. bucket-handle displacement of the detached anterior third of the medial meniscus under the medial femoral condyle
 D. bucket-handle displacement of the detached anterior third of the lateral meniscus under the lateral femoral condyle
 E. bone and soft-tissue debris lodged in the fracture gap
8. **During the first year after a solid organ transplantation, osteonecrosis of the femoral head will develop in what percentage of patients?**
- A. 0% to 5%
 B. 6% to 25%
 C. 26% to 50%
 D. 51% to 75%
 E. 76% to 100%
9. **Which of the following is found to have the greatest inhibitory effect on posterolateral spinal fusion in rabbits?**
- A. a nonspecific cyclooxygenase inhibitor
 B. a nonspecific cyclooxygenase promoter
 C. a cyclooxygenase-2 inhibitor
 D. a cyclooxygenase-2 promoter
 E. a cyclooxygenase-1 inhibitor
10. **When the most disabled patients who undergo total hip arthroplasty are compared with less disabled patients, which statement is correct?**
- A. the most disabled patients improve the same amount but their final status is worse
 B. the most disabled patients improve more but their final status is worse
 C. the most disabled patients improve more and their final status is equal
 D. the most disabled patients do not improve as much but derive more benefit from surgery
 E. there is no relationship between preoperative disability and outcome
11. **Open rotator cuff repair techniques seem to provide greater mechanical strength than do currently used arthroscopic repair techniques because they can be performed:**
- A. with the modified Mason-Allen tendon stitch
 B. after extensive mobilization of the rotator cuff tendon
 C. with suture anchors
 D. with augmented transosseous suture-to-bone fixation
 E. with autograft tendon augmentation
12. **A sixty-five-year-old man had advanced osteoarthritis of the right knee associated with an ipsilateral femoral shaft malunion. The preoperative full-length anteroposterior radiograph of the lower extremity showed a mechanical axis of 24° of varus. The line perpendicular to the mechanical axis of the femur at the femoral condyle did not pass through the insertion of the collateral ligaments. The preferred surgical plan is a:**
- A. two-stage corrective osteotomy of the malunion and total knee arthroplasty
 B. simultaneous corrective osteotomy of the malunion and total knee arthroplasty
 C. total knee arthroplasty regardless of the extra-articular deformity
 D. total knee arthroplasty with correction of the deformity by intra-articular bone resection
 E. corrective osteotomy of the malunion only
13. **Some patients have a dislocation for the first time many years after a total hip arthroplasty. These late dislocations occur:**
- A. less commonly than was previously thought
 B. more frequently in men than in women
 C. after a median time of less than ten years
 D. more frequently than early dislocations
 E. in association with multiple different predisposing factors

- 14. Which of the following is not an expected result of decompressive surgery for spinal stenosis?**
- marked improvement in walking ability
 - marked improvement in bicycling ability
 - improved Oswestry Disability Index
 - improved visual analog pain score
 - improvement for both central and lateral recess stenosis
- 15. Mutations in several proteins of the clotting cascade have recently been identified as increasing thrombotic risk. The net risk of thromboembolism is multiplied when there are two abnormal genetic markers, especially when coupled with what clinical factor?**
- smoking
 - hormone replacement
 - cancer
 - obesity
 - diabetes
- 16. The main indication for anconeus arthroplasty—rotation of the anconeus into the radiohumeral joint—for patients with post-traumatic radiocapitellar and/or proximal radioulnar joint dysfunction is:**
- moderate to severe elbow pain
 - stiffness of the elbow
 - instability of the elbow
 - wrist pain
 - cubitus varus
- 17. What is the most common reason for revision among patients who undergo hemiarthroplasty for arthritis after instability surgery?**
- arthritis of the acromioclavicular joint
 - irreparable rotator cuff tear
 - infection
 - recurrent instability
 - glenoid arthritis
- 18. The most common reason for a reoperation after ulnohumeral arthroplasty for degenerative arthritis of the elbow is:**
- recurrence of osteophytes
 - capsular release for recurrent contracture
 - ulnar nerve decompression
 - hematoma evacuation
 - removal of ectopic bone
- 19. Surgical excision of the radial head can be effectively used to treat irreparable fractures. A contraindication to radial head excision alone is:**
- mechanical block to pronation or supination of the forearm
 - isolated radial head fracture
 - 2 mm of proximal migration of the radius at the wrist on longitudinal traction of the proximal part of the radius
 - 8 mm of proximal migration of the radius at the wrist on longitudinal traction on the proximal part of the radius
 - malunion of a comminuted radial head fracture
- 20. Patellar fracture is one of the complications of anterior cruciate ligament reconstruction with use of bone-patellar tendon-bone graft. Which of the following factors has been shown to most increase the risk of this complication?**
- small patellar bone plug
 - sharp-cornered patellar bone plug
 - oval shape of the patella
 - round-cornered patellar bone plug
 - trapezoidal-shaped patellar bone plug
- 21. The preferred treatment method for a sixty-five-year-old man with primarily severe patellofemoral arthritis of the knee is:**
- unicompartmental knee arthroplasty
 - bicompartmental (patella-sparing) knee arthroplasty
 - patellectomy
 - isolated patellar resurfacing
 - total knee arthroplasty
- 22. Which of the following is most likely to be associated with increased stability of the hip following revision total hip arthroplasty?**
- trochanteric nonunion
 - use of an elevated-rim liner
 - use of 22-mm femoral head
 - male gender
 - anterolateral surgical approach
- 23. Which of the following factors seems to be the most important in decreasing the quality of the results following surgery for patellar tendinopathy (jumper's knee) in athletes?**
- duration of symptoms of more than two years before surgery
 - preoperative intracortical injections of corticosteroids
 - identification of a well-defined area of degenerative tendon at surgery
 - resumption of running
 - resumption of volleyball
- 24. Extracorporeal shock wave therapy has been recommended as an alternative therapy for chronic lateral epicondylitis. Previously reported good results could not be confirmed because:**
- only two-thirds of the patients had a good result after one year
 - a local anesthetic was used in the verum-extracorporeal shock wave therapy group
 - extracorporeal shock wave therapy had no clinically relevant effect

- D. treatment with some of the devices may decrease the clinical outcome
E. patients were blinded to the treatment
- 25. The risk of dislocation following primary total hip replacement is increased after a posterior approach when no attempt is made to repair the capsule and tendons. Biomechanically, transosseous repair of the hip capsule and short external rotators will:**
- A. increase torque resistance prior to dislocation but decrease rotational stability
B. increase stability, whatever the position or orientation of the implant
C. have no significant advantage over a soft-tissue repair that is not transosseous
D. increase stability but limit hip flexion to $<90^\circ$
E. increase stability only when there is malposition of one of the components
- 26. A glenohumeral prosthetic radial mismatch between 5.5 and 10 mm is associated with:**
- A. decreased mobility of the joint
B. increased rate of rotator cuff tear
C. decreased polyethylene wear
D. decrease in glenoid radiolucent lines
E. increased stability of the joint
- 27. Orthopaedic practice expenses have been shown to vary significantly by payer type. Which of the following correctly ranks the payer types from highest to lowest total practice expenses per episode of care?**
- A. Workers' Compensation, preferred provider organization, indemnity plan, health maintenance organization/point of service, Medicare, self-pay
B. Workers' Compensation, health maintenance organization/point of service, indemnity plan, preferred provider organization, Medicare, self-pay
C. Workers' Compensation, indemnity plan, health maintenance organization/point of service, preferred provider organization, Medicare, self-pay
D. Workers' Compensation, health maintenance organization/point of service, preferred provider organization, Medicare, indemnity plan, self-pay
E. self-pay, indemnity plan, Medicare, preferred provider organization, health maintenance organization/point of service, Workers' Compensation
- 28. Compared with physician-adjusted dosage of warfarin following total joint arthroplasty, the use of a nomogram to direct dosage adjustment resulted in similar findings regarding:**
- A. mean international normalized ratio achieved
B. average number of days to achieve an international normalized ratio of >1.7
C. duration of maintenance of the desired international normalized ratio
D. prevalence of deep vein thrombosis or pulmonary embolism
E. all of the above
- 29. Which of the following best describes the appearance of diffuse pigmented villonodular synovitis of the knee on magnetic resonance images?**
- A. uniform bright signal on T1-weighted images
B. uniform bright signal on T2-weighted images
C. uniform dark signal on T1-weighted images
D. uniform dark signal on T2-weighted images
E. intermediate-to-dark signal on T1 and T2-weighted images
- 30. Which of the following is not true of blinded, randomized trials performed to test the effectiveness of new orthopaedic devices?**
- A. there is unbiased reporting of outcomes by patients and surgeons
B. the results usually reflect the experience of many surgeons
C. known and unknown prognostic factors are usually similar in both treatment groups
D. follow-up is no longer than that needed for a cohort study
E. strict entry and exclusion criteria lead to a highly selected group of patients
- 31. A reduction in the maximum extension of the wrist can occur with flexion of the elbow following transfer of the brachioradialis to the extensor carpi radialis brevis. Biomechanical simulations suggest that surgical tensioning of the transfer can contribute to the deficit. What other two factors also play a role in this problem?**
- A. brachioradialis strength and passive wrist joint properties
B. patient age and brachioradialis strength
C. maximum muscle stress and brachioradialis moment arm
D. injury level and patient age
E. passive limit of elbow extension and passive wrist joint properties
- 32. In adults with symptomatic flatfoot, the most prevalent anatomic abnormality seen on computerized tomography scans is:**
- A. sinus tarsi impingement
B. calcaneofibular impingement
C. compression of the sural nerve
D. hypertrophy of the fibular malleolus
E. calcaneal malalignment
- 33. Acute compartment syndrome can occur in a well leg placed in the hemilithotomy position on a fracture table. In addition to increased intramuscular pressure in the well leg and prolonged surgical time, which of**

- the following factors is important in the development of this complication?**
- the type of surgical procedure being performed
 - excessive traction through a perineal post
 - the type of anesthesia used
 - hypotension in the well leg
 - the amount of hip flexion of the well leg
- 34. In comparison with patients who undergo primary total hip arthroplasty for a displaced intracapsular hip fracture, patients who undergo total hip arthroplasty after failed internal fixation are at greater risk of:**
- requiring another revision in the first year
 - dying in the first year
 - having a more painful hip
 - sustaining a hip dislocation in the first year
 - having a deep wound infection in the first year
- 35. Treatment of periprosthetic femoral fractures with a Mennen plate has a high rate of failure. Which of the following factors might explain the disappointing results?**
- gender and weight of the patient
 - previous operations to treat the fracture
 - use of the Mennen plate for periprosthetic fractures proximal to the tip of the prosthesis
 - use of the Mennen plate for periprosthetic fractures distal to the tip of the prosthesis
 - unsupervised postoperative activity
- 36. While the prevalence of the total Achilles tendon rupture has increased during the last decade, the total number of complications (rerupture and infection) after surgery:**
- has decreased due to better surgical techniques
 - has not changed
 - has increased along with a number of primary ruptures
 - has increased even faster than the number of primary ruptures
 - have been shown to be easily treatable, even in the presence of infection
- 37. The osteoseptocutaneous fibular transplant includes skin with the vascularized fibula to serve as soft-tissue supplementation as well as a means with which to monitor the vascularity of the transplant. The skin paddle is nourished by:**
- perforators from the anterior crural septum of the lateral compartment
 - perforators from the posterior crural septum of the lateral compartment
 - perforators from the anterior compartment
 - direct perforators from the posterior tibial artery
 - musculocutaneous perforators from the extensor digitorum muscle
- 38. Theoretical complications of a metallic femoral head-polyethylene articulation with sliding include:**
- premature polyethylene wear
 - prosthetic loosening
 - an increase in hip forces at heel strike
 - eventual instability
 - all of the above
- 39. What genetic polymorphism is related to lumbar disc disease?**
- TaqI polymorphism in exon 9 of VDR gene
 - Apal polymorphism in intron 8 of VDR gene
 - PvuII polymorphism in intron 1 of ER gene
 - XbaI polymorphism in intron 1 of ER gene
 - none
- 40. Magnetic resonance imaging of the entire neural axis is recommended at presentation for all patients with neural infantile idiopathic scoliosis because the prevalence of neural axis abnormalities in the population is approximately:**
- 5%
 - 10%
 - 20%
 - 50%
 - 75%
- 41. After a bimalleolar fracture, the main difference between an ankle being moved passively and one under active control of the muscle-tendon units that cross the ankle is:**
- the ankle is more stable when under active control of the muscle-tendon units
 - the talus shows more external rotation when under active control of the muscle-tendon units
 - there is no significant difference between the two methods of moving the ankle
 - there is more talar dorsiflexion when the ankle is under active control of the muscle-tendon units
 - there is a greater arc of motion when the ankle is under active control of the muscle-tendon units
- 42. A twenty-five-year-old man sustained a closed displaced intra-articular calcaneal fracture at work. Radiographs demonstrated a severely displaced joint depression fracture with a Böhler angle of -5° , and the computerized tomography scan showed a Sanders Type-III fracture. Which of the following factors has been shown to increase the chance of a good functional outcome?**
- Workers' Compensation
 - lower Böhler angle
 - quality of reduction
 - higher Sanders type
 - surgery before two days' time

- 43. Which of the following statements reflects the long-term prognosis of Achilles tendinopathy?**
- in 41% of the patients some overuse symptoms develop in the initially uninvolved Achilles tendon
 - 95% of the patients need surgical treatment
 - half of the patients still have cardinal symptoms after eight years
 - only 20% of the patients are able to return to a full level of physical activity
 - total Achilles tendon rupture is common among patients with chronic Achilles tendinopathy
- 44. Histopathological findings usually direct the methods of treatment of Achilles tendinopathy. Which of the following factors is the most characteristic of Achilles tendinopathy?**
- inflammation
 - degeneration
 - hypovascularity
 - tenovaginitis
 - total deficiency of fibroblasts
- 45. A nine-year-old boy presents with a midshaft, transverse femoral fracture. You judge that the fracture is best treated with titanium elastic nailing. In counseling the family about the risks of this treatment method, you should explain that the most frequent complication is:**
- avascular necrosis of the proximal femoral epiphysis
 - soft-tissue irritation from the nail tips distally
 - refracture after nail removal
 - loss of fixation, including nail migration
 - growth arrest of the distal femoral physis from nail insertion
- 46. While jumping in a basketball game, a fourteen-year-old boy feels a "pop" in his knee. He has knee pain and swelling soon after the injury. He is diagnosed in the emergency department with a tibial tubercle fracture. He is admitted, with a plan for surgery the next morning. The nurse calls frequently overnight, reporting that he has leg pain that is worsening every hour, despite satisfactory analgesic administration. The most likely explanation for the worsening leg pain is:**
- unrecognized soft-tissue injury of the leg
 - associated tibial shaft fracture not recognized at presentation
 - tense knee effusion caused by the associated large tear in the retinaculum
 - compartment syndrome caused by bleeding from the anterior tibial recurrent artery
 - associated knee ligament injury not recognized at presentation
- 47. Sustained super-physiological compression acting on an immature growth plate has been observed to:**
- slow longitudinal growth
 - prevent eventual closure of the growth plate
 - stimulate longitudinal growth
 - produce hypervascularity of the growth plate
 - cause proliferative chondrocytes to differentiate into fibroblasts
- 48. Which of the following factors is the most important in the selection of patients for unicompartmental knee arthroplasty?**
- age
 - weight
 - activity level
 - type of arthritis
 - stress radiograph showing full correction of the deformity and a normal contralateral compartment
- 49. Which of the following has been shown to be a consequence of relative motion between the polyethylene insert and the metal baseplate of a fixed-bearing tibial component design?**
- dislocation of the polyethylene insert from the metal baseplate
 - generation of metal and polyethylene wear debris at the interface between the polyethylene insert and baseplate
 - surface delamination of the polyethylene insert
 - decreased volume of wear debris displaced from the polyethylene insert
 - fatigue fracture of the metal baseplate
- 50. Which of the following factors is most associated with an adverse outcome following shoulder arthroplasty performed for primary osteoarthritis?**
- full-thickness supraspinatus tear
 - partial-thickness supraspinatus tear
 - subscapularis tear
 - fatty degeneration of the subscapularis
 - fatty degeneration of the infraspinatus
- 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 2003 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of hip arthroplasty, trauma, and orthopaedic rehabilitation? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of total hip replacement, trauma, and rehabilitation? 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"/> Orthopaedic Forum	<input type="checkbox"/> Instructional Course Lectures

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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

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