
The Journal of Bone & Joint Surgery
Continuing Medical Education

CME

Review Questions

July, August, September
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 July, August, and September issues of the American volume of *The Journal of Bone and Joint Surgery* (Volume 84-A, Numbers 7, 8, and 9). 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 January 15, 2003.**

1. **In a simulated unstable intra-articular distal radial fracture model, augmentation of Kirschner wire fixation with calcium phosphate cement provides:**
 - A. inferior stability compared with that provided by augmented external fixation, but increased stability compared with that provided by Kirschner wire fixation alone
 - B. stability similar to that provided both by augmented external fixation and by Kirschner wire fixation
 - C. increased stability compared with that provided by augmented external fixation, but decreased stability compared with that provided by Kirschner wire fixation alone
 - D. stability similar to that provided by augmented external fixation, but increased stability compared with that provided by Kirschner wire fixation
 - E. inferior stability compared with that provided by all tested methods of percutaneous fixation
2. **The most common cause of failure of total knee arthroplasty in patients with hemophilic arthropathy is:**
 - A. polyethylene wear
 - B. infection
 - C. loosening
 - D. instability
 - E. patellar fracture
3. **A ruptured patellar tendon after a total knee arthroplasty is best treated by which of the following alternatives?**
 - A. xenograft augmentation
 - B. primary repair of the ruptured tendon
 - C. arthrodesis
 - D. primary repair with allograft reconstruction
 - E. cast immobilization
4. **Compared with a two-strand semitendinosus-gracilis autograft, a bone-patellar tendon-bone autograft for reconstruction of the anterior cruciate ligament provides a superior outcome with regard to:**
 - A. patient satisfaction
 - B. anterior knee laxity
 - C. activity level
 - D. ability to run or squat
 - E. stair climbing
5. **Which of the following statements best describes the outcome of high-energy tibial plateau fractures more than five years after the injury?**
 - A. there is a high prevalence of severe arthrosis and secondary reconstructive procedures
 - B. there is a significant deterioration in patient function, SF-36 score, and lowa knee score
 - C. there is no apparent deterioration in patient function, SF-36 score, or lowa knee score

- D. older patients are more satisfied with the result than are younger patients
E. men are more satisfied with the result than are women
- 6. In total hip replacement surgery, the most important factor predicting the likelihood of autologous or allogeneic transfusion is:**
A. the availability of predonated autologous units
B. the severity of baseline anemia
C. the amount of operative blood loss
D. the amount of blood loss estimated for the entire hospital duration
E. the body-mass index of the patient
- 7. With regard to forefoot structural pathology in diabetic patients, which statement is most accurate?**
A. age-related changes are dominant in comparison with diabetes-associated changes
B. diabetes-associated changes affect only the soft tissues
C. age-related changes are of the same magnitude as diabetes-associated changes
D. diabetes-associated changes are dominant in comparison with age-related changes
E. age-related changes partially correct for diabetes-associated changes
- 8. What is the primary contraindication for meniscal transplantation?**
A. axial malalignment
B. advanced arthrosis
C. elderly patient
D. focal chondral lesions
E. obesity
- 9. Which of the following regarding meta-analysis is most correct?**
A. meta-analysis is a thorough review of the literature without pooling of results across included studies
B. meta-analysis is similar to a narrative review of the literature
C. meta-analysis is a systematic review of the literature with statistical pooling of results across included studies
D. the quality of a meta-analysis is not affected by the quality of the individual studies that are included
E. meta-analysis is a systematic review of the literature that utilizes qualitative methods
- 10. Which of the following is associated with the greatest risk of a refracture following an index osteoporotic fracture?**
A. female gender
B. poor walking ability
C. dementia
D. age over eighty-five years at the time of the index fracture
E. age between forty-five and forty-nine years at the time of the index fracture
- 11. Medial elbow ganglion as a cause of cubital tunnel syndrome is most likely to be associated with which of the following conditions?**
A. osteoarthritis of the elbow
B. rheumatoid arthritis of the elbow
C. elbow instability
D. tennis elbow
E. malunion of a distal humeral fracture
- 12. Good pain relief following total knee arthroplasty for osteoarthritis in limbs affected by poliomyelitis is most reliably obtained:**
A. if the patient has had no prior surgery on the knee
B. if the patient does not have preoperative recurvatum of the knee
C. if one uses a highly constrained condylar knee design
D. if the patient lives independently
E. if the patient has antigravity quadriceps strength or greater quadriceps strength
- 13. Delamination is a damage mode that has been observed on the articulating surfaces of retrieved polyethylene components used in total knee arthroplasty. Which of the following statements is true regarding delamination after total knee arthroplasty?**
A. delamination may result from subsurface fatigue failure
B. the prevalence of delamination is independent of the time of implantation
C. delamination is the most common type of damage observed on retrieved tibial polyethylene components used in total knee arthroplasty
D. delamination occurs earlier in net-shaped compression-molded polyethylene total knee arthroplasty components than in machined ram-extruded components
E. delamination is less prevalent in highly oxidized polyethylene components
- 14. Which of the following factors is NOT associated with an increased risk of a contralateral slipped capital femoral epiphysis?**
A. African-American ethnicity
B. advanced bone age
C. endocrinopathy
D. premenarchal status
E. obesity
- 15. Wear on the backside of modular tibial polyethylene of a cemented total knee prosthesis may be accelerated by tibial post-cam impingement. Risk of post-cam impingement can be decreased by avoiding all of the following EXCEPT:**

- A. flexion of the femoral component
 B. posterior placement of the pilot hole for the femoral intramedullary alignment guide
 C. posterior slope of the tibial component
 D. tight extension gap
 E. clinical hyperextension
- 16. The most frequent location for incomplete seating of the glenoid component after total shoulder replacement for osteoarthritis is:**
- A. anterior
 B. posterior
 C. superior
 D. inferior
 E. central
- 17. Patient dissatisfaction following a hammer-toe repair is most commonly associated with:**
- A. vascular impairment
 B. toenail abnormality
 C. malalignment of the digit
 D. numbness with injury of the digital nerve
 E. swelling of the digit
- 18. In addition to surgically treating a patient with a low-energy hip fracture, the orthopaedist should:**
- A. obtain a dual-energy x-ray absorptiometry scan prior to discharge
 B. begin treatment with calcium, a bisphosphonate, and estrogen
 C. begin treatment with vitamin D, calcium, and a bisphosphonate
 D. prescribe a commercial hip protector
 E. consult an endocrinologist or metabolic bone specialist
- 19. Cementation of a polyethylene liner into a well-fixed metal shell has become an increasingly popular technique in revision total hip arthroplasty. Which of the following factors would most likely lead to catastrophic failure of this construct?**
- A. an undersized liner with a smooth surface
 B. an undersized liner with a circumferentially grooved surface
 C. an undersized liner placed into a metal shell with no holes
 D. an oversized liner
 E. an undersized liner placed into a cluster-holed metal shell
- 20. A six-year-old girl with a history of developmental dysplasia of the hip that was treated in infancy is seen during routine follow-up. She has no pain or limp but has radiographic evidence of residual acetabular dysplasia. The recommended treatment is:**
- A. observation; tell the parents that the child will do well
 B. abduction bracing
 C. no treatment now; tell the parents that a pelvic osteotomy may be needed as a teenager
 D. femoral osteotomy only
 E. pelvic osteotomy with or without femoral osteotomy
- 21. Which of the following statements is true regarding the final results of single-portal endoscopic carpal tunnel release compared with those of open release?**
- A. open release allows faster return of grip strength
 B. endoscopic release is followed by decreased sensation
 C. endoscopic release allows earlier return to work
 D. endoscopic release results in delayed return of dexterity
 E. endoscopic release is more expensive
- 22. Which of the following statements is FALSE regarding femoral nailing on a fracture table versus femoral nailing on a radiolucent table with manual traction?**
- A. malrotation occurs more frequently with use of a fracture table
 B. total operating time is shorter with use of manual traction
 C. there is no significant difference in fluoroscopy time
 D. insertion of a nail locking screw is faster with manual traction
 E. in patients with simple fracture patterns (AO types A and B), limb length is more likely to be restored correctly on a fracture table
- 23. The functional improvement after total shoulder arthroplasty for osteoarthritis can best be characterized by which of the following statements?**
- A. younger patients demonstrate more improvement than older patients do
 B. patients regain about two-thirds of the function absent preoperatively
 C. patients with greater preoperative function improve more than those with less preoperative function do
 D. men demonstrate less improvement than women do
 E. postoperative function is independent of preoperative function
- 24. Which of the following is NOT associated with a high risk of redislocation of the shoulder following an acute first-time dislocation?**
- A. isolated fracture of the greater tuberosity
 B. massive rotator cuff tear
 C. fracture of the glenoid rim
 D. original dislocation produced by a high-energy injury
 E. associated neurological deficit

- 25. Ischemic necrosis of the immature femoral head has been shown to produce femoral head flattening. Which of the following processes plays a role in the development of femoral head flattening?**
- appositional bone formation
 - osteoclastic bone resorption
 - mechanical fragmentation
 - subchondral bone fracture
 - chondrolysis
- 26. Enlargement of the toes and forefoot are common problems associated with macrodactyly of the foot. Which of the following procedures will most likely reduce the size of the foot to allow fitting of regular shoes?**
- toe amputation
 - toe shortening
 - epiphysiodesis
 - ray resection of lesser toes
 - debulking
- 27. Postoperative rehabilitation protocols following repair of intra-synovial flexor tendon lacerations emphasize:**
- high-force rehabilitation protocol to stimulate formation of type-I collagen at the repair site
 - high-force rehabilitation protocol to stimulate maturity of repair site extracellular matrix
 - low-force rehabilitation protocol as that has been shown to result in tendon repair-site structure and function equal to those achievable by high-force protocols without the additional risk of rupture or gap formation
 - immobilization for three to six weeks to maximize tendon healing
 - early immobilization following manipulation under anesthesia
- 28. The fifteen-year survivorship free of revision for aseptic loosening of a collared matte-finished femoral component inserted with second-generation cement techniques is:**
- the same for patients regardless of age
 - worse for patients under fifty years of age at the time of the operation
 - better for patients under fifty years of age at the time of the operation
 - worse for patients of high weight
 - worse in males than in females
- 29. Which of the following factors has been shown to increase the risk of pulmonary fat embolism following total hip arthroplasty?**
- bilateral simultaneous total hip arthroplasty
 - operative time of less than two hours
 - total hip arthroplasty with cement
 - regional rather than general anesthesia
 - preoperative elevated triglyceride level
- 30. Patellar impingement is one of the complications of unicompartmental arthroplasty. Which of the following factors has been shown to increase the risk of this complication?**
- preoperative degenerative changes in the patellofemoral joint
 - position of the femoral component
 - preoperative congruity of the patellofemoral joint
 - shape of the patella
 - height of the patella
- 31. Regarding viscosupplementation, the accuracy of needle placement into the intra-articular space of the knee is improved by using which of the following?**
- an anterolateral portal
 - a lateral midpatellar portal
 - an anteromedial portal
 - a larger needle
 - preinjection of air or saline solution
- 32. Ice has been demonstrated to reduce edema. Which of the following mechanisms is most likely responsible?**
- decreased microvascular perfusion secondary to venular vasoconstriction
 - decreased microvascular permeability
 - decreased microvascular perfusion secondary to arteriolar vasoconstriction
 - decreased metabolic demands of the tissue following ice application
 - increased blood viscosity following ice application
- 33. Although bone and cartilage transplantation has been routinely performed for more than thirty-five years, there is no consensus regarding the ideal graft pretreatment. According to an experimental study in mice, both angiogenesis and immune tolerance can be improved in fast-frozen grafts ($-70^{\circ}\text{C}/\text{min}$) in the following situation:**
- in recipients of isografts pretreated by dimethylsulfoxide (a cryoprotective substance)
 - in non-presensitized recipients of allografts pretreated by dimethylsulfoxide
 - in non-presensitized recipients of allografts without pretreatment
 - in presensitized recipients of allografts pretreated by dimethylsulfoxide
 - in presensitized recipients of allografts without pretreatment
- 34. On examination of the foot, the most reliable indicator of instability of the lesser metatarsophalangeal joints is:**
- pain with dorsal/plantar drawer test
 - fixed contracture of the involved digit
 - neuritic symptoms
 - associated intractable plantar keratosis
 - concomitant hammertoe deformity

- 35. Which of the following variables has the strongest association with patient satisfaction following reconstruction of the anterior cruciate ligament?**
- patient age
 - source of the graft used to reconstruct the anterior cruciate ligament
 - difference between sides demonstrated by KT-1000 testing with maximum manual pressure
 - thigh girth
 - patient's subjective assessment of symptoms and function
- 36. A ten-year follow-up study of cementless porous-coated sockets implanted without screw fixation revealed that the most likely cause for revision of the socket was:**
- change of cup position
 - recurrent dislocation
 - aseptic loosening of the socket
 - polyethylene wear
 - liner dissociation
- 37. Comorbidities can adversely affect the results of self-assessment instruments used by patients with musculoskeletal disease. In a study of patients with adhesive capsulitis, which condition was associated with the highest number of comorbidities?**
- low-back pain
 - hypertension
 - diabetes
 - depression
 - Workers' Compensation claim
- 38. What is the most common early complication after hip revision with impacted morselized allograft bone and cement?**
- femoral head dislocation
 - aseptic loosening
 - infection
 - femoral fracture
 - pulmonary embolism
- 39. Accurate sizing of a meniscal allograft is critical for a successful outcome. Following correction for magnification, what percentage of the sagittal length of the tibial plateau is the medial meniscal length?**
- 120%
 - 100%
 - 90%
 - 80%
 - 70%
- 40. Which of the following is the most important factor influencing the longevity of the acetabular component following the conversion of a fused hip to a total hip arthroplasty?**
- diagnosis at the time of fusion
 - gender of the patient
 - age at which the fusion was performed
 - age at which the total hip arthroplasty was performed
 - type/nature of the fusion technique
- 41. The correct initial treatment of a severe rattlesnake envenomation in a child is:**
- intramuscular antivenin
 - intravenous antivenin
 - fasciotomy and débridement of necrotic tissue
 - antivenin only for confirmed compartment syndrome
 - antivenin and fasciotomy
- 42. Which of the following parameters is the most useful early predictor of scoliosis in patients with myelomeningocele?**
- age of onset
 - ambulatory status
 - clinical motor level
 - last intact laminar arch
 - asymmetrical motor involvement
- 43. Postinjection granulomatous inflammation of the knee following intra-articular hylan viscosupplementation is best characterized by:**
- immediate postinjection pain, swelling, and erythema that is self-limited and resolves within two days after the injection
 - mild swelling and warmth that develops within two days after the injection, peaks at five days, and generally resolves by two weeks but with persistent pain
 - mild swelling and warmth that develops within two days after the injection and is accompanied by fever and constitutional symptoms
 - intense pain, swelling, warmth, and erythema that are clinically indistinguishable from the symptoms of septic arthritis
 - moderate swelling and warmth that develop several weeks after the injection and result in chronic, debilitating pain
- 44. In a study of patients younger than sixty who had sustained a displaced subcapital fracture of the hip, the results of reduction and internal fixation performed within the first twelve hours after injury were compared with those of operations done more than twelve hours after injury. It was found that patients who were operated on more than twelve hours after injury had:**
- a poorer functional outcome
 - a higher prevalence of osteonecrosis
 - a higher prevalence of delayed union
 - a higher prevalence of deep venous thrombosis
 - a higher prevalence of urinary tract infection

- 45. According to current recommendations concerning the placement of core sutures in the repair of intrasynovial flexor tendon lacerations:**
- the two-strand core suture technique is optimal because of the decreased bulk at the repair site
 - the four, six, or eight-strand core suture technique is optimal because of the improved biomechanical performance of the repair site up to six weeks postoperatively demonstrable in both ex vivo and in vivo studies
 - the number of suture strands crossing the repair site has no direct effect on repair site strength
 - multiple-strand core suture techniques employing "locking" loops result in significantly higher load-to-failure strength than those employing "grasping" loops do
 - multiple-strand core suture techniques can be employed with little risk to the viability of the tendon stumps and epitenon
- 46. Which of the following are necessary for a good result of the treatment of a chronic unreduced simple dislocation of the elbow?**
- collateral ligament repair with tendon grafts
 - release or transfer of the biceps
 - coronoid bone block
 - limited damage to the articular surfaces
 - good preoperative range of motion
- 47. Reduction of a chronic radial head dislocation is not an easy procedure. In order to achieve good results, which of the following factors is THE LEAST important?**
- osteotomy of the ulna
 - elongation of the ulna
 - rigid fixation of the ulna
 - reconstruction of the annular ligament
 - application of a cast with neutral forearm rotation
- 48. Of the following factors, which is associated with the highest risk of later fracture of the femoral shaft (excluding intraoperative fractures) following surgery for a hip fracture?**
- low mental test score of the patient at the time of the original hip fracture
 - male gender of the patient
 - a hip fracture pattern graded as severe with use of the Garden and Evans classification
 - poor walking ability of the patient prior to the hip fracture
 - use of an implant with a proximal diaphyseal intramedullary stress riser
- 49. Compared with the frequency of an acute local reaction in patients who have only one course of treatment with hylan GF-20 (Synvisc), the frequency in patients who have more than one course of treatment:**
- decreases approximately eightfold in patients treated previously
 - decreases 50% in patients treated previously
 - is the same
 - doubles in patients treated previously
 - increases approximately eightfold in patients treated previously
- 50. Pin loosening is a frequent complication of external fixation. Which of the following measures decreases the risk of pin loosening most?**
- use of pins with a smaller diameter
 - pin-care regimen utilizing topical antibiotics
 - use of hydroxyapatite-coated pins
 - use of pure titanium pins
 - increasing the rigidity of the construct

RESPONSE FORM

EXAMINATION EVALUATION

Did the October 2002 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of reconstructive knee surgery, the spine, and pediatric hip? Yes No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of total knee replacement, adult spine surgery, and congenital hip dysplasia? 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
<input type="checkbox"/> Classified advertising	<input type="checkbox"/> Letters to The Editor
<input type="checkbox"/> Clinical scientific articles	<input type="checkbox"/> Basic scientific articles
<input type="checkbox"/> Orthopaedic Forum	<input type="checkbox"/> Instructional Course Lectures

ACCREDITATION STATEMENT

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the American Academy of Orthopaedic Surgeons (AAOS) and *The Journal of Bone and Joint Surgery* (JBJS). The AAOS is accredited by the ACCME to provide continuing medical education for physicians. The AAOS designates this educational activity for up to 10 hours of category-1 credit toward the AMA Physicians' Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

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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