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The Journal of Bone & Joint Surgery Continuing Medical Education

CME

Review Questions

January, February, March
2001

PURPOSE

The purposes of this CME program are:

- To provide the general orthopaedic surgeon with an ability to assess his or her continuing competence in orthopaedics through the acquisition of contemporary scientific information.
- To provide a broad-based review and update of the major subspecialty areas in orthopaedics.
- To make The Journal reader aware of new advances in orthopaedic surgical techniques and technology.

INSTRUCTIONS

In order to benefit most from this educational experience and qualify for Continuing Medical Education credit, please observe the following instructions:

1. Read the learning objectives listed on the Response Form and be certain that they meet your individual learning needs.
2. These CME questions have been derived from the information presented in the January, February, and March issues of the American volume of *The Journal of Bone and Joint Surgery* (Volume 83-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, 2001.**

1. Proximal lateral opening-wedge osteotomy of the tibia is indicated for osteoarthritis:

A. localized to the lateral condyle of the femur
B. localized to the lateral tibial plateau
C. due to a previous medial meniscectomy
D. associated with crystal arthropathy
E. localized to the medial condyle of the femur

2. Which of the following deformities in the upper cervical spine caused by rheumatoid arthritis is most likely to lead to sudden death?

A. atlantoaxial subluxation
B. subaxial subluxation
C. basilar invagination
D. lysis of the odontoid process
E. facet joint erosion

3. A 45-year-old woman with a cementless total hip replacement prosthesis and a history of metal allergy to inexpensive jewelry complains of general discomfort associated with her implant. Metal hypersensitivity should be considered:

A. when 3 months postoperatively the patient demonstrates dermatitis and swelling near the implant site
B. when 6 months postoperatively the patient complains of pain and joint swelling, and radiographs show periprosthetic osteolysis
C. when 6 months postoperatively the patient brings positive results of a metal allergy patch test conducted by an allergist
D. when 3 years postoperatively the patient has dermatitis, urticaria, and vasculitis

4. In primary total hip arthroplasty for dysplasia with arthritis, a bone graft to improve coverage of the cup is not required if the cup is covered by the host acetabulum by:

A. 40%
B. 50%
C. 60%
D. 70%
E. 80%

5. Arthroscopy of a total knee replacement using a stainless-steel cannula:

A. creates deep troughs in the cobalt-chrome components
B. does not damage the components
C. can leave deposits of stainless steel on the components
D. creates stress risers in the bone
E. creates excessive heat due to reflected light

6. Normal bone turnover in the presence of particulate wear debris can be adversely affected by many mechanisms including the activation of osteoblasts (by ingestion of particles), which can induce:

A. production of IL-6 and PGE-2, and decreased synthesis of type-I collagen

B. increased elaboration of IL-1β and TNF-α, which suppresses osteoclast function
C. prostaglandin-mediated early apoptosis of chondroblasts and osteoblasts
D. degradation of the type-I collagen in bone matrix
E. conversion of undifferentiated mesenchymal cells from an osteoblast lineage to a fibroblast lineage

7. The interobserver accuracy for measurement of congenital scoliosis at the 95% confidence level is:
A. ± 1 degree
B. ± 3 degrees
C. ± 9 degrees
D. ± 12 degrees
E. ± 18 degrees

8. The use of calcium sulfate to fill benign bone lesions:
A. is not recommended due to a high incidence of mechanical failure
B. caused an undesirable inflammatory response
C. could not be followed radiographically to monitor bone resorption
D. has promise as it has desirable resorption characteristics and minimal complications
E. is not recommended as calcium sulfate was incompletely resorbed in most cases

9. In Puloski's series of retrieved posterior stabilized total knee implants, the most prevalent pattern of wear occurring on the tibial post involved:
A. delamination of the medial surface
B. pitting over the anterior surface
C. burnishing of the posterior surface
D. abrasive wear over the anterior surface
E. third-body wear over the posterior surface

10. During uphill walking, which one of the following gait adaptations is most likely to be seen following a soleus muscle flap procedure for coverage of a severe lower extremity soft-tissue wound?
A. decrease in ankle dorsiflexion near the end of single-limb stance
B. shortening of the contralateral step length
C. compensatory increase in the activity of the anterior tibialis muscle
D. increase in plantar flexion at toe-off
E. decrease in peak knee flexion during swing phase

11. Reattachment and repair of the radial carpal ligaments through a volar approach is best indicated for which one of the following wrist injuries?
A. pure radiocarpal dislocation with a fracture of the tip of the radial styloid process
B. radiocarpal dislocation with a radial styloid fracture entering the midportion of the distal radial fossa
C. radiocarpal dislocation with an avulsion fracture of the ulnar styloid process and a dorsal lip fracture of the radius
D. carpal lunate dissociation with an associated capitate fracture
E. radiocarpal dislocation with a "die-punch" fracture of the distal radius

12. Low-intensity ultrasound, as approved by the FDA for the treatment of fractures:
A. is the same magnitude and frequency as that used in diagnostic procedures
B. works more effectively if the fracture is treated for more than 1 hour per day
C. fails to influence the fracture-healing patterns of patients who smoke
D. can decrease the healing time of fresh fractures up to 40%
E. accelerates union of cortical bone but fails to influence the healing times in trabecular bone

13. The following is a list of factors that may potentially decrease the incidence of loosening and infection of the pins used for fixation of halos used to immobilize the cervical spine. Which factor does not reduce the rate of complications but rather increases it?
A. use of 6 pins rather than 4 pins
B. decreasing the distance between the halo ring and the skull
C. placing the halo pin above (superior) to the maximum circumference of the skull
D. retightening the pins at a suitable time interval following application of the halo
E. reducing the patient's activity level and ensuring that the appropriate vest is well fitted

14. Correction of the palmar rotation of the carpal scaphoid in the modified Graner procedure for advanced Kienböck disease is important to:
A. prevent gradual radial shift of the carpus on the radius
B. improve grip strength
C. improve residual motion in the remaining radiocarpal and intercarpal joints
D. prevent progression of osteoarthritis
E. prevent late carpal tunnel syndrome

15. During primary total hip arthroplasty for the dysplastic hip with arthritis, what is the maximum lengthening possible if the sciatic nerve is monitored by visualization and palpation and, if necessary, a wake-up test:
A. 2 centimeters
B. 4 centimeters
C. 6 centimeters
D. 8 centimeters
E. none at all

16. In the treatment of severe congenital femoral deficiency, the results of a rotationplasty of the affected limb can be enhanced by:

A. addition of a Syme amputation
B. fusing the residual femur to the ilium
C. doing the procedure before the age of 2 years
D. amputating the toes
E. shortening the opposite limb

17. The single most important technical factor preventing serious nerve injuries during elbow arthroscopic capsulotomy or synovectomy is:
A. the use of an arm holder
B. the use of suction and a pump
C. the use of retractors
D. the size of the instruments
E. the use of non-powered instruments

18. Lower extremity injury severity score thresholds have been utilized to select patients for amputation or limb reconstruction surgery. A large prospective analysis of the scores found:
A. all are very specific and sensitive and can be used for clinical decision-making
B. only the MESS was a reliable clinical tool
C. the high specificity of the scores validated their use in deciding when early amputation is indicated
D. no support for the utility of any kind of the scores for discrimination between limbs requiring amputation and those likely to be successfully salvaged

19. During a revision knee arthroplasty, it is discovered that the patellar implant is worn and loose. After removal of the patellar implant, the height of the remaining patellar bone measures 12 millimeters. Under these circumstances, it is preferable to:
A. graft the patella and then insert a new prosthesis
B. insert a new prosthesis on the remaining patella
C. perform a patellectomy
D. leave the remaining patella in place and not insert a new patellar prosthesis
E. bone graft the remaining patella using a subsynovial pouch

20. Complete the following statement with the most correct phrase. In patients 50 years of age and older with fractures of the distal radius, injection of a bone cement that undergoes remodeling gives better outcomes when compared to cast immobilization alone,
A. regardless of the amount of fracture comminution
B. even without cast immobilization
C. when the position after closed reduction was satisfactory
D. but only in the treatment of nondisplaced fractures
E. however the rate of malunions was higher in the group treated with cement

21. When compared to uninstrumented, bone-only anterior decompression and fusion for the operative treatment of single-level cervical degenerative disc disease, the use of a fusion cage is associated with:
A. increased rates of both fusion and complications
B. an increased fusion rate and fewer complications
C. a lower fusion rate and more frequent complications
D. a lower fusion rate and fewer complications
E. improved functional outcome measures

22. A patient with a hip fracture is mentally incapable of giving informed consent for nonemergent surgical fixation of the fracture. No immediate family members can be found, and the patient has not previously granted anyone power of attorney. If the orthopaedic surgeon wishes to proceed with surgical fixation of the fracture, the surgeon should first:
A. contact the risk management department and its malpractice insurance carrier
B. carefully document that the procedure is in the patient's best interest and then proceed with surgery
C. obtain a second opinion from another qualified physician
D. seek a court-appointed surrogate to act on the patient's behalf
E. ask the hospital legal counsel to place a note in the medical record responding to the need for surgery

23. What is the most important major goal of any community trauma hospital?
A. create a workable call schedule for staff surgeons
B. ensure that patients do not die from treatable injuries
C. detect early and refer complex spine and pelvic trauma to level-one centers
D. create contracts that exclude complex trauma care
E. design better telecommunication systems for trauma care

24. Radiographic analysis of the kinematics of the low contact stress meniscal bearing total knee replacement demonstrates that during knee flexion:
A. femoral rollback occurs in the vast majority of cases
B. the meniscal bearings do not move appreciably
C. knee flexion is decreased in knees that do not demonstrate femoral rollback
D. the lack of femoral rollback indicates an insufficiency of the posterior cruciate ligament
E. the meniscal bearings move backward as much as 1 centimeter

25. Intraoperative injury to the medial collateral ligament during primary total knee arthroplasty (TKA) for varus gonarthrosis is best treated by:
A. primary repair combined with medial hamstring transfer
B. immediate primary suture repair and hinged knee bracing for 6 weeks
C. a rotating hinged TKA component

D. proceeding with the case as though the injury had not occurred
E. immediate allograft reconstruction of the medial collateral ligament

26. Inferences from meta-analyses are most limited by which of the following?
A. publication bias
B. scientific methodology of the meta-analysis
C. quality of the primary studies being pooled
D. lack of studies authored by epidemiologists
E. publication in a non-surgical journal

27. An acute grade-III injury of the ligamentous structures of the posterolateral knee is probably best treated by:
A. bracing and aggressive physical therapy
B. delayed reconstruction of injured structures using allograft
C. immediate reconstruction of all injured structures with allograft
D. direct anatomic repair of all injured structures within 3 weeks
E. long leg cast immobilization for at least 6 weeks

28. The ERAS (Electronic Residency Application Service) charts of female applicants to orthopaedic residency programs are ranked:
A. significantly better than those of males with similar qualifications
B. significantly worse than those of males with similar qualifications
C. the same as those of males with similar qualifications
D. more highly if the applicant is an accomplished athlete
E. more highly by female reviewers

29. In patients with femoral neck and intertrochanteric fractures, preoperative skin traction:
A. reduces pain
B. decreases complications
C. improves fracture healing
D. is no more effective than no traction
E. is equally effective as skeletal traction

30. True intra-articular lipoma is characterized by:
A. slow enlargement of a painless knee swelling accompanied by intermittent effusions
B. joint trauma, meniscal lesions, chronic synovitis or arthritis
C. a history of joint swelling and pain of varying duration caused by the interposition of the tumor mass and strangulation of the tumor secondary to volvulus about its stalk
D. villous proliferation of the synovial membrane and hyperplasia of the subsynovial fat
E. magnetic resonance findings of a large frond-like mass arising from the synovium with a signal intensity similar to that of fat in a pulse sequence

31. In the long-term follow-up of transtibial amputees from the Vietnam war, the only difference between those with an isolated injury and those with multiple injuries was:
A. quality of gait pattern
B. incidence and severity of stump complications
C. need for psychological support services
D. amount of prosthetic wear
E. number of years employed

32. The amount of time required to successfully infect peripheral blood derived buffy coat cells with adenoviruses containing the LMP-1 cDNA is:
A. 1 minute
B. 10 minutes
C. 60 minutes
D. 2 hours
E. 10 hours

33. When comparing early and delayed surgical treatment of displaced supracondylar fractures of the humerus in children, which of the following statements is most accurate?
A. early surgery significantly reduces the need for open reduction and has no measurable effect on iatrogenic nerve injury
B. delayed surgery does not affect the rate of infection and significantly increases the rate of compartment syndrome
C. early surgery significantly reduces the rate of iatrogenic nerve injury and increases the rate of infection
D. delayed surgery significantly increases the rate of infection and increases the need for open reduction
E. early surgery does not affect the need for open reduction and has no measurable effect on compartment syndrome

34. Which of the following is not a risk factor for supracondylar femoral fracture after total knee replacement:
A. advanced age
B. rheumatoid arthritis
C. anterior notching of the distal femur
D. male sex
E. chronic use of corticosteroids

35. The most likely mechanism of action of low-intensity ultrasound on bone and connective tissues is:
A. enhanced blood flow to the injury site, but only during exposure to the signal
B. upregulation of aggrecan expression
C. induction of a low-level mechanical signal to the bone by acoustic pressure waves
D. inhibition of angiogenesis
E. upregulation of the bone morphogenetic protein transcription pathways

36. Distal clavicle excision is indicated with subacromial decompression for rotator cuff dysfunction and pain when:

A. there is radiographic evidence of acromioclavicular (AC) joint degeneration with impingement
B. AC joint instability is the primary cause of AC joint pain with impingement
C. conservative treatment for AC joint arthralgia and impingement has failed
D. positive impingement signs are present with a type-III acromion
E. MRI shows encroachment into the subacromial space by bone spurs on the inferior surface of the AC joint

37. The integrity of the interosseous membrane (IOM) is important to load transmission in the human forearm under which one of the following loading conditions:
A. after radial shortening procedures
B. after ulnar lengthening procedures
C. when a gap exists between the radial head and the capitellum, such as after a radial head excision
D. when there is contact between the radial head and the capitellum, such as the normal valgus alignment of the elbow
E. only with increased loads (>133 newtons) and is relatively inactive at lower loads (<133 newtons)

38. In a goat model, full-thickness osteochondral defects of the medial femoral condyle, measuring 6 millimeters in diameter and depth:
A. heal with fibrocartilage
B. heal with articular cartilage
C. heal with fibrous tissue and bone
D. do not heal and remain quiescent
E. do not heal but enlarge and become cavitary

39. When a grade-III injury of all posterolateral knee structures occurs in combination with a complete tear of the posterior cruciate ligament, which of the following physical examination findings would be expected?
A. increased tibial external rotation at 30 but not 90 degrees of flexion
B. increased tibial external rotation at 90 but not 30 degrees of flexion
C. no change in tibial external rotation
D. decreased varus rotation at all angles of flexion
E. increased tibial external rotation at 30 and 90 degrees of flexion

40. Intra-articular lipomas of the knee joint:
A. are very common
B. rarely exceed the size of a hen's egg
C. are histologically identical to lipoma arborescens
D. do not have a pedicle
E. usually are found in the intercondylar notch

41. The mechanism of loosening of posterior cruciate substituting total knee prostheses has been demonstrated to be due to:
A. transmission of anterior-posterior shear stresses from the cam-post mechanism
B. excessive wear of polyethylene patellar components
C. tibiofemoral impingement in extension
D. initial malalignment of the femoral component
E. transmission of tibiofemoral rotational stresses

42. Which of the following factors was most important in orthopaedists' decisions to leave a full-time academic position for private practice?
A. tenure considerations
B. institutional and departmental leadership
C. financial compensation and autonomy
D. resources for research
E. patient volume and mix

43. The use of structural allograft to replace bone loss in revision knee arthroplasty is:
A. contraindicated due to the inability to gain adequate graft-prosthesis stability
B. durable in the medium term
C. often a failure in the short term due to graft resorption
D. hampered by a high allograft-host nonunion rate
E. contraindicated due to the risk of disease transmission

44. Which of the following irrigating solutions, when delivered at low pressures, results in the greatest removal of adherent bacteria from bone without compromising osteoblast function:
A. normal saline
B. antibiotic
C. povidone
D. soap
E. chlorhexidine

45. Implant-related hypersensitivity reactions are associated with type-IV delayed-type hypersensitivity (DTH) responses, which are:
A. mediated by B cells in response to metal protein complexes
B. mediated by T helper cells in response to metal protein complexes
C. mediated by macrophages in response to particulate metal debris
D. mediated by T cytotoxic cells in response to particulate metal debris

46. In a recent study of surgical repair of chronic rotator cuff tears, Cofield et al. found that the size of the tear was an important predictor of outcome. Which of the following factors is not associated with an increased size of the tear?
A. older age
B. less preoperative range of motion
C. history of distal clavicle resection
D. handedness
E. increased preoperative weakness

47. Compared to landing without catching a ball, the upper limb motion of catching a ball during landing resulted in:

A. greater biceps femoris muscle activity relative to vastus lateralis muscle activity, thereby predisposing the anterior cruciate ligament to injury
B. less rectus femoris muscle activity relative to biceps femoris muscle activity, thereby predisposing the anterior cruciate ligament to injury
C. a significantly shorter time between the onset of biceps femoris activity and the onset of rectus femoris activity, thereby predisposing the anterior cruciate ligament to injury
D. a significantly longer time between the onset of biceps femoris activity and the onset of rectus femoris activity, thereby predisposing the anterior cruciate ligament to injury
E. similar onset times between the biceps femoris and rectus femoris muscles, therefore suggesting no change to anterior cruciate ligament injury risk between the two conditions

48. Long-term follow-up after arthrodesis of the ankle shows that degenerative arthritis of other foot joints is common. Which joint is most likely to be affected?

A. subtalar
B. calcaneocuboid
C. talonavicular
D. naviculocuneiform
E. first metatarsal-cuneiform

49. Revision of a loose femoral component associated with severe bone loss can be accomplished with good long-term (9-15-year) results in over three-quarters of patients using:

A. any femoral prosthesis combined with oral biphosphonates
B. any femoral prosthesis combined with ultrasound stimulation
C. a long-stem femoral prosthesis without cement or bone graft
D. a long-stem femoral prosthesis cemented to a proximal femoral allograft but not to host bone
E. a long-stem femoral prosthesis/allograft composite cemented to host bone over its distal half only

50. Administration of enoxaparin for 4 weeks following major lower extremity joint replacement surgery:

A. reduces the incidence of thromboembolism following total hip replacement
B. provides no therapeutic benefit in total joint surgery
C. was equally effective as a placebo in reducing the incidence of symptomatic pulmonary embolism in total joint replacement
D. had an unacceptably high rate of neurologic complications
E. was associated with worrisome changes in liver function tests

BONUS QUESTION *(optional)*

51. On the axial T1-weighted magnetic resonance image, the normal, intact interosseous membrane of the human forearm most closely resembles the physiognomy of:

A. Dracula
B. Little Red Riding Hood
C. The Lone Ranger
D. Spiderman
E. Howdy Doody

RESPONSE FORM

EXAMINATION EVALUATION

Did the April 2001 CME Review Questions meet these educational objectives:

1. Provide a broad-based review and update specifically in the areas of shoulder surgery, sports medicine, and hand surgery? ❑ Yes ❑ No
2. Provide you with an ability to assess your continuing competance in orthopaedics? ❑ 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): _____

_____

_____

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
   ____ Geriatric
   ____ Pediatric
   ____ Rehabilitation
   ____ Sports
   ____ Trauma
   ____ Spine
   ____ Hand
   ____ Rheumatology
   ____ Foot and Ankle
   ____ Other: _____
4. Which is your number-one priority to read when you receive *The Journal* (American volume only) each month?
   ❑ Commercial advertising
   ❑ Classified advertising
   ❑ Clinical scientific articles
   ❑ Orthopaedic Forum
   ❑ Current Concepts
   ❑ Letters to The Editor
   ❑ Basic scientific articles
   ❑ 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 x121.

ANSWER KEY

Black out the correct answers

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