CME 3: July, August, September 2012

Published on October 03, 2012, *Expires Jan 16, 2013, at 12:01 AM Pacific Standard Time*

Note: You must read all the articles and answer at least **50%** of the questions correctly to pass this exam.

Clear Answers Save for Later

Article Title: Effectiveness and Safety of Tranexamic Acid in Reducing Blood Loss in Total Knee Arthroplasty: A Meta-Analysis [Full Text] PDF

1. A sixty-eight-year-old woman presents with swelling and pain in the left knee, which she has had persistently for two days after a total left knee arthroplasty. The knee swelling had gradually increased postoperatively. A tourniquet was used intraoperatively. On examination, the left knee is swollen and tender. The hemoglobin level is 9.0 g/dL, and the hematocrit is 37%. A left lower-limb B-type ultrasound reveals no deep vein thrombosis. A diagnosis of hemarthrosis is made. Which of the following has been demonstrated to reduce bleeding immediately following total knee arthroplasty?

- **A.** tranexamic acid
- **B.** vitamin K1
- **C.** protamine sulfate
- **D.** menadiol diacetate
- **E.** prothrombin complex

Article Title: The Efficacy of a Thrombin-Based Hemostatic Agent in Unilateral Total Knee Arthroplasty. A Randomized Controlled Trial [Full Text] PDF

2. Which of the following has not been shown in the literature to result from bone and soft-tissue bleeding after total knee arthroplasty?

- **A.** pain
- **B.** decreased knee motion
- **C.** increased transfusion rates
- **D.** increased length of hospital stay
- **E.** infection

Article Title: Single Versus Double-Incision Technique for the Repair of Acute Distal Biceps Tendon Ruptures. A Randomized Clinical Trial [Full Text] PDF

3. A forty-year-old man sustained a distal biceps tendon rupture in the dominant upper extremity. After treatment with a single-incision surgical technique, what is the most likely abnormal neurologic finding?

- **A.** weak thumb interphalangeal joint extension
- **B.** dorsal hand numbness
- **C.** weak wrist flexion
- **D.** volar forearm numbness
- **E.** weak wrist extension

Article Title: The Timed Up and Go Test Is an Early Predictor of Functional Outcome After Hemiarthroplasty for Femoral Neck Fracture [Full Text] PDF

4. A seventy-eight-year-old woman fell down the stairs and sustained a displaced left femoral neck fracture that was successfully treated with a left hip hemiarthroplasty. This previously active patient is experiencing a slow recovery with limited walking. Her family is worried that she may never regain her independence and ability to return home. What is the most appropriate early predictor of physical function and the prognosis for independent walking after surgical treatment of a hip fracture?

- **A.** Harris hip score
- **B.** Timed Up and Go test
- **C.** Short Form-36
- **D.** preinjury function
- **E.** preinjury ability to walk and current presence of pain

Article Title: Change of Craniofacial Deformity After Sternocleidomastoid Muscle Release in Pediatric Patients with Congenital Muscular Torticollis [Full Text] PDF

5. A three-year-old boy is seen in your office because of an awkward head position. The head is tilted to the right side and the face is rotated to the left. The boy's mother remembers that she could palpate a hard mass on the right side of his neck during the first couple of months after birth, after which the mass subsided spontaneously. After he

had head control, he seemed to be more comfortable with his neck tilted to the right side and with his face rotated to the left. As he grew, the head tilt became more obvious, and the skull seemed to grow asymmetrically. Examination shows a head tilt of 30° to the right side and a 30° lack of neck rotation to the right side. No mass is palpable in the neck. Ophthalmic tests reveal no abnormal findings. No vertebral abnormality is seen on cervical spine radiographs. Which of the following is the most likely diagnosis?

- **A.** atlantoaxial rotatory subluxation
- **B.** cervical spine tumor
- **C.** congenital muscular torticollis
- **D.** strabismus
- **E.** retropharyngeal abscess

Save for Later

Article Title: Relationship of Hyperglycemia and Surgical-Site Infection in Orthopaedic Surgery [Full Text] PDF

6. A thirty-five-year-old man fell from a three-story building, sustaining injuries limited to a right femoral neck fracture and a right distal radial fracture. The only relevant medical history was hypertension. On admission to the hospital, the basic metabolic panel revealed the following levels: sodium: 135 mEq/L, potassium: 3.4 mEq/L, chloride: 102 mEq/L, bicarbonate: 25 mmol/L, blood-urea-nitrogen: 10 mg/dL, creatinine: 0.92 mg/dL, and glucose: 150 mg/dL. The patient underwent urgent operative intervention with open reduction and internal fixation of the right femoral neck fracture. Intraoperatively, he received 1 L of normal saline solution and 2.5 L of PLASMA-LYTE. The blood glucose level was 190 mg/dL immediately postoperatively and 188 mg/dL on postoperative day one. What is the most likely explanation for the patient's hyperglycemia?

- **A.** stimulation of the sympathetic nervous system and increased levels of cholecystokinin, increasing gastric hydrogen-ion secretion promoting breakdown of complex sugars
- **B.** an alteration of endogenous hormones, including excess catecholamine production, resulting in gluconeogenesis, glycogenolysis, and insulin resistance
- **C.** angiogenesis and increased osteoblastic activity at the fracture site resulting in a release of glucose into the systemic circulation
- **D.** activation of the neuro-adrenal axis in an attempt to obtain hemodynamic compensation, increasing levels of angiotensin II and aldosterone, and increased urine output

Article Title: Comparison of Two Preoperative Skin Antiseptic Preparations and Resultant Surgical Incise Drape Adhesion to Skin in Healthy Volunteers [Full Text] PDF

7. Which of the following skin preparations has been demonstrated to be the most effective for all surgical sites?

- **A.** chlorhexidine gluconate/isopropyl alcohol
- **B.** povidone-iodine scrub paint with an isopropyl alcohol application
- **C.** iodine povacrylex/isopropyl alcohol
- **D.** no specific skin preparation

Article Title: Systems-Based Safety Intervention: Reducing Falls with Injury and Total Falls on an Orthopaedic Ward [Full Text] PDF

8. A sixty-seven-year-old woman is admitted to the orthopaedic ward of an acute-care hospital following an elective total knee replacement. During which of the following scenarios in the postoperative period is the patient at highest risk of falling?

- **A.** therapy (physical or occupational)
- **B.** toileting
- **C.** changing clothes for discharge
- **D.** walking with the nurse
- **E.** walking with family

Article Title: Acute Achilles Tendon Rupture. A Questionnaire Follow-up of 487 Patients [Full Text] PDF

9. A fifty-two-year-old man sustained a complete Achilles tendon rupture while playing his first tennis match after a few months of sports inactivity. He has generally been in good health. On physical examination, he has weak ankle plantar flexion, a palpable gap of 2.5 cm proximal to the Achilles tendon insertion on the calcaneus, and a positive Thompson test. Which of the following is most likely to be true for this patient with total Achilles tendon rupture?

- **A.** because this is a total Achilles tendon rupture, it must be treated surgically
- **B.** because of the low risk of complications and good patient-reported function, nonsurgical treatment is appropriate
- **C.** because of a high risk of infection at this age, nonsurgical treatment is mandatory
- **D.** because this is a sports injury, it must be treated surgically

Article Title: A Multicenter Randomized Controlled Trial Comparing Single-Row with Double-Row Fixation in Arthroscopic Rotator Cuff Repair [Full Text] PDF

10. A fifty-four-year-old woman presents to you with right shoulder pain of insidious onset, located in the lateral aspect of the shoulder. She has nocturnal pain and discomfort with forward elevation of the arm. Physical examination reveals weakness in the supraspinatus muscle distribution. Magnetic resonance imaging demonstrates a small full-thickness supraspinatus tear. Which of the following arthroscopic treatments is most likely to result in tendon-healing?

- **A.** arthroscopic cuff repair with single-row fixation
- **B.** arthroscopic cuff repair with double-row fixation
- **C.** arthroscopic cuff repair with single-row fixation and acromioplasty
- **D.** arthroscopic cuff repair with double-row fixation and acromioplasty
- **E.** arthroscopic acromioplasty and debridement

Save for Later

Article Title: Suture Number Determines Strength of Rotator Cuff Repair [Full Text] PDF

11. A fifty-nine-year-old man undergoes uneventful right rotator cuff tendon repair. One week after surgery, he trips and breaks his fall with his right arm. On the basis of

biomechanical studies of sheep, which of the following techniques and treatments used at the time of surgery is most likely to prevent acute failure of the rotator cuff repair in this patient?

- **A.** higher numbers of sutures crossing the tendon
- **B.** a double-row repair technique
- **C.** a single-row repair technique
- **D.** subacromial decompression
- **E.** injection of platelet-rich plasma

Article Title: Spica Casting for Pediatric Femoral Fractures. A Prospective, Randomized Controlled Study of Single-Leg Versus Double-Leg Spica Casts [Full Text]

PDF

12. A three-year-old boy with a midshaft oblique femoral fracture with 5 mm of shortening on initial radiographs is treated with a single-leg hip spica cast after fracture reduction. Compared with what can be expected after use of a double-leg hip spica cast, which of the following should be expected after use of a single-leg hip spica cast?

- **A.** increased varus angulation at the fracture site
- **B.** the child's parents requiring significantly less time off from work
- **C.** significantly more difficulty with cast abrasions
- **D.** decreased comfort while sitting in a chair

Article Title: Obesity, Diabetes, and Preoperative Hyperglycemia as Predictors of Periprosthetic Joint Infection. A Single-Center Analysis of 7181 Primary Hip and Knee Replacements for Osteoarthritis [Full Text]

PDF

13. A sixty-two-year-old man presents for consideration of knee replacement. He has continuous pain when walking and difficulty with fully extending and flexing the right knee. Radiographs indicate severe osteoarthritis, and total knee replacement is recommended. The patient is, however, concerned about the risk of postoperative infection. He takes medication for hypertension and has been recently prescribed an oral antidiabetic medication for type-II diabetes. He is otherwise healthy. His body mass index is 31 kg/m^2 (a weight of 100 kg, and a height of 180 cm). Which of the following best describes his risk of postoperative infection?

- **A.** only morbid obesity is a risk factor for infection
- **B.** diabetes increases the risk of infection only when insulin is required
- **C.** in obese patients, diabetes approximately doubles the risk of infection
- **D.** his comorbid diseases have no effect on the risk of infection

Article Title: Reliability of Predictors for Screw Cutout in Intertrochanteric Hip Fractures [Full Text]

PDF

14. A seventy-eight-year-old woman fell at home and sustained a peritrochanteric hip fracture (type A3). She underwent surgery, at which time a gamma nail was placed to maintain the fracture reduction. On the immediate postoperative radiograph, a tip-apex distance of 22.7 mm was measured and the lag screw was in a central-inferior position. After three weeks, the patient presents with sudden, renewed pain in the operatively treated hip, in the absence of new trauma. Radiographs made at this time show that the lag screw has cut out of the femoral head. Which factor most likely is the reason for this screw cutout?

- **A.** the use of a gamma nail
- **B.** the type-A3 fracture
- **C.** the tip-apex distance
- **D.** the central-inferior position of the lag screw

Article Title: Adverse Outcomes in Hip Arthroplasty: Long-Term Trends [Full Text]

PDF

15. A sixty-five-year-old man with a history of renal failure and diabetes presents to the emergency room complaining of an inability to walk due to dramatically worsening hip pain. He underwent a total hip arthroplasty fifteen years earlier. Radiographs reveal marked loosening of both the femoral and the acetabular component with osteolysis. During discussion of the risks and benefits of revision total hip arthroplasty, he should be advised of which of the following risks?

- **A.** an approximately 20% risk of readmission to the hospital within three months after surgery
- **B.** a 5% risk of bleeding complications requiring a return to the operating room
- **C.** a risk of an adverse outcome that is similar to the risk after his primary hip arthroplasty
- **D.** a 2% risk of death within three months after surgery

Save for Later

Article Title: The Safety of Controlled Hypotension for Shoulder Arthroscopy in the Beach-Chair Position [Full Text]

PDF

16. What level of evidence currently guides most anesthesiologists in the management of controlled hypotension during shoulder arthroscopy for patients in the beach-chair position?

- **A.** I
- **B.** II
- **C.** III
- **D.** IV
- **E.** V

Article Title: Simple Guidelines for Efficient Referral of Soft-Tissue Sarcomas. A Population-Based Evaluation of Adherence to Guidelines and Referral Patterns [Full Text]

PDF

17. A seventy-three-year-old man suddenly realized that his left thigh was swollen when trying on new pants. He had not noted any pain or functional limitation. One week later, he was evaluated by his physician. On physical examination, a deep mass could be seen and palpated in the proximal-medial aspect of the left thigh. With hip adduction, the mass could not be moved but when he relaxed his muscles, the mass was not fixed to bone. The mass was firm but not hard and was roughly 8 cm in size. All standard serum laboratory tests revealed levels that were within a normal range. How should you proceed with the investigation and treatment of this soft-tissue mass?

- **A.** no need for further investigation, all serum levels are normal and the patient feels fine
- **B.** do an open biopsy of the mass
- **C.** prepare the patient for a local excision of the mass at your surgical center
- **D.** refer the patient to a tertiary sarcoma center
- **E.** observe the mass for growth over the next three months

Article Title: A Clove-Hitch Suture Method for Small-Caliber Tendon Ends [Full Text] PDF

18. The single pull-out clove-hitch suture method is chosen intraoperatively to secure a tibialis anterior tendon transfer to the cuboid in a child who is being treated for residual congenital clubfoot deformity. How many passes of the suture material are made through the tendon with this method?

- **A.** one
- **B.** two
- **C.** three
- **D.** four

Article Title: Arthroscopic Bankart Repair and Capsular Shift for Recurrent Anterior Shoulder Instability. Functional Outcomes and Identification of Risk Factors for Recurrence [Full Text] PDF

19. A twenty-two-year-old man presents to his attending orthopaedic physician after sustaining an anterior dislocation of the right shoulder while playing football. He has had two prior anterior glenohumeral dislocations of this shoulder since he was eighteen years old, both of which were treated with physical therapy. Radiographs of the right shoulder demonstrate a large Hill-Sachs lesion in the humeral head. He is otherwise in good health. Physical examination of the right shoulder demonstrates a positive anterior apprehension sign but no hyperlaxity or multidirectional instability. Which of the following is an independent risk factor for recurrence following arthroscopic Bankart repair of a recurrent anterior glenohumeral dislocation?

- **A.** patient sex
- **B.** patient age at the time of surgery
- **C.** previous number of dislocations
- **D.** participation in contact sports

Article Title: Use of Platelet-Leukocyte Membrane in Arthroscopic Repair of Large Rotator Cuff Tears. A Prospective Randomized Study [Full Text] PDF

20. A sixty-two-year-old man presents to you because of a six-month history of right shoulder pain, a decrease in abduction strength, and limited shoulder motion. Magnetic resonance imaging (MRI) of the involved shoulder shows a large repairable posterosuperior rotator cuff tear. The patient is well informed about rotator cuff surgery from the Internet and asks if there is a possible role for platelet-rich plasma in the treatment of his shoulder condition. On the basis of the recent literature, which of the following is the possible role of platelet-rich plasma in rotator cuff repair?

- **A.** it may shorten immobilization time after surgery
- **B.** it may lessen postoperative pain
- **C.** it may improve rotator cuff healing
- **D.** it may reduce the bleeding of the abraded greater tuberosity footprint

Save for Later

Article Title: The Impact of Epidural Steroid Injections on the Outcomes of Patients Treated for Lumbar Disc Herniation. A Subgroup Analysis of the SPORT Trial [Full Text] PDF

21. In the Spine Patient Outcomes Research Trial (SPORT), patients who had received epidural steroid injections for treatment of a herniated lumbar intervertebral disc had which of the following differences in outcome at one year and four years relative to patients who had not received epidural steroid injections?

- **A.** no difference in improvement at one year or four years
- **B.** less improvement at one year, more improvement at four years
- **C.** no difference in improvement at one year, more improvement at four years
- **D.** more improvement at one year, no difference in improvement at four years

Article Title: Variability in the Definition and Perceived Causes of Delayed Unions and Nonunions. A Cross-Sectional, Multinational Survey of Orthopaedic Surgeons [Full Text] PDF

22. Which of the following criteria do orthopaedic surgeons believe will provide the most accurate diagnosis when they assess the healing of a fracture?

- **A.** clinical criteria alone would give the most accurate diagnosis
- **B.** radiographic criteria alone would give the most accurate diagnosis
- **C.** both clinical and radiographic criteria are equally important in giving the most accurate diagnosis
- **D.** neither clinical nor radiographic criteria should be used; instead, some other criteria should be employed

Article Title: The Cost-Effectiveness of Single-Row Compared with Double-Row Arthroscopic Rotator Cuff Repair [Full Text] PDF

23. A fifty-six-year-old man presents to you for evaluation of right shoulder pain of insidious onset. He has weakness but full shoulder motion. A magnetic resonance imaging (MRI) study demonstrates a full-thickness defect in the rotator cuff. After unsuccessful treatment with physical therapy and injections, the patient and physician decide to proceed with arthroscopic rotator cuff repair. You are aware of the importance of practicing the most cost-effective medicine. In which scenario is a double-row rotator cuff repair more cost-effective than a single-row repair for this patient?

- **A.** a massive 5-cm tear with retraction to the glenoid and grade-III atrophy
- **B.** a 1-cm full-thickness tear of the supraspinatus without retraction
- **C.** a 3-cm tear in the dominant shoulder

- **D.** a 3-cm tear in the nondominant shoulder
- **E.** a double-row repair is not more cost-effective

Article Title: High-Flexion Total Knee Arthroplasty: Survivorship and Prevalence of Osteolysis. Results After a Minimum of Ten Years of Follow-up [Full Text]

PDF

24. The high-flexion total knee arthroplasty system was introduced to enhance knee flexion and decrease wear of tibial polyethylene. Compared with the standard total knee prosthesis, the high-flexion total knee system includes an extension of the posterior condyle of the femoral component by 2 mm, a modification of the cam and tibial spine, and a reduction of patellar impingement. The purpose of an extended posterior condyle of the femoral component is to extend the surface of the femoral component posteriorly to theoretically increase the articular contact area at high flexion angles and increase posterior femoral translation and knee flexion. Which of the following is the least important factor to enhance knee motion after total knee arthroplasty?

- **A.** a good preoperative range of motion of the knee
- **B.** achieving well-balanced extension and flexion space with the arthroplasty
- **C.** limb characteristics (long and slender versus short and thick)
- **D.** the patient's motivation
- **E.** use of a high-flexion total knee prosthesis

Article Title: A Study in Vivo of the Effects of a Static Compressive Load on the Proximal Tibial Physis in Rabbits [Full Text]

PDF

25. A fifteen-year-old boy presents to his physician with pain in his knees and hips that has persisted for several months. He is a competitive heavyweight lifter who practices and specializes in lifting barbells in the range of 200 to 300 lb (91 to 136 kg). Physical examination reveals tenderness in the knees over the proximal tibial physis. Radiographs indicate asymmetrical compression of the distal femoral and proximal tibial physes with mild tibia vara. Compression of physes from excessive weight-lifting is likely to result in which of the following?

- **A.** loss of synovial fluid from joint capsules
- **B.** increasing calcification of femoral articular surfaces
- **C.** loss of type-II collagen and aggrecan comprising the physes
- **D.** increasing systemic growth factors
- **E.** loss of matrix metalloproteinases in physes

Save for Later

Article Title: Effects of Neoadjuvant Chemotherapy on Image-Directed Planning of Surgical Resection for Distal Femoral Osteosarcoma [Full Text]

PDF

26. When an orthopaedic surgeon chooses to recommend neoadjuvant chemotherapy prior to resection of an extremity osteosarcoma, he or she should know that the decision is which of the following?

- **A.** based on opinion with no foundation in clinical evidence
- **B.** thoroughly evidence-based, supported by Level-I randomized controlled trials
- **C.** rational, with a variety of supporting arguments based indirectly on clinical evidence
- **D.** extremely controversial, as few American orthopaedic surgeons choose neoadjuvant chemotherapy for osteosarcoma

Article Title: Vancomycin-Modified Implant Surface Inhibits Biofilm Formation and Supports Bone-Healing in an Infected Osteotomy Model in Sheep. A Proof-of-Concept Study [Full Text]

PDF

27. A thirty-eight-year-old woman sustained a grade-IIIB open fracture of the distal parts of the left tibia and fibula in an automobile accident. The wound was debrided and the fracture was stabilized with an external fixator. She subsequently underwent two additional operative procedures, including insertion of an intramedullary nail. She developed a surgical site infection and a subsequent fracture nonunion. Culture results identified methicillin-resistant Staphylococcus aureus (MRSA) as the causative organism. Radiographs demonstrated a 2-cm tibial defect with sclerotic bone ends but no sequestrum. The intramedullary rod remains in good position. What is the most likely explanation for the chronic infection leading to a nonunion in this patient?

- **A.** biofilm formation on the implants
- **B.** interfragmentary motion at the fracture site
- **C.** wrong choice of intramedullary nail system
- **D.** poor patient compliance
- **E.** false-positive culture result for MRSA

Article Title: Risk of Injury to the Superior Gluteal Nerve When Using a Proximal Incision for Insertion of a Piriformis-Entry Reamed Femoral Intramedullary Nail. A Cadaveric Study [Full Text]

PDF

28. A forty-two-year-old man with a body mass index (BMI) of 42 kg/m^2 and a weight of 285 lb (129 kg) sustained a closed right femoral shaft fracture. You decide to utilize a piriformis fossa-entry reamed intramedullary nail for fixation through a proximal incision located at the level of the iliac crest. What will minimize damage to the superior gluteal nerve during instrumentation and nail insertion?

- **A.** the addition of a protective sleeve during reaming and instrumentation
- **B.** nothing: the use of a proximal incision for instrumentation and nailing has an inherently increased risk for nerve damage
- **C.** instrumentation and nail insertion along the trajectory of the femoral anatomic axis
- **D.** lateral decubitus position of the patient for nail insertion
- **E.** an extensile exposure to isolate the superior gluteal nerve so that it can be visualized during instrumentation and nailing

Article Title: Distraction Osteogenesis for Complex Foot Deformities: U-Osteotomy with External Fixation [Full Text]

PDF

29. A twenty-four-year-old computer salesman complains of a right foot deformity with discomfort after walking long distances. He had a congenital right clubfoot and had undergone three prior operations as a child, including posteromedial release, tibialis anterior tendon transfer, and triple arthrodesis. Examination shows a varus forefoot, a stiff

subtalar joint in varus, and a painless ankle joint. Clinically, the hindfoot varus and forefoot varus are equal in severity. Radiographs of the ankle show no evidence of arthritis, a flat-top talus, a 2.5-cm limb-length discrepancy, and a severe varus deformity of 30°. Which surgical procedure would best correct this complex foot deformity?

- **A.** midtarsal joint fusion
- **B.** U-osteotomy with external fixation (distraction osteogenesis)
- **C.** ankle arthrodesis
- **D.** Achilles tendon lengthening
- **E.** amputation of the foot

Article Title: The Orthopaedic Forum. Levels of Evidence in Foot and Ankle Surgery Literature: Progress from 2000 to 2010? [Full Text] PDF

30. A prospective study of two methods of Achilles tendon repair was done. In one group (sixteen patients), the two tendon ends were repaired with use of a modified Kessler suture; in the control group (sixteen patients), the two tendon ends were opposed but no suture was used. The patients were randomly assigned to the groups, and both groups received the same postoperative regimen and rehabilitation protocol. Assessment was by the same blinded independent physiotherapist reviewer. No prior power calculation was undertaken, and the results showed no significant difference between the groups in terms of the primary outcome measure, which was rerupture at twenty-four months. Which of the following level-of-evidence classifications used by JBJS best describes this study?

- **A.** Level I, prognostic study
- **B.** Level I, therapeutic study
- **C.** Level II, prognostic study
- **D.** Level II, therapeutic study
- **E.** Level III, therapeutic study

Save for Later

Article Title: Topics in Training. Reshaping Orthopaedic Resident Education in Systems-Based Practice [Full Text] PDF

31. What is the most commonly utilized learning tool for teaching the systems-based practice competency in resident education reported by orthopaedic residents and educators?

- **A.** online learning programs
- **B.** quality improvement projects
- **C.** self-directed study
- **D.** clinical observation
- **E.** didactics and case-based learning

Article Title: Injection of the Subacromial Bursa in Patients with Rotator Cuff Syndrome. A Prospective, Randomized Study Comparing the Effectiveness of Different Routes [Full Text] PDF

32. A fifty-four-year-old woman presents with a one-year history of nontraumatic, insidious-onset right shoulder pain that is worse with overhead activity and awakens her at night. Physical examination reveals tenderness over the anterior aspect of the acromion on palpation and pain with shoulder abduction from 80° to 120°. Pain is increased with passive flexion of the shoulder in internal rotation (the impingement test). Anteroposterior and outlet radiographs demonstrate a normal glenohumeral joint, absence of calcification, and a curved acromion. A diagnosis of rotator cuff syndrome is made, and a therapeutic injection of local anesthetic and corticosteroid is offered to the patient. Which of the following statements is most accurate for this patient?

- **A.** injection of the subacromial bursa will be most successful if it is performed through a posterior approach
- **B.** injection of the subacromial bursa will be equally successful regardless of whether it is performed through an anterior, lateral, or posterior approach
- **C.** injection of the subacromial bursa through a lateral approach will be least successful
- **D.** injection of the subacromial bursa through an anterior approach will be least successful
- **E.** injection of the subacromial bursa will be most successful if it is performed through either a lateral or an anterior approach

Article Title: Macroscopic and Microscopic Analysis of the Thumb Carpometacarpal Ligaments. A Cadaveric Study of Ligament Anatomy and Histology [Full Text] PDF

33. The anterior (volar) oblique ligament at the thumb carpometacarpal joint is:

- **A.** a stout complex located radial to the abductor pollicis longus
- **B.** a stout complex located ulnar to the abductor pollicis longus
- **C.** a thin complex located radial to the abductor pollicis longus
- **D.** a thin complex located ulnar to the abductor pollicis longus
- **E.** a thin complex located volar to the dorsal central ligament

Article Title: Progression of Periacetabular Osteolytic Lesions [Full Text] PDF

34. If, at the time of medium-term follow-up, a computed tomography scan of a cementless total hip replacement shows a high rate of osteolysis around the acetabular component, which of the following statements is best supported by evidence?

- **A.** this patient's femoral osteolytic lesions will continue to increase in size
- **B.** a younger patient is more likely to have osteolytic lesions that will increase in size
- **C.** an active patient is more likely to have osteolytic lesions that will increase in size
- **D.** a patient with diabetes is likely to have osteolytic lesions that will increase with time

Article Title: A Comparison of MRI and CT Imaging Clarity of Titanium Alloy and Titanium Alloy with Cobalt-Chromium-Alloy Pedicle Screw and Rod Implants in the Lumbar Spine [Full Text] PDF

35. A patient presents to you after having undergone lumbar spinal surgery with spinal instrumentation containing titanium alloy/cobalt-chromium alloy. Because of a complex postoperative course, the patient needs to be further evaluated with both magnetic resonance imaging (MRI) and computed tomography (CT). Which of the following statements

best describes the findings on CT and MRI of a spine with titanium alloy/cobalt-chromium alloy instrumentation in place?

- **A.** less artifact is seen with titanium alloy spinal instrumentation than with titanium alloy/cobalt-chromium alloy instrumentation
- **B.** less artifact is seen with titanium alloy/cobalt-chromium alloy spinal instrumentation than with titanium alloy instrumentation
- **C.** image artifact with titanium alloy and titanium alloy/cobalt-chromium alloy spinal instrumentation is essentially equivalent
- **D.** metallic artifact from titanium alloy/cobalt-chromium alloy spinal instrumentation causes images to be of little use
- **E.** metallic artifact from titanium alloy spinal instrumentation causes images to be of little use

Save for Later

Article Title: Polygenic Threshold Model with Sex Dimorphism in Adolescent Idiopathic Scoliosis: The Carter Effect [Full Text] PDF

36. The fact that males, in whom adolescent idiopathic scoliosis is less common than it is in females, require a higher genetic load to become affected and are therefore more likely to transmit the disorder to their offspring is known as:

- **A.** mendelian inheritance
- **B.** the Carter effect
- **C.** polygenic transmission
- **D.** generation skipping

Article Title: Practice Patterns for Subacromial Decompression and Rotator Cuff Repair. An Analysis of the American Board of Orthopaedic Surgery Database [Full Text] PDF

37. A fifty-six-year-old man presents to you with a six-month history of shoulder pain. You diagnose a full- thickness supraspinatus tendon tear and recommend surgical repair. You are currently in your case-collection period for Part II of the American Board of Orthopaedic Surgery board certification process. Which of the following most accurately describes the expected surgical intervention used to treat this disorder?

- **A.** the likelihood that the patient will be treated with an arthroscopic approach does not depend on the region of the surgeon's practice
- **B.** if the surgeon has no fellowship training, he or she is more likely to perform the procedure arthroscopically
- **C.** a subacromial decompression is always performed with surgical repair of a supraspinatus tendon
- **D.** if the surgeon has a sports medicine declared subspecialty, he or she is more likely to perform the procedure arthroscopically
- **E.** the procedure is currently more likely to be performed with an open technique rather than an arthroscopic technique than it was in 2004

Article Title: The Association Between Body Mass Index and the Outcomes of Total Knee Arthoplasty [Full Text] PDF

38. A fifty-seven-year-old woman with symptomatic tricompartmental knee osteoarthritis requiring total knee replacement presents to your clinic. She is morbidly obese with a body mass index (BMI) of 45 kg/m^2 but is otherwise in good health and has no local or systemic contraindications to surgery. Because of her morbid obesity, what should you tell her about the expected risks and benefits associated with her knee replacement in comparison with those for a patient with a BMI in the "normal" range (<25 kg/m^2)?

- **A.** the risks of wound complications, rates of implant survival, and improvements in knee function are equivalent irrespective of BMI
- **B.** the risk of wound complications is higher and the rate of implant survival is lower in morbidly obese patients, but postoperative levels of knee function are equivalent
- **C.** the risk of wound complications is higher and postoperative knee function is poorer in morbidly obese patients, but postoperative ratings of general health are better
- **D.** the general health score is lower and postoperative knee function is poorer in morbidly obese patients, but improvements in knee function are equivalent because of poorer preoperative function in obese patients
- **E.** the rate of implant survival is lower and the postoperative general health rating is poorer in morbidly obese patients, but the general health rating improves to a greater extent because of poorer preoperative ratings of health in obese patients

Article Title: Carpal Tunnel Syndrome and Radiographically Evident Basal Joint Arthritis of the Thumb in Elderly Koreans [Full Text] PDF

39. A fifty-three-year-old woman was referred to you for the surgical treatment of pain localized at the base of the left thumb and radiating to the thenar eminence. Hand radiographs showed large osteophytes and subchondral sclerosis at the thumb carpometacarpal joint. Which of the following physical examination tests would be most useful in determining the differential diagnosis?

- **A.** Spurling test
- **B.** empty-can test
- **C.** piano-key sign
- **D.** Phalen test
- **E.** Bunnel test

Article Title: Computer-Assisted Surgery Is Not More Accurate or Precise Than Conventional Arthroscopic ACL Reconstruction. A Prospective Randomized Clinical Trial [Full Text] PDF

40. A twenty-two-year-old female basketball player comes to an orthopaedic surgeon who is experienced in anterior cruciate ligament (ACL) reconstruction and computer-assisted surgery. The ACL ruptured four months ago, but the knee has not responded sufficiently to conservative treatment. The question arises as to whether or not this experienced ACL orthopaedic surgeon should choose to perform a computer-assisted ACL reconstruction. With only the degree of reproducibility of the procedure taken into account, which of the following is most likely correct?

- **A.** computer-assisted ACL reconstruction is dependent on computed tomography data for templating the intended target; additional diagnostic studies are needed
- **B.** computer-assisted ACL reconstruction is not more precise than an experienced ACL surgeon
- **C.** computer-assisted ACL reconstruction is more precise than an experienced ACL surgeon
- **D.** the accuracy of computer-assisted ACL reconstruction is significantly higher than that of a conventional reconstruction for achieving the intended target

Save for Later

Article Title: Sling Compared with Plate Osteosynthesis for Treatment of Displaced Midshaft Clavicular Fractures. A Randomized Clinical Trial [Full Text] PDF

41. According to recent studies, what are the most common risks associated with nonoperative treatment of displaced midshaft clavicular fractures?

- **A.** deep vein thrombosis and swelling of the upper limb
- **B.** complex regional pain syndrome and sensitivity of the upper limb
- **C.** nonunion and symptomatic malunion
- **D.** brachial plexus compression and thoracic outlet syndrome

Article Title: Revision for Unexplained Pain Following Unicompartmental and Total Knee Replacement [Full Text] PDF

42. The revision rate following unicompartmental knee arthroplasty has been reported to be higher than that following total knee arthroplasty. When comparing the reasons for revision of these two implant types, which of the following is true?

- **A.** the reasons for revision have been shown to be the same for both implants
- **B.** a greater proportion of total knee arthroplasties are revised because of unexplained pain
- **C.** a greater proportion of unicompartmental knee arthroplasties are revised because of unexplained pain
- **D.** a greater proportion of total knee arthroplasties are revised because of aseptic loosening/lysis
- **E.** a greater proportion of unicompartmental knee arthroplasties are revised because of infection

Article Title: Effect of Scapular Orientation on Shoulder Internal Impingement in a Cadaveric Model of the Cocking Phase of Throwing [Full Text] PDF

43. A twenty-year-old college baseball pitcher comes to you because of pain in his right shoulder during throwing. After physical examination and magnetic resonance imaging, he was diagnosed as having pathological internal impingement at the shoulder. Which physical finding is generally associated with this disorder?

- **A.** medial scapular border prominence
- **B.** deltoid muscle atrophy
- **C.** trapezius muscle atrophy
- **D.** biceps muscle atrophy
- **E.** shoulder paresthesia

Article Title: Mechanical Comparison of Novel Bioabsorbable Plates with Titanium Plates and Small-Series Clinical Comparisons for Metacarpal Fractures [Full Text] PDF

44. The use of bioabsorbable plates for fracture fixation has been reported, with materials including polyglycolic acid (PGA), polylactide (PLA), or a polymer of PLA and PGA. Recently, novel bioabsorbable plates were made from unsintered hydroxyapatite (40% w/w) and poly-L-lactide (PLLA) (60% w/w) composite. Which of the following is the primary characteristic of these novel bioabsorbable plates?

- **A.** radiolucency
- **B.** heat resistance
- **C.** the bending strength of the semi-tubular plate constructs is comparable with that of titanium plates using 2.0-mm screws
- **D.** the bending stiffness of the one-third tubular plate constructs is greater than that of the titanium plates using 2.0-mm screws
- **E.** the torsional strength of the semi-tubular plate constructs is less than that of the titanium plates using 2.0-mm screws

Article Title: The Association Between Preoperative Spinal Cord Rotation and Postoperative C5 Nerve Palsy [Full Text] PDF

45. A forty-nine-year-old woman has had progressive pain radiating down the right arm into the thumb for one year. She has noted clumsiness in her hands and balance problems with her gait. Her radiographs and magnetic resonance imaging findings are consistent with a diagnosis of spinal stenosis between the discs at C4-C5 and C5-C6. She elects to undergo an anterior cervical corpectomy and fusion from C4 to C6. Postoperatively, the next morning, she is unable to abduct the left shoulder against gravity. What preoperative imaging finding or medical history appears to be most predictive of these postoperative findings?

- **A.** spinal cord rotation of ≥6°
- **B.** the space available for the spinal cord
- **C.** the cross-sectional area of the spinal cord
- **D.** a history of diabetes
- **E.** myelopathy on preoperative physical examination

Save for Later

Article Title: The Efficacy of Intra-Articular Injections for Pain Control Following the Closed Reduction and Percutaneous Pinning of Pediatric Supracondylar Humeral Fractures. A Randomized Controlled Trial [Full Text] PDF

46. Chondrolysis following a single-shot intra-articular injection with local anesthetic has been reported primarily in which joint(s)?

- **A.** elbow
- **B.** shoulder
- **C.** knee
- **D.** all of the above
- **E.** none of the above

Article Title: Prospective Observational Study of Donor-Site Morbidity Following Anterior Iliac Crest Bone-Grafting in Orthopaedic Trauma Reconstruction Patients [Full Text] PDF

47. A forty-five-year-old man undergoes an anterior iliac crest bone graft as part of the treatment for a tibial fracture nonunion. The incidence of persistent donor site pain with a visual analog scale (VAS) score of >3 (out of 10) at one year or more postoperatively would be expected to be which of the following?

- **A.** 5%

- **B.** 15%
- **C.** ≥25%
- **D.** 2%

Article Title: Corrosion at the Head-Neck Taper as a Cause for Adverse Local Tissue Reactions After Total Hip Arthroplasty [Full Text] PDF

48. A sixty-year-old woman comes to you with right hip pain. The pain is localized to the groin and has been progressing over the last two months. She underwent a right total hip arthroplasty with a metal-on-polyethylene bearing surface three years ago, and initially had an excellent result. Physical examination demonstrates mild hip abductor weakness. Radiographs of the site of the hip arthroplasty show a normal postoperative appearance, and an extensive infection workup is negative. Metal levels demonstrate a serum cobalt level of 13.2 ng/mL (normal, 0.16 ± 0.10 ng/mL) and a serum chromium level of 1.4 ng/mL (normal, 0.24 ± 0.35 ng/mL). Which of the following is the most likely diagnosis?

- **A.** extensive wear of the polyethylene liner with articulation of the metal head against the acetabular shell
- **B.** loosening of the acetabular component
- **C.** impingement between the prosthetic neck and acetabular shell
- **D.** corrosion at the modular femoral head-neck junction
- **E.** loosening of the femoral component

Article Title: Spinal Column Injuries Among Americans in the Global War on Terrorism [Full Text] PDF

49. A twenty-seven-year-old man arrives at your clinic in a wheelchair as a new patient at the Veterans Administration Hospital after having been recently discharged from a large military medical center. He states that he has lost the use of his legs from a recent war injury. A neurologic examination reveals that he has 5/5 motor strength in his right and left upper extremities with intact reflexes and normal muscle tone. His sensation is intact from the C5 through T1 dermatome distribution. He has marked atrophy in the quadriceps, hamstrings, and gastrocnemius-soleus muscles bilaterally. He has 0/5 motor strength in the hip and knee flexors and extensors and 0/5 motor strength in ankle plantar flexion and dorsiflexion bilaterally. He is insensate distal to the umbilicus and has no perianal sensation. Which of the following mechanisms most likely caused his spinal cord injury?

- **A.** nearby explosive device while he was walking
- **B.** gunshot wound
- **C.** motor-vehicle collision
- **D.** fall from a height
- **E.** helicopter crash

Article Title: The Effect of Iliac Crest Autograft on the Outcome of Fusion in the Setting of Degenerative Spondylolisthesis. A Subgroup Analysis of the Spine Patient Outcomes Research Trial (SPORT) [Full Text] PDF

50. In a recent study using data from the multicenter Spine Patient Outcomes Research Trial (SPORT), what was the effect of iliac crest autograft on the outcome of lumbar spinal fusion for degenerative spondylolisthesis compared with the outcome for patients who did not receive iliac crest autograft?

- **A.** less improvement in outcome, higher reoperation rate
- **B.** less improvement in outcome, no difference in reoperation rate
- **C.** no difference in outcome, no difference in reoperation rate
- **D.** more improvement in outcome, higher reoperation rate
- **E.** more improvement in outcome, lower reoperation rate

Save for Later

Submit Answers | Clear Answers | Save for Later

The Journal of Bone and Joint Surgery
20 Pickering Street
Needham, MA 02492 USA

Online ISSN: 1535-1386

Response Form

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.

The deadline to submit your answers for grading this set of questions is January 15, 2013.

EXAMINATION EVALUATION (MANDATORY)

Did the July through September 2012 CME Review Questions meet these educational objectives*:

1. Provide a broad-based review and update specifically in the areas of shoulder and elbow surgery, orthopaedic trauma, and total hip arthroplasty? ❑ Yes ❑ No
2. Strengthen your problem-solving abilities related to patient care particularly in the areas of shoulder and elbow surgery, orthopaedic trauma, and total hip arthroplasty? ❑ Yes ❑ No
3. Make you aware of new advances in shoulder and elbow surgery, orthopaedic trauma, and total hip arthroplasty? ❑ Yes ❑ No

Comments (please comment on the quality of the questions and their relationship to your practice): _____

*Note: These objectives will change every quarter.

ANSWER KEY

Black out the correct answers

1. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**18.** Ⓐ Ⓑ Ⓒ Ⓓ	**35.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
2. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**19.** Ⓐ Ⓑ Ⓒ Ⓓ	**36.** Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**20.** Ⓐ Ⓑ Ⓒ Ⓓ	**37.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
4. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**21.** Ⓐ Ⓑ Ⓒ Ⓓ	**38.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
5. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**22.** Ⓐ Ⓑ Ⓒ Ⓓ	**39.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
6. Ⓐ Ⓑ Ⓒ Ⓓ	**23.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**40.** Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ	**24.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**41.** Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**25.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**42.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
9. Ⓐ Ⓑ Ⓒ Ⓓ	**26.** Ⓐ Ⓑ Ⓒ Ⓓ	**43.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
10. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**27.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**44.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
11. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**28.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**45.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
12. Ⓐ Ⓑ Ⓒ Ⓓ	**29.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**46.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
13. Ⓐ Ⓑ Ⓒ Ⓓ	**30.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**47.** Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ	**31.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**48.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
15. Ⓐ Ⓑ Ⓒ Ⓓ	**32.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**49.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
16. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**33.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**50.** Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ
17. Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ	**34.** Ⓐ Ⓑ Ⓒ Ⓓ	

CME Credits Claimed*_____

*Required. Please enter the number of CME credit hours you are claiming for this exam. You must complete this field to receive CME credit.

AAOS Member Number_____
(Without this number, the AAOS will not track your CME credits.)

Last Name First Name Degree

Mailing Address

City/State Zip Code

Phone Number

Fax Number E-mail Address (optional)

PAYMENT OPTIONS

Payment must accompany the CME Response Form.

Mail to: CME Division, The Journal of Bone and Joint Surgery, 20 Pickering Street, Needham, MA 02492

Subscription (4 quarterly exams)..... $275.00
Single exam.....$75.00

Please check one:

❑ Check/money order made payable to *The Journal of Bone and Joint Surgery* (drawn on a U.S. bank or U.S. bank draft only)

❑ Mastercard ❑ Visa ❑ AMEX

Account number: _____

Expiration date: _____/_____

Name as it appears on card: _____

I authorize my credit card to be charged $ _____ for this activity.

Signature _____

QUESTIONS?

For payment questions, contact the Subscription Department at 781-449-9780, x2140. For questions regarding submitted tests, contact Merle Adelson at 781-449-9780, x1240. E-mail all other questions to cme@jbjs.org.