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EDUCATIONAL OBJECTIVES
As a result of taking the 2010 Adult Reconstructive Surgery of the Hip and Knee Examination:
• I can diagnose and treat postoperative infection and other complications after total hip or knee arthroplasty.
• I know the most appropriate management for severe arthrosis of the hip and knee, and can communicate the relative benefits and risks of total joint replacement to patients.
• I can describe the process of degenerative conditions of the hip and knee (e.g. osteoarthritis, osteonecrosis, impingement, etc.).
• I know and can recognize the suitable conditions for metal on metal hip resurfacing and total hip arthroplasty.
• I know the appropriate procedures for pain management following adult reconstructive surgery of the hip and knee
• I can apply the AAOS guidelines for deep vein thrombosis prophylaxis.

It is the goal of the Academy to promote safe and effective orthopaedic care in all our programs, products, and services.
Produced by the American Academy of Orthopaedic Surgeons
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Question 1
During the course of a revision total knee arthroplasty via a medial parapatellar exposure, the surgeon does a complete intra-articular release and synovectomy but exposure is still inadequate. A quadriceps snip is performed and, at the end of the procedure, the knee is stable throughout a range of motion and the postoperative radiographs show acceptable alignment of the components. The patient’s postoperative physical therapy regimen should include which of the following?

1. No restriction in range of motion or weight bearing after surgery.
2. Limit flexion to 30 degrees postoperatively, progressing 10 degrees per week
3. Limit flexion to 90 degrees for the first 6 weeks postoperatively
4. Limit to active flexion only with no passive flexion or active extension for 6 weeks
5. Use of a hinged knee brace for 6 weeks postoperatively

Question 2
A healthy 72-year-old woman is seen 14 days after cemented total knee arthroplasty. She reports increasing pain and swelling for the last 4 days accompanied by 4 days of wound drainage. Examination reveals that she is afebrile, and has erythema and moderate serosanguinous drainage from the wound. The knee is moderately swollen. Aspiration of the knee reveals no organisms on Gram stain. Culture results are expected back in 48 hours. Optimal management should consist of

1. initiation of a first-generation cephalosporin while awaiting culture results.
2. initiation of broad-spectrum antibiotics while awaiting culture results.
3. ultrasound to evaluate for fluid collection around the knee.
4. surgical debridement of the knee before culture results are available.
5. inpatient observation and no antibiotics until culture results are available.
Question 3
A 72-year-old woman underwent a primary total hip arthroplasty 14 months ago. She states that the hip has now dislocated four times when rising from a low chair, requiring closed reduction. A radiograph is shown in Figure 3a and a CT scan of her pelvis is shown in Figure 3b. What is the most reliable method for rectifying her instability?

1. Use of an abduction orthosis for 6 weeks
2. Modular exchange of the femoral head to a 36-mm head and a longer neck
3. Modular exchange of the polyethylene liner to a constrained acetabular insert
4. Revision and repositioning of the acetabular component and use of a 36-mm femoral head
5. A physical therapy program stressing abductor strengthening

Question 4
A patient with a history of rheumatoid arthritis reports a painful total hip arthroplasty 3 years after the index procedure. Radiographs reveal loosening of the femoral component. Preoperative blood work shows an erythrocyte sedimentation rate (ESR) of 38 mm/h (normal 0-29 mm/h) and a C-reactive protein (CRP) of 8.9 (0.2-8.0). What is the most appropriate action at this time?

1. Technetium bone scan
2. Hip aspiration for culture
3. FDG-PET scan
4. Surgery with no further investigations
5. Revision surgery and obtain an intraoperative frozen section
Question 5
A 75-year-old man who sustained an intertrochanteric hip fracture underwent open reduction and internal fixation with a sliding hip screw. Six months after the procedure, the patient has shortening and external rotation of the extremity and progressively severe groin pain with ambulation. Radiographs are shown in Figures 5a and 5b. What is the most appropriate management?

1. Valgus/flexion osteotomy of the proximal femur with repeat open reduction and internal fixation
2. Conversion to bipolar hemiarthroplasty with a cementless femoral component
3. Conversion to total hip arthroplasty with a calcar replacement femoral component that bypasses the hardware
4. External bone stimulator
5. Removal of hardware, followed by physical therapy and use of a shoe lift
Question 6
Figure 6 shows the radiograph of a 72-year-old woman who underwent a primary total hip arthroplasty 17 years ago. She now reports groin pain. Optimal surgical management should consist of which of the following?

1. Synovectomy and polyethylene liner exchange
2. Synovectomy, polyethylene liner exchange, and femoral stem revision
3. Synovectomy and complete acetabular revision
4. Synovectomy, bone grafting of lytic lesions, and retention of the components and polyethylene liner
5. Revision of all components with synovectomy

Question 7
Which of the following statements best describes how unicompartmental knee arthroplasty (UKA) differs from total knee arthroplasty (TKA)?

1. TKA has a higher reoperation rate than UKA during the first 10 postoperative years.
2. TKA provides for more normal rotational kinematics than UKA.
3. UKA more closely replicates normal knee kinematics than TKA.
4. Mobile bearings have been successful in UKA but not TKA.
5. Mobile bearings have been successful in TKA but not UKA.
Question 8
Which of the following is associated with the use of large femoral heads in total hip arthroplasty?

1. Increased risk of total hip dislocation
2. Decreased range of motion
3. Fewer options for femoral head bearing material
4. Acceptable wear with modern bearing surfaces
5. Increased component impingement

Figure 9

Question 9
A 68-year-old man underwent a primary total hip arthroplasty 2 years ago for a femoral neck fracture. His early postoperative course was unremarkable, but he notes some aching in the thigh since surgery. His symptoms have gotten worse over the last year, such that he now has activity-related thigh pain that limits his walking ability. An AP hip radiograph is shown in Figure 9. What is the most appropriate surgical management?

1. No surgery is indicated
2. Revision of the acetabular component
3. Revision of the femoral component
4. Psoas tendon tenotomy
5. Strut grafting of the femur to stiffen the bone near the tip of the implant
Figure 10 shows patellar radiographs of a 68-year-old woman who underwent bilateral total knee arthroplasty 2 months ago. Following a recent fall onto the left side, she now reports anterior pain in the left knee. A CT scan shows that the femoral and tibial components are appropriately externally rotated and radiographs show acceptable axial alignment and no evidence of loosening. What is the most appropriate treatment option?

1. Fracture fixation and bracing
2. Lateral retinacular release with proximal realignment
3. Tibial component revision
4. Distal realignment by medialization of the tibial tubercle
5. Revision of the patellar component

Question 11
Which of the following best describes the legal definition of standard of care?

1. Conforming to a majority norm
2. Providing the most minimally acceptable care
3. Providing average care
4. Providing the care you would expect for yourself or a loved one
5. Reasonable treatment that exhibits knowledge, skill, diligence, and care

Question 12
Which of the following statements most accurately describes the risk of ileus following total joint arthroplasty?

1. Older age decreases risk.
2. Male gender decreases risk.
3. The risk is roughly 1% in total joint arthroplasty patients.
4. The risk more commonly occurs in total knee arthroplasty (TKA) patients than in total hip arthroplasty (THA) patients.
5. A history of abdominal surgery has no effect on risk.
Question 13
During surgical hip dislocation for the management of femoral acetabular impingement, preservation of what structure is paramount to maintaining vascularity to the femoral head?

1. Metaphyseal vessels
2. Medial epiphyseal artery
3. Superficial branch of the medial femoral circumflex artery
4. Deep branch of the lateral femoral circumflex artery
5. Deep branch of the medial femoral circumflex artery

Figure 14

Question 14
A 68-year-old woman who underwent left total hip arthroplasty 14 years ago now reports pain in her thigh. A radiograph is shown in Figure 14. What is the most reliable method for reconstructing the femoral component?

1. Revision to a standard length cemented femoral component using third generation cementing techniques
2. Revision to a proximal femoral replacement device (“tumor prosthesis”)
3. Revision to a proximally porous-coated, metaphyseal loading cementless femoral component
4. Revision to a diaphyseal engaging, extensively coated cementless femoral component
5. Revision to an allograft-prosthetic composite
Question 15
A 71-year-old woman with coronary artery disease underwent an uncomplicated right total hip arthroplasty for osteoarthritis 12 years ago. Her hip has functioned well until approximately 18 months ago when she noted the spontaneous onset of groin, buttock, and proximal thigh pain that is present at rest and made worse with activity. A radiograph is shown in Figure 15. What is the recommended management at this point?

1. Immediate admission to the hospital and emergent revision hip arthroplasty
2. Reassurance and follow-up if symptoms worsen
3. Repeat radiographs in 1 month
4. Protected weight bearing with urgent revision hip arthroplasty when the patient is medically cleared
5. A prescription for alendronate and reevaluation in 1 year
A 35-year-old man reports a 2-year history of right groin pain. The pain is made worse with hip flexion, prolonged sitting, and cycling. A radiograph and MRI scan are shown in Figures 16a and 16b. Nonsurgical management has failed to provide relief. What is the best surgical option?

1. Arthroscopic labral debridement
2. Reverse periacetabular osteotomy
3. Resurfacing hip arthroplasty
4. Femoral neck osteochondroplasty and resection of the detached labrum
5. Femoral neck osteochondroplasty and reattachment of the labrum
Question 17
A 51-year-old woman who underwent a total knee arthroplasty 14 months ago for severe degenerative arthritis now reports progressive pain, swelling, and buckling of the knee. She must use crutches and is unable to negotiate stairs. Laboratory testing reveals a normal erythrocyte sedimentation rate and C-reactive protein. Radiographs of the patient are shown in Figures 17a through 17c. What is the most important test to further evaluate this problem?

1. Long standing anterior-posterior radiograph of the hip-knee-ankle
2. Axial CT views from the supracondylar distal femur to the proximal tibia below the tibial tubercle
3. Fluoroscopic stress views to demonstrate the position of subluxation
4. Bone scan
5. MRI scan

Question 18
Changes to the properties of ultra-high molecular weight polyethylene with increasing irradiation dose include improved

1. resistance to oxidation.
2. ultimate tensile strength.
3. resistance to crack propagation.
4. fracture toughness.
5. volumetric wear.
Question 19
A 72-year-old man with a history of Parkinson’s disease, stable coronary artery disease, and mild renal insufficiency is seen for hip arthroplasty. Which of the following is considered the most appropriate bearing of choice?

1. Ceramic-on-ceramic
2. Large diameter metal head on highly cross-linked polyethylene liner
3. Ceramic head on metal liner
4. Large diameter metal-on-metal total hip arthroplasty
5. Metal on conventional polyethylene liner (noncross-linked)

Question 20
A 52-year-old man who weighs 325 lb is wheelchair-bound from severe degenerative arthritis of the left hip. Twenty-four hours after cementless total hip arthroplasty, he develops shortness of breath and evaluation shows a saddle pulmonary embolus. The patient is started on enoxaparin sodium at 150 mg every 12 hours. Two days later, the patient’s hematocrit is 20% despite four units of transfused packed cells, and he now has developed a complete sciatic nerve palsy. What is the best course of action?

1. Emergent exploration of the sciatic nerve
2. Transfusion to raise the hematocrit to 30% and sequential neurovascular examinations
3. Placement of a vena cava filter, halt anticoagulation, blood transfusion, and exploration of the sciatic nerve
4. Transfusion to raise the hematocrit to 30%, continued administration of enoxaparin, and sequential neurovascular examinations
5. Placement of a temporary vena cava filter and exploration of the sciatic nerve

Question 21
What is the most common cause of reoperation following contemporary hip resurfacing for degenerative coxarthrosis?

1. Limb-length discrepancy
2. Altered femoral offset
3. Snapping psoas tendon
4. Limitation of hip movement
5. Femoral neck fracture
Question 22
A 77-year-old man with a history of mild renal insufficiency and atrial fibrillation on warfarin therapy is scheduled to undergo a left total hip arthroplasty. He previously underwent a right total hip arthroplasty with development of significant heterotopic bone that resulted in limitation of motion. What is the most appropriate form of prophylactic treatment to minimize the formation of heterotopic bone on his left hip?

1. Postoperative indomethacin for 3 weeks
2. Postoperative indomethacin for 6 weeks
3. No treatment indicated; can treat later if heterotopic bone forms
4. 800 centigrey of radiation given to the periprosthetic soft tissues preoperatively on the morning of surgery
5. 400 centigrey of radiation given to the periprosthetic soft tissues day 2 postoperatively

Figure 23a Figure 23b

Question 23
A 46-year-old male construction worker has right hip pain that has failed to respond to nonsurgical management. His body mass index (BMI) is 32, he is 6’2” tall, and he has no other medical comorbidities. AP and lateral radiographs of the right hip are shown in Figures 23a and 23b. The patient inquires about his suitability for metal-on-metal hip resurfacing. The patient should be educated that he is at higher risk for failure secondary to which of the following?

1. BMI > 30
2. Presence of secondary changes of the acetabulum
3. Osteonecrosis of the femoral head
4. Age of younger than 55 years old
5. Male gender
Question 24

A 31-year-old woman had disabling right knee pain. An arthroscopic assessment reveals chondromalacia of both the lateral femoral condyle and tibial plateau. The standing femorotibial axis measures 10 degrees of valgus. The optimum treatment of this condition should include

1. distal femoral varus osteotomy.
2. osteoarticular transplant to the lateral femoral condyle.
3. unicondylar arthroplasty.
4. high tibial osteotomy.
5. Fulkerson tibial tubercle transfer.
A healthy 78-year-old woman falls down a flight of stairs 2 years after undergoing left total hip arthroplasty. Radiographs are shown in Figures 25a through 25c. Optimal management should include which of the following?

1. Skeletal traction
2. Long stem femoral revision
3. Closed reduction and internal fixation with a retrograde femoral nail
4. Open reduction and internal fixation with a conventional plate and screws
5. Open reduction and internal fixation with a plate, proximal cables, and distal screws
Question 26
Osteolysis after total hip arthroplasty with polyethylene acetabular bearings is most closely correlated with which of the following risk factors?

1. Patient weight
2. Femoral head bearing material
3. Linear wear rate
4. Decreased femoral offset
5. Increased femoral offset

Question 27
Which of the following patients requires preoperative noninvasive cardiac testing?

1. 52-year-old man scheduled to undergo elective lumbar decompression and fusion, with a history of hypercholesteremia, hypertension, and deep venous thrombosis following treatment of an ankle fracture
2. 67-year-old woman scheduled to undergo total knee arthroplasty, with a history of myocardial infarction, cerebrovascular accident, and diabetes mellitus
3. 68-year-old woman scheduled to undergo total hip arthroplasty for osteonecrosis, no known medical comorbidities, but has not seen a physician in more than 20 years and drinks 7 to 10 alcoholic beverages per week
4. 72-year-old man with an intertrochanteric hip fracture, with a history of chronic renal failure, colon cancer, and obesity
5. 81-year-old man with a fracture of the proximal femur, history of myocardial infarction, prostate adenocarcinoma, and hypothyroidism, and prior to the fracture he was able to climb a flight of stairs
Question 28
A 62-year-old woman undergoes an uncomplicated primary metal-on-metal cementless hip arthroplasty. Her early postoperative course is unremarkable. She returns at 1 year reporting groin pain. Her symptoms are made worse with stair climbing and getting in and out of her vehicle. Examination reveals minimal discomfort with passive range of motion, but straight leg raising reproduces her symptoms. A radiograph is shown in Figure 28. What is the most appropriate surgical management?

1. Revision of the femoral component
2. Psoas tendon tenotomy
3. Exchange of the bearing to metal-on-polyethylene
4. Exchange of the bearing to ceramic-on-ceramic
5. Exchange of the bearing to a smaller femoral head and metal liner

Question 29
Increasing tibial polyethylene conformity can have what effect on fixed bearing total knee arthroplasty?

1. Increased contact stress within the polyethylene
2. Increased risk of polyethylene delamination
3. Decreased mechanical forces transferred to the fixation surfaces
4. Decreased femoral rollback during flexion
5. Increased femoral rotation during flexion
Question 30
The anterior approach to total hip arthroplasty requires dissection between which of the following muscle planes?

1. Sartorius and gluteus maximus
2. Gluteus minimus and rectus femoris
3. Rectus femoris and sartorius
4. Tensor fascia lata and sartorius
5. Tensor fascia lata and rectus femoris

Question 31
A 41-year-old female postal worker reports a 9-month history of left groin and lateral hip pain. She denies pain in the right hip. Her social history reveals that she smokes and drinks on average five alcoholic beverages per week. Her body mass index (BMI) is 26. Radiographs are shown in Figures 31a through 31c and coronal and axial MRI scans are shown in Figures 31d and 31e, respectively. What is the most important factor that will determine if her right hip will become symptomatic?

1. Patient age
2. Gender of the patient
3. Patient’s BMI and activity level
4. Size of the lesion
5. Association with alcohol use
Question 32
A 66-year-old woman reports pain in both of her knees that has been recalcitrant to nonsurgical management. Radiographs, including an AP of both knees, lateral and patellar views of the more symptomatic left knee and a mechanical axis, are shown in Figures 32a through 32d. The lateral radiograph shows maximal knee extension. When counseling the patient preoperatively regarding the risks of total knee arthroplasty, she should be educated that she is at higher risk than the typical patient for which of the following complications?

1. Deep venous thrombosis
2. Peroneal nerve injury
3. Wound healing problems
4. Femoral component loosening
5. Quadriceps tendon rupture
Question 33
A 22-year-old patient has had severe groin pain for many months and is unable to engage in any physical activity. The AP radiograph of the pelvis shows minimal arthritis. The lateral radiograph of the hip is shown in Figure 33a. An MR-arthrogram is shown in Figure 33b. What is the most appropriate treatment at this stage?

1. Hip arthroscopy and labral debridement
2. Femoroacetabular osteoplasty and labral repair
3. Femoral osteotomy
4. Hemiarthroplasty
5. Total hip arthroplasty

Question 34
Following total knee arthroplasty, a patient is noted to have asymmetrical absent pulses and poor capillary refill. What is the next most appropriate step in management?

1. Observation of the limb for 4 hours to see if the arterial spasm resolves
2. Measurement of lower leg compartment pressures
3. Magnetic resonance angiogram
4. Emergent return to the operating room for wound exploration while the patient is still under anesthesia
5. Return to the operating room, obtain a vascular surgery consultation, and perform an intraoperative arteriogram
Question 35
With respect to the safety of allogeneic transfusions, which of the following infectious diseases is not tested for during routine laboratory blood screening?

1. Human immunodeficiency virus (HIV)
2. Hepatitis C
3. Lyme disease
4. Syphilis
5. West Nile virus encephalitis

Question 36
A 57-year-old man undergoes total hip arthroplasty, has an uncomplicated early postoperative course, and a normal neurovascular status is documented. However, on postoperative day two he develops a progressive foot drop that increases over the next 24 hours. Postoperative repeat radiographs of the hip arthroplasty are unrevealing. There is no suggestion of swelling of the thigh to suggest a subfascial wound hematoma. What is the next most appropriate step?

1. MRI of the lumber spine
2. MRI of the knee joint
3. Electromyography and nerve conduction velocity studies of the sciatic nerve
4. Lumbar spine anterior/posterior and lateral radiographs
5. Venous Doppler of the lower extremity
Question 37
A 68-year-old woman undergoes an uncomplicated primary total knee arthroplasty with cement. Twelve days later, the proximal wound appears healed and pain is decreased, but the distal wound continues to drain with slight surrounding redness. What is the most appropriate management?

1. Prescribe an antibiotic specific for hospital-acquired bacteria.
3. Place the knee in an immobilizer and observe.
4. Place sutures to close up the wound in the clinic.
5. Irrigate and debride the knee in the operating room.

Question 38
A nondisplaced fracture of the proximal medial femoral neck proximal to the lesser trochanter is noted at the time of insertion of a cementless tapered wedge-type femoral component in a total hip arthroplasty. Appropriate perioperative management should include which of the following?

1. Cerclage cable placed proximal to the lesser trochanter with partial weight bearing for 6 weeks postoperatively
2. No intraoperative or postoperative modifications are necessary
3. Non-weight-bearing for 6 weeks, retention of the femoral component, and no cerclage wire
4. Fracture exploration and repair with multiple cerclage cables, strut allograft and revision of the femoral component with a long-stemmed implant
5. Revision with a cemented implant
Question 39
A 68-year-old woman reports pain and sensations of instability following a primary total knee arthroplasty 18 months ago. A preoperative radiograph is shown in Figure 39a and postoperative AP and patellar view radiographs are shown in Figures 39b and 39c. A CT scan shows that the femoral component is internally rotated 8 degrees and the tibial component is internally rotated 4 degrees. Management should include which of the following?

1. A structured physical therapy program
2. A custom patellar stabilizing brace
3. Modular polyethylene liner exchange to a thicker liner
4. Revision of the femoral and tibial components
5. An open lateral retinacular release
Question 40
The term “paradoxical motion,” used to describe knee kinematics, is best described by which of the following definitions?

1. The patella does not roll forward into the trochlear groove during knee extension.
2. The tibia rolls back on the femur during knee extension.
3. The tibiofemoral contact point moves anteriorly during knee flexion.
4. The posterior cruciate ligament rolls posteriorly with respect to the anterior cruciate ligament during knee extension.
5. The femur rolls back on the tibia during knee flexion.

Question 41
Patients with hip dysplasia have a series of anatomic abnormalities that most commonly include which of the following?

1. Shallow, medialized acetabulum that is deficient anteriorly and superiorly
2. Large contact area between the femoral head and acetabulum
3. Large femoral head with long femoral neck
4. Excessive femoral neck anteversion and a posterior greater trochanter
5. Decreased neck-shaft angle
Question 42
An 82-year-old man who underwent a primary total knee arthroplasty 11 weeks ago is now seen following a fall from a standing height. A radiograph is shown in Figure 42. Examination reveals a small abrasion of the skin overlying the anterior aspect of the knee. He is able to actively extend the knee but has a 10-degree extensor lag. Initial management should include which of the following?

1. A 4-week period of immobilization followed by protected range of motion in a hinged knee brace
2. Use of a cylinder cast for 12 weeks
3. Open reduction and internal fixation of the fracture using a tension band technique
4. Revision of the patellar component
5. Resection of the proximal bony fragment and soft-tissue repair
Question 43
An active 72-year-old man underwent a right hybrid total hip arthroplasty for osteoarthritis 4 years ago. His hip has functioned well until approximately 8 months ago. He now reports activity-related proximal thigh pain and groin pain. A current radiograph is shown in Figure 43a. A radiograph obtained prior to the onset of symptoms is shown in Figure 43b. What is the most likely cause of his symptoms?

1. Polyethylene wear with polyethylene-induced synovitis
2. Psoas tendon irritation secondary to psoas impingement over the anterior inferior edge of the acetabular component
3. Loose femoral component
4. Osteolysis secondary to polyethylene wear particles
5. Modulus mismatch of the stem and femur
Question 44
A 64-year-old woman who underwent a successful total hip arthroplasty (THA) 2 years ago now reports a painful hip. A radiograph is shown in Figure 44. Laboratory evaluation includes an erythrocyte sedimentation rate (ESR) of 65 mm/h (0-30 mm/h) and a C-reactive protein of 5.4 mg/L (< 0.8 mg/L). What is the next step in management?

1. Ultrasound examination
2. Technetium bone scan
3. Indium-labeled WBC scan
4. Hip joint aspiration
5. Two-stage revision surgery

Question 45
The American Academy of Orthopaedic Surgeons thrombophlebitis prophylaxis guidelines for patients undergoing total joint arthroplasty include which of the following?

1. General as opposed to regional anesthesia
2. Preoperative assessment for risk of thromboembolic disease as well as bleeding
3. Routine use of inferior vena cava filters
4. Warfarin with a goal International Normalized Ratio (INR) of 2-3 for patients with standard risk of bleeding and thrombophlebitis
5. Thromboembolic compression stockings (TEDs)
Question 46
Figure 46 shows the radiograph of a 65-year-old man who reports restricted range of motion and pain with sitting 18 months after undergoing right side revision total hip arthroplasty. What is the most appropriate management?

1. Intensive physiotherapy
2. Alendronate
3. Indomethacin
4. Radiotherapy
5. Excision

Question 47
What is the most common cause of early failure for patellofemoral arthroplasty?

1. Progression of tibiofemoral arthritis
2. Loosening of the femoral trochlear component
3. Loosening of the patellar component
4. Patellar instability/maltracking
5. Rupture of the quadriceps tendon from trochlear component impingement secondary to excessive anterior placement and flexion of the implant
Question 48
An 88-year-old nursing home resident is seen in the emergency department after a fall. At the time of admission, physical examination of the affected extremity reveals absent pulses and inadequate capillary refill. A radiograph is seen in Figure 48. Appropriate management includes which of the following?

1. Emergent open reduction and internal fixation of the fracture
2. Emergent consultation with vascular surgery and a possible arteriogram
3. Revision of the femoral component followed by vascular surgical consultation
4. Open reduction and internal fixation of the fracture with intraoperative vascular consultation
5. Release traction until surgical management is performed

Question 49
An otherwise healthy 58-year-old woman reports hip pain after undergoing total hip arthroplasty 8 months ago. She gives a history of prolonged wound drainage after surgery treated with antibiotics. Hip aspiration is positive for methicillin-resistant coagulase-negative staphylococcus. Appropriate management at this point includes which of the following?

1. Arthroscopic irrigation followed by appropriate antibiotic treatment
2. Treatment with 6 weeks of IV vancomycin and oral rifampin
3. Treatment with 6 weeks of IV vancomycin and oral rifampin, followed by indefinite oral antibiotic suppression
4. Open debridement with exchange of the polyethylene insert, followed by appropriate antibiotic treatment
5. Open debridement with removal of the implants and insertion of an antibiotic spacer
Question 50
Patients with ankylosing spondylitis undergoing total knee arthroplasty are likely to experience which of the following complications?

1. Infection
2. Instability
3. Heterotopic ossification
4. Periprosthetic fracture
5. Patellar loosening

Question 51
Posterior cruciate-retaining total knee arthroplasty has been studied by numerous methods including kinematic video fluoroscopy. Which of the following is the best description of typical kinematic behavior?

1. Unpredictable anterior femoral condylar translation from full extension to 90 degrees of flexion
2. Predictable femoral rollback from full extension to 90 degrees of flexion
3. Medial femoral condyle pivot with minimal medial femoral condyle translation and lateral femoral condyle posterior translation in flexion
4. Lateral femoral condyle pivot with minimal medial femoral condyle translation
5. Anterior tibial contact of both the medial and lateral femoral condyles in full extension
A 52-year-old woman has a 60-degree extensor lag following a right total knee arthroplasty performed 16 months ago. Since the time of her primary total knee arthroplasty she has undergone primary repair of a patellar tendon rupture that occurred after a fall 8 months ago. A lateral radiograph of the knee is shown in Figure 52. A CT scan obtained to determine component rotation showed that the femoral component is internally rotated 9 degrees and the tibial component is internally rotated 12 degrees. Appropriate management at this time should include

1. a structured physical therapy program to increase quadriceps muscle strength.
2. a hinged knee brace locked in extension while ambulating.
3. exchange of the modular polyethylene spacer to a thicker insert and reconstruction of the patellar tendon using hamstring augmentation.
4. exchange of the modular polyethylene spacer to a thicker insert and reconstruction of the patellar tendon using an extensor mechanism allograft tensioned tightly in full extension.
5. revision of the tibial and femoral components and reconstruction of the patellar tendon using an extensor mechanism allograft tensioned tightly in full extension.
Question 53

Figure 53 shows the radiograph of a 48-year-old man who has a left side periprosthetic femoral fracture around the femoral stem of a previous revision hip arthroplasty. What is the most appropriate treatment?

1. Open reduction and internal fixation with a plate
2. Open reduction and internal fixation with a cable
3. Revision with a short stem and plate fixation
4. Revision with allograft prosthesis composite
5. Removal of the proximal femoral bone and replacement with a cemented segmental prosthesis
A 66-year-old woman who underwent a right total knee arthroplasty 13 years ago now has pain, knee effusion, squeaking, and grinding in the operated knee. The patellar view radiograph is shown in Figure 54. What is most likely to be encountered during revision arthroplasty?

1. Loose femoral and/or tibial component
2. Fractured patella
3. Extensive metallosis
4. Patellar clunk
5. Ruptured extensor mechanism
Question 55
A 56-year-old man who underwent a left total hip arthroplasty 8 years ago is seen following a fall from a standing height. A radiograph obtained at 2 years postoperatively is shown in Figure 55a and a current radiograph obtained in the emergency department is shown in Figure 55b. On further questioning, he reports pain in this thigh for the past 3 years that has been increasing in intensity. Appropriate management at this time includes which of the following?

1. Nonsurgical management with the use of a cast-brace
2. Nonsurgical management with skeletal traction
3. Open treatment with a locked plate with or without strut allograft
4. Revision of the femoral component to a cemented femoral component that bypasses the fracture site by two cortical diameters
5. Revision of the femoral component to a cementless femoral component that bypasses the fracture site by at least two cortical diameters
Question 56
A 62-year-old woman who underwent a primary total knee arthroplasty under a combined spinal-epidural anesthetic presents 5 hours postoperatively with severe pain in the extremity that is unresponsive to narcotic pain medication. A tourniquet was used during the procedure. On examination, the patient is unable to dorsiflex or plantar flex the foot and the pulses appear to be asymmetric. What is the next most appropriate step in management?

1. Discontinuation of the epidural and serial neurologic exams
2. Loosening of the surgical bandages and elevation of the extremity
3. MRI of the spine to evaluate for an epidural hematoma
4. Return to the operating room for angiography and vascular bypass
5. Return to the operating room for angiography, vascular bypass, and four-compartment fasciotomy

Question 57
What mechanical properties are observed in polyethylene used for total knee arthroplasty after the material undergoes oxidation?

1. Increased elastic modulus and decreased strength
2. Increased elastic modulus and increased ductility
3. Decreased elastic modulus and decreased strength
4. Decreased strength and increased ductility
5. Decreased elastic modulus and decreased ductility

Question 58
What is the most common cause for late revision (> 2 years post op) total knee arthroplasty?

1. Infection
2. Polyethylene wear
3. Instability
4. Patellar complications
5. Malalignment
Question 59
Figures 59a and 59b show the radiographs of a 63-year-old woman who is seen in the emergency department after a minor twisting episode. History reveals that she underwent a successful mobile-bearing total knee arthroplasty for severe lateral compartment arthritis and valgus deformity 4 months ago. What is the most likely cause of this problem?

1. Flexion instability
2. Posterior cruciate ligament rupture
3. Lateral collateral ligament rupture
4. Chronic patellar instability
5. Prosthetic rotational malalignment

Question 60
Which of the following abnormalities has been observed in a higher than expected frequency in patients with metal-on-metal hip bearings?

1. Renal cell carcinoma
2. Leukocyte chromosomal aberrations
3. Carcinomas of the gastrointestinal tract
4. Soft-tissue sarcomas
5. Thyroid carcinoma
Question 61
A 73-year-old woman with a history of type II diabetes mellitus undergoes a total hip arthroplasty for osteoarthritis. She continues to have serosanguinous wound drainage from the midportion of the incision 12 days after surgery. What is the most appropriate treatment at this time?

1. Return to the operating room for debridement and irrigation with removal of all implants and immediate reimplantation
2. Return to the operating room for open debridement and irrigation, exchange of the polyethylene insert, followed by appropriate antibiotics based on intraoperative culture results
3. Hip spica pressure dressing and a 2-week course of oral antibiotics
4. Hip aspiration for culture, followed by a 2-week course of appropriate IV antibiotics based on culture results
5. Hip aspiration for culture, followed by a 6-week course of appropriate IV antibiotics based on culture results

Figure 62

Question 62
A 63-year-old woman reports pain in her groin, particularly when rising from a chair and when taking her first steps out of bed in the morning. History reveals that she underwent a left primary total hip arthroplasty 19 years ago. An AP radiograph is shown in Figure 62 and revision surgery is planned. What is the most reliable method for reconstruction of the acetabulum?

1. Use of a cemented, all polyethylene acetabular component
2. Use of a cementless, porous-coated acetabular component with adjunctive screw fixation
3. Use of an antiprotrusio cage
4. Use of a bilobed, cementless acetabular component
5. Use of a bipolar head placed directly into the acetabulum
Question 63
A 72-year-old man undergoes an uncomplicated cementless total hip arthroplasty for advanced osteoarthritis. At his 6-week postoperative follow-up, he has minimal pain and is progressing well with his mobility. Radiographs show early formation of Brooker grade III heterotopic bone around his hip. What is the best treatment of the heterotopic bone at this time?

1. Observation, repeat radiographs, and reexamination in 6 weeks
2. A 14-day course of indomethacin
3. A 4-week course of indomethacin
4. Plan for a return to the operating room at 10 weeks for excision of the heterotopic bone
5. Arrange urgently for 800 centigrey of radiation to the soft tissues and areas of heterotopic bone around the hip, with shielding of the implants

Question 64
Figure 64 shows the radiograph of a 61-year-old man with ankylosing spondylitis. He is scheduled to undergo left total hip arthroplasty. Which of the following perioperative interventions should be considered?

1. Intraoperative sciatic nerve monitoring
2. Preoperative radiation therapy with 700 centigray
3. Postoperative radiation therapy with 1,500 centigray
4. Postoperative continuous passive motion
5. Soft cervical collar during postoperative physical therapy
Question 65
Which of the following statements best describes the process of articular cartilage degeneration in osteoarthritis?

1. In the second stage there is decreased catabolic activity with less matrix breakdown.
2. In the second stage there is less chondrocyte proliferation and decreased matrix production.
3. Matrix degradation includes increased proteoglycan production, more proteoglycan production, and longer glycosaminoglycan chains.
4. Cartilage degeneration may be initiated by inflammation, overload, or decreased matrix production.
5. Chondrocyte repair responses improve with aging.

Question 66
An active 38-year-old male carpenter reports activity-related medial knee pain. Arthroscopy performed 3 years ago revealed a torn medial meniscus that was debrided and mild condylar changes of the medial femoral condyle and medial tibial plateau. Current standing radiographs reveal Ahlback stage II changes with mild medial femoral joint space narrowing and a 5-degree varus deformity. What is the best treatment option?

1. High tibial osteotomy
2. Arthroscopic debridement and condylar “microfracture”
3. Osteoarticular transplant to the medial femoral condyle
4. Unicondylar arthroplasty
5. Total knee arthroplasty

Question 67
A patient with a severe nickel allergy and degenerative joint disease of the hip would be best served by which of the following prosthetic options?

1. Cemented titanium stem, ceramic (alumina) head, and press-fit titanium cup
2. Cemented cobalt-chrome stem, ceramic (alumina) head, and press-fit cobalt-chrome cup
3. Press-fit titanium stem, cobalt-chrome head, and press-fit titanium cup
4. Press-fit titanium stem, titanium head, and press-fit titanium cup
5. Press-fit titanium stem, ceramic (alumina) head, and cementless titanium cup
Question 68
Implant position at the time of primary total knee arthroplasty to optimize patellar tracking includes which of the following?

1. External rotation of the femoral and tibial components
2. Internal rotation of the femoral component and external rotation of the tibial component
3. Internal rotation of the femoral and tibial components
4. Medialization of the femoral component
5. Lateralization of the patellar component

Question 69
The placement of supplemental screw fixation with acetabular component fixation is a typical adjunct measure but carries the greatest risk of vascular injury if placed in which of the following positions?

1. Superior
2. Posterior superior
3. Posterior inferior
4. Superior lateral
5. Anterior superior

Question 70
A 71-year-old woman has a failed revision hip arthroplasty and is undergoing a re-revision hip arthroplasty. Her last hip surgery was 4 years ago with revision of the acetabular component. Radiographs show a well-fixed extensively porous-coated femoral component and a failed acetabular component with proximal and medial migration through the floor of the acetabulum. Preoperative laboratory studies reveal an erythrocyte sedimentation rate (ESR) of 70 mm/h (normal 0-29 mm/h), a C-reactive protein (CRP) of 23.3 (normal 0.2-8.0), and a negative hip aspiration. At the time of surgery, tissues look inflamed and a frozen section shows 20 WBC per high power field; however, a Gram stain is negative. What is the most appropriate action at this point?

1. Proceed with the revision as planned
2. Obtain cultures and proceed with revision of the acetabulum only
3. Obtain cultures and proceed with revision of the femur only
4. Obtain cultures, remove the implants, and insert an antibiotic spacer
5. Obtain cultures and close
Question 71
A 79-year-old patient has a history of peripheral vascular disease and reports chronic knee pain. She has had coronary artery disease treated with angiography and stents on two occasions. Peripheral pulses are absent in both lower extremities, but the patient is disabled by advanced chronic degenerative arthritis in her right knee and would like to proceed with a total knee arthroplasty. The next most appropriate evaluation should include which of the following?

1. Ankle-brachial index of the affected lower extremity
2. Femoral popliteal angiography
3. Venous Dopplers of both lower extremities
4. MRI of the popliteal fossa
5. Radiographs to identify calcified plaques in the femoral artery

Question 72
A 56-year-old woman with rheumatoid arthritis who underwent total hip arthroplasty 17 years ago now reports pain and progressive shortening of the extremity over the past year. An AP radiograph of the hip is shown in Figure 72. Laboratory studies show an erythrocyte sedimentation rate (ESR) of 34 mm/h (normal 0 to 28 mm/h) and a C-reactive protein of 10.2 (normal 0.2-8.0). She is presently taking oral antibiotics for a urinary tract infection. What is the next most appropriate step in management?

1. Aspiration of the hip joint and if negative, revision of the acetabular component
2. Aspiration of the hip joint and culture once she has discontinued the antibiotics for 3 weeks
3. Triple phase bone scan
4. Indium-111 leukocyte scan
5. Serial plain radiographs and protected weight bearing

Figure 72
Question 73
An active 18-year-old patient reports severe left hip pain that prevents her from playing lacrosse. An AP radiograph of the pelvis is shown in Figure 73. What is the most appropriate option for this patient?

1. Activity modification
2. Hip fusion
3. Periacetabular osteotomy
4. Femoral osteotomy
5. Total hip arthroplasty
Figure 74 shows the radiograph of an 84-year-old woman who reports severe right knee pain. At the time of total knee arthroplasty, she is found to have gross insufficiency and attenuation of the medial collateral ligament (MCL) complex. Optimal management should consist of

1. primary repair of the MCL and use of a posterior stabilized total knee arthroplasty (TKA) prosthesis.
2. augmentation of the MCL with a collagenous tissue scaffold and use of a posterior stabilized TKA prosthesis.
3. complete release of the lateral collateral ligament (LCL) and use of a posterior stabilized TKA prosthesis.
4. lateral unicompartmental arthroplasty.
5. use of a varus-valgus constrained TKA prosthesis.
Question 75

Figure 75 shows the radiograph of a healthy 52-year-old woman who has severe right hip pain that has been unresponsive to nonsurgical management. What is the most appropriate surgical procedure at this time?

1. Total hip arthroplasty
2. Hemiarthroplasty of the hip
3. Valgus femoral osteotomy
4. Periacetabular osteotomy
5. Varus femoral osteotomy

Question 76

Which of the following surgical maneuvers is most likely to enhance proper patellar tracking during total knee arthroplasty and minimize the need for a lateral retinacular release?

1. Use of a mobile-bearing prosthesis
2. Anterior placement of the tibial tray
3. Internal rotation of the femoral component
4. Internal rotation of the tibial component
5. External rotation of the tibial component
Question 77
An obese 62-year-old man (BMI 38) who underwent a cementless total hip arthroplasty 14 months ago fell from a ladder and is now unable to bear weight on the extremity. A radiograph from his 3-month visit is shown in Figure 77a and a radiograph from the time of the injury is shown in Figure 77b. Appropriate management includes which of the following?

1. Nonsurgical management with the use of a cast-brace
2. Nonsurgical management with skeletal traction
3. Open treatment with a plate with or without strut allograft
4. Revision of the femoral component to a cemented femoral component that bypasses the fracture site by two cortical diameters
5. Revision of the femoral component to a cementless femoral component that bypasses the fracture site by at least two cortical diameters

Question 78
An 83-year-old man with a history of diabetes mellitus reports abdominal pain on postoperative day number three following a total hip arthroplasty. The patient reports having a bowel movement the prior evening. Examination reveals that the abdomen is distended but nontender. What is the next step in management?

1. Rectal examination for occult blood
2. Insertion of a nasogastric tube with lavage to identify blood in the gastric contents
3. Radiograph of the abdomen
4. Ultrasound of the abdomen
5. CT of the abdomen
Question 79
A 46-year-old man reports occasional squeaking of his hip 2 years after undergoing an uneventful total hip arthroplasty. History reveals no pain, physical examination cannot reproduce audible squeaking, and radiographs show appropriate implant position. What is the most appropriate management?

1. Revise the cup bearing to polyethylene
2. Revise the cup bearing to polyethylene and replace the femoral head with a metal design
3. Increase the cup abduction angle
4. Decrease the cup abduction angle
5. Continue routine follow-up and observation

Question 80
A healthy 74-year-old man reports right knee pain and swelling 6 years after undergoing primary total knee arthroplasty. Radiographs are shown in Figures 80a and 80b. He states he had severe bilateral bowlegged deformity for the last 20 years, but the right side got “a little better after the knee arthroplasty.” The infection work-up is negative, and a review of a bone scan and serial radiographs reveals no signs of component loosening. Lateral ligaments appear lax on examination. Optimal surgical management should consist of which of the following?

1. Tibial polyethylene exchange
2. Tibial polyethylene exchange and lateral collateral ligament reconstruction and medial collateral ligament release
3. Revision of all components and soft-tissue balancing
4. Isolated tibial revision
5. Femoral revision and tibial polyethylene exchange
Question 81
Which of the following organisms is most often found in a late (> 3 months) infection of a total hip arthroplasty?

1. Staphylococcus aureus
2. Staphylococcus epidermidis
3. Group B streptococcus
4. Eschericia coli
5. Streptococcus viridans

Figure 82

Question 82
A patient sustained a periprosthetic femoral fracture. The proximal femur is comminuted and the femoral component is loose. The patient has absent pulses and poor capillary refill. An emergent arteriogram is shown in Figure 82. What is the most appropriate management?

1. Open reduction and internal fixation of the fracture
2. Traction, followed by revision total hip arthroplasty and vascular repair
3. Revision total hip arthroplasty, four compartment fasciotomy, and sequential neurovascular examination
4. Revision total hip arthroplasty, followed by vascular repair
5. Traction, followed by vascular shunting, revision total hip arthroplasty, and definitive vascular repair
Question 83
During normal human knee flexion (beginning with the knee fully extended), which of the following statements best describes tibial rotation with respect to the femur?

1. Rotation is constantly occurring in both directions during the flexion cycle.
2. The tibia initially externally rotates, then progressively internally rotates.
3. The tibia initially internally rotates, then progressively externally rotates.
4. The tibia initially internally rotates, then remains in that rotational position until deep flexion when further internal rotation occurs.
5. The tibia initially externally rotates, then remains in that rotational position until deep flexion when further external rotation occurs.

Question 84
The anterior approach to the hip (iliofemoral or Smith-Peterson) puts which of the following anatomic structures at greatest risk?

1. Femoral artery
2. Femoral nerve
3. Lateral femoral cutaneous nerve
4. Medial femoral circumflex artery
5. Obturator artery

Question 85
Which of the following polyethylene manufacturing processes is expected to generate the greatest degree of polyethylene oxidation?

1. Sterilization with ethylene oxide
2. Sterilization with gamma radiation in a vacuum condition
3. Sterilization with gamma radiation in air
4. Sterilization with gamma radiation in oxygen-free gasses
5. Cross-linking the polyethylene followed by melting
Question 86
When compared to total hip arthroplasty, hip resurfacing offers which of the following advantages?

1. Better patient compliance with precautions
2. Increased patient activity in sports
3. Increased mobility of the hip
4. Improved pain relief
5. Preservation of proximal femoral bone

Question 87
A 78-year-old woman underwent total hip arthroplasty 15 years ago. She reports a recent history of increasing thigh pain prior to a fall and is now unable to ambulate. Radiographs are shown in Figures 87a and 87b. What is the best treatment for this condition?

1. Surgical traction for 6 weeks followed by application of a cast brace
2. Application of a femoral cable plate
3. Femoral revision with a cemented long stem prosthesis
4. Application of cerclage wired double allograft femoral struts
5. Femoral revision with a cementless long taper fluted modular stem and proximal allograft strut supplementation
Question 88
A 45-year-old man underwent a femoral varus intertrochanteric osteotomy at age 19 years for Perthes disease. He now reports intractable left hip pain, is unable to ambulate more than ½ block, and has pain on stairs. Adjunct nonsurgical management, such as nonsteroidal anti-inflammatory drugs and physical therapy, has failed to provide relief. Radiographs shown in Figures 88a and 88b reveal end-stage degenerative joint disease. What is the most appropriate management of the proximal femoral deformity?

1. Femoral osteotomy with realignment of the femoral canal to accommodate a cementless prosthesis
2. Custom prosthesis that will accommodate the prior osteotomy deformity
3. Hip arthrodesis
4. Cemented femoral component without femoral osteotomy
5. Valgus femoral osteotomy

Question 89
Which of the following has been associated with an increased likelihood of stress shielding after cementless total hip arthroplasty?

1. Use of titanium alloy femoral components
2. Use of proximally fixed femoral components
3. Use of distally fixed femoral components
4. Use of press-fit stems in patients with narrow intramedullary canals
5. Use of plasma sprayed components
Question 90
During total hip arthroplasty, neurologic injury most commonly occurs in which of the following structures?

1. Inferior gluteal nerve
2. Obturator nerve
3. Peroneal branch of the sciatic nerve
4. Tibial branch of the sciatic nerve
5. Femoral nerve

Question 91
A 71-year-old man underwent an uncomplicated hybrid ceramic-on-conventional polyethylene hip arthroplasty 8 years ago. He now has minimal hip symptoms, but radiographs show massive acetabular osteolysis. An AP pelvis radiograph is shown in Figure 91a and a sagittal CT scan is shown in Figure 91b. What is the most appropriate treatment?

1. Symptomatic treatment with analgesics and a follow-up radiograph in 2 years
2. Revision of the acetabular component and exchange of the ceramic head
3. Revision of both the acetabular and femoral components
4. Revision of the acetabular liner, bone grafting, and exchange of the femoral head to metal
5. Revision of the acetabulum and exchange of the femoral head to metal
Question 92
Advantages of a resurfacing metal-on-metal hip arthroplasty over a large diameter metal-on-metal total hip arthroplasty include which of the following?

1. Lower risk of femoral component loosening
2. Acetabular bone preservation
3. Lower reoperation rate
4. Femoral bone preservation
5. Lower wear rate

Question 93
Patients with fulminant disseminated intravascular coagulation (DIC) have which of the following findings?

1. Patients frequently have elevated fibrinogen levels.
2. Patients frequently have decreased D-Dimer levels.
3. Rapid infusion of IV heparin is generally curative.
4. Prothrombin time (PT) is usually normal.
5. Activated partial thromboplastin time (aPTT) is frequently elevated.
Figure 94

Question 94
Figure 94 shows the lateral radiograph of an 80-year-old woman who is an independent ambulator and has a supracondylar periprosthetic fracture around the knee. What is the most appropriate management for this patient?

1. Closed reduction and nonsurgical management
2. Open reduction and internal fixation using a distal femoral locking plate
3. Open reduction and internal fixation using an intramedullary rod
4. Revision total arthroplasty using distal femoral allograft
5. Revision total knee arthroplasty using distal femoral replacement

Question 95
Effective management of heterotopic ossification (HO) following total hip arthroplasty should include which of the following?

1. Indomethacin treatment for 10 days postoperatively
2. Immediate excision of established heterotopic ossification followed by radiation therapy or indomethacin
3. Postoperative administration of ethylhydroxydiphosphonate
4. Preoperative administration of radiation therapy 1 week before surgery
5. Postoperative administration of radiation therapy
Question 96
Computer navigation in total knee arthroplasty (TKA) has demonstrated which of the following?

1. Decreased cost
2. Improved clinical outcomes
3. Fewer outliers in terms of component position
4. Improved longevity
5. Decreased surgical time

Question 97
Which of the following statements best describes the kinematic behavior of the knee during motion from full extension to flexion?

1. Both the medial and lateral knee tibiofemoral contact points rotate and translate equally with increasing knee flexion.
2. The medial femoral condyle translates much less than the lateral femoral condyle with knee flexion.
3. The lateral femoral condyle translates much less than the medial femoral condyle with knee flexion.
4. The medial compartment rotates internally whereas the lateral compartment rotates externally.
5. The lateral compartment rotates internally whereas the medial compartment rotates externally.
A 71-year-old businessman reports medial knee pain recalcitrant to nonsurgical management. Examination reveals that his body mass index (BMI) is 28 and he has a mild varus deformity with a range of motion from 5 degrees to 130 degrees of flexion. Anterior drawer and Lachman’s test are negative. Radiographs are shown in Figures 98a through 98c. For cultural and religious reasons, he is concerned about maintaining his range of motion and kneeling ability. Which of the following options is best?

1. High tibial osteotomy
2. Unicompartmental knee arthroplasty
3. Cruciate-retaining total knee arthroplasty with a fixed bearing design
4. Posterior stabilized total knee arthroplasty with a fixed bearing design
5. Cruciate-sacrificing total knee arthroplasty with a rotating platform design
Question 99
At the time of revision total knee arthroplasty, the surgeon is trialing the knee and finds that it extends fully and is stable in flexion with a 23-mm trial spacer; however, the patella is impinging on the polyethylene spacer. No augments were used on the femur or the tibia because the components fit well without them. What is the most appropriate action at this time?

1. Proceed with implantation of the final components.
2. Perform a Z-lengthening of the patellar tendon.
3. Increase the size of the femoral component and use posterior femoral augments to decrease the size of the flexion gap.
4. Increase the size of the femoral component and use augments both distally and posteriorly to lower the joint line and decrease the size of the flexion gap.
5. Place distal femoral augments on the femoral component to lower the joint line.

Question 100
A 68-year-old woman is undergoing a cementless medial/lateral tapered femoral placement during a total hip arthroplasty and the surgeon notices a small crack forming in the anteromedial femoral neck with final implant insertion. The most appropriate management should include which of the following?

1. Placement of a cerclage cable around the femoral neck above the lesser trochanter
2. Removal of the implant, placement of a cable around the femoral neck above the lesser trochanter, and reinsertion of the implant
3. Removal of the press-fit implant and cementing of the same femoral stem
4. Final seating of the cementless femoral component without additional measures
5. Removal of the cementless femoral component and placement of a revision modular taper-fluted femoral stem
EXAMINATION WORKSHEET

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