FULL-LENGTH PRACTICE TEST 10

Practice Test 10: Musculoskeletal Medicine

55 Questions — Recommended Time: 55 Minutes

1. A 65-year-old woman presents with progressive pain and stiffness in both knees that worsens with activity and improves with rest. She reports morning stiffness lasting less than 30 minutes. Physical examination reveals bony enlargement at the joint margins, crepitus with range of motion, and mild effusion. X-rays reveal joint space narrowing, osteophyte formation, and subchondral sclerosis. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Osteoarthritis

C. Gout

D. Septic arthritis

2. A 35-year-old woman presents with bilateral symmetric joint pain and swelling affecting the metacarpophalangeal and proximal interphalangeal joints of both hands. She reports morning stiffness lasting over 2 hours. Laboratory studies reveal a positive rheumatoid factor, positive anti-cyclic citrullinated peptide (anti-CCP) antibody, and elevated ESR and CRP. Which of the following is the most appropriate initial disease-modifying therapy?

A. Oral prednisone as long-term monotherapy

B. Hydroxychloroquine alone

C. Infliximab as first-line therapy

D. Methotrexate

3. A 48-year-old man presents with acute onset of severe pain, swelling, and erythema of the first metatarsophalangeal joint that awoke him from sleep. He recently started hydrochlorothiazide for hypertension. Arthrocentesis reveals negatively birefringent, needle-shaped crystals under polarized light microscopy. Which of the following is the most likely diagnosis?

A. Acute gouty arthritis

B. Pseudogout (calcium pyrophosphate deposition disease)

C. Septic arthritis

D. Reactive arthritis

4. A 22-year-old male college football player sustains a non-contact knee injury during a cutting maneuver. He reports hearing a "pop" and experiencing immediate knee swelling. Physical examination reveals a positive Lachman test and a positive anterior drawer test. Which of the following is the most likely diagnosis?

A. Posterior cruciate ligament tear

B. Medial meniscus tear

C. Anterior cruciate ligament tear

D. Lateral collateral ligament sprain

5. A 55-year-old woman presents with pain and tenderness over the lateral aspect of her elbow that worsens with gripping and wrist extension. She plays tennis three times per week. Physical examination reveals point tenderness over the lateral epicondyle, and pain is reproduced with resisted wrist extension and forearm supination. Which of the following is the most likely diagnosis?

A. Olecranon bursitis

B. Lateral epicondylitis (tennis elbow)

C. Medial epicondylitis (golfer's elbow)

D. Radial head fracture

6. A 70-year-old woman with a history of osteoporosis trips on a rug and falls on her outstretched hand. She presents with wrist pain, swelling, and a "dinner fork" deformity. X-ray reveals a dorsally displaced distal radius fracture. Which of the following is the most likely diagnosis?

A. Colles fracture

B. Smith fracture

C. Scaphoid fracture

D. Monteggia fracture

7. A 60-year-old man presents with severe low back pain that radiates down the posterior aspect of his left leg to the lateral foot. He reports numbness and tingling along the lateral calf and foot. Straight leg raise test is positive at 30 degrees on the left. MRI reveals a large posterolateral disc herniation at L5-S1. Which of the following is the most likely affected nerve root?

A. L3

B. L4

C. L5

D. S1

8. A 14-year-old boy presents with right knee pain that worsens with running and jumping. Physical examination reveals a prominent, tender tibial tubercle with swelling. Pain is reproduced with resisted knee extension and direct pressure over the tibial tuberosity. Lateral knee X-ray reveals fragmentation and irregularity of the tibial tubercle apophysis. Which of the following is the most likely diagnosis?

A. Patellar tendinitis

B. Patellar fracture

C. Osgood-Schlatter disease

D. Slipped capital femoral epiphysis

9. A 30-year-old man presents with progressive low back pain and stiffness that has been present for over three months. He reports morning stiffness lasting more than one hour that improves with exercise but worsens with rest. He is HLA-B27 positive. X-ray of the pelvis reveals bilateral sacroiliitis. Which of the following is the most likely diagnosis?

A. Mechanical low back pain

B. Ankylosing spondylitis

C. Lumbar disc herniation

D. Psoriatic arthritis

10. A 50-year-old woman presents with widespread musculoskeletal pain, fatigue, and non-restorative sleep for the past six months. Physical examination reveals tenderness at multiple specific anatomic sites but no joint swelling or deformity. All laboratory studies including ESR, CRP, ANA, and RF are normal. Which of the following is the most likely diagnosis?

A. Fibromyalgia

B. Systemic lupus erythematosus

C. Rheumatoid arthritis

D. Polymyalgia rheumatica

11. A 4-year-old boy is brought to the emergency department because he refuses to bear weight on his right leg. He has a fever of 102.5°F and appears ill. The right hip is held in flexion, abduction, and external rotation. Passive range of motion of the hip produces severe pain. Laboratory studies reveal WBC 18,000/μL, ESR 55 mm/hr, and CRP 8.5 mg/dL. Which of the following is the most appropriate next step?

A. Observation and rest

B. MRI of the lumbar spine

C. Oral antibiotics and outpatient follow-up

D. Urgent hip joint aspiration

12. A 28-year-old woman presents with bilateral shoulder and hip girdle pain, difficulty raising her arms above her head, and difficulty climbing stairs. She reports a violaceous rash on her upper eyelids (heliotrope rash) and erythematous papules over her knuckles (Gottron papules). Serum CK is elevated at 5,500 U/L. Which of the following is the most likely diagnosis?

A. Polymyalgia rheumatica

B. Systemic lupus erythematosus

C. Dermatomyositis

D. Fibromyalgia

13. A 45-year-old construction worker presents with shoulder pain that worsens with overhead activities. He reports pain at night when lying on the affected side. Physical examination reveals a positive Neer impingement sign, positive Hawkins-Kennedy test, and a painful arc between 60 and 120 degrees of abduction. Strength testing is intact. Which of the following is the most likely diagnosis?

A. Rotator cuff impingement syndrome

B. Adhesive capsulitis (frozen shoulder)

C. Acromioclavicular joint arthritis

D. Complete rotator cuff tear

14. A 32-year-old woman presents with pain and swelling of her right knee following a twisting injury during a soccer game. She reports a "locking" sensation in the knee and inability to fully extend it. Physical examination reveals joint line tenderness, a positive McMurray test with a palpable click, and a positive Thessaly test. Which of the following is the most likely diagnosis?

A. Anterior cruciate ligament tear

B. Meniscal tear

C. Patellar dislocation

D. Iliotibial band syndrome

15. A 72-year-old woman with a history of osteoporosis presents with acute onset of severe mid-thoracic back pain after bending over to pick up a grocery bag. She has point tenderness over the T12 vertebral body. There are no neurologic deficits. X-ray reveals a compression fracture of T12 with 40% loss of vertebral body height. Which of the following is the most likely type of fracture?

A. Osteoporotic vertebral compression fracture

B. Pathologic fracture from metastatic disease

C. Traumatic burst fracture

D. Chance fracture

16. A 40-year-old woman presents with a three-month history of hand pain and stiffness. Physical examination reveals hard, bony nodules at the distal interphalangeal joints and proximal interphalangeal joints. X-rays reveal joint space narrowing and osteophytes at the DIP joints. Which of the following best describes the bony nodules at the DIP joints?

A. Bouchard nodes

B. Rheumatoid nodules

C. Heberden nodes

D. Tophi

17. A 25-year-old man presents with acute onset of low back pain after lifting a heavy box at work. He reports pain radiating down the anterior thigh to the medial leg. He has weakness of knee extension and a diminished patellar reflex. MRI reveals a disc herniation at L3-L4. Which of the following is the most likely affected nerve root?

A. L3

B. L4

C. L5

D. S1

18. A 55-year-old man presents with sudden onset of severe pain, swelling, warmth, and erythema of his right knee. He is febrile with a temperature of 101.8°F. He has a history of diabetes and a recent skin infection on his right lower extremity. Arthrocentesis reveals turbid, yellow-green synovial fluid with 85,000 WBCs/µL (predominantly neutrophils) and no crystals. Gram stain reveals gram-positive cocci in clusters. Which of the following is the most likely diagnosis?

A. Gout

B. Pseudogout

C. Reactive arthritis

D. Septic arthritis

19. A 60-year-old woman presents with bilateral shoulder and hip girdle pain and stiffness that has developed gradually over two weeks. She reports morning stiffness lasting over one hour. She has difficulty raising her arms and getting out of a chair. ESR is 85 mm/hr and CRP is markedly elevated. CK is normal. She has no skin rash. Which of the following is the most likely diagnosis?

A. Polymyalgia rheumatica

B. Rheumatoid arthritis

C. Dermatomyositis

D. Fibromyalgia

20. A 16-year-old male basketball player presents with acute ankle pain after landing on another player's foot with his ankle turning inward (inversion). There is significant swelling and ecchymosis over the lateral ankle with tenderness over the anterior talofibular ligament. He can bear weight with a limp. The Ottawa ankle rules are negative for bony tenderness. Which of the following is the most likely diagnosis?

A. Ankle fracture

B. Achilles tendon rupture

C. Lateral ankle sprain (anterior talofibular ligament injury)

D. Syndesmotic (high ankle) sprain

21. A 45-year-old woman presents with a 6-month history of progressive hand numbness and tingling affecting the thumb, index finger, middle finger, and radial half of the ring finger. She reports dropping objects and nighttime awakening from hand pain. Physical examination reveals a positive Tinel sign and positive Phalen test at the wrist. Thenar atrophy is noted. Which of the following is the most likely diagnosis?

A. Cervical radiculopathy at C6

B. Carpal tunnel syndrome

C. Ulnar neuropathy at the elbow

D. Thoracic outlet syndrome

22. A 68-year-old man presents with acute onset of pain, swelling, and warmth of his right knee. Arthrocentesis reveals positively birefringent, rhomboid-shaped crystals under polarized light microscopy. X-ray of the knee reveals chondrocalcinosis (calcification of the meniscal cartilage). Which of the following is the most likely diagnosis?

A. Gout

B. Septic arthritis

C. Osteoarthritis flare

D. Pseudogout (calcium pyrophosphate deposition disease)

23. A 35-year-old man presents with pain in his right heel that is worst with the first steps in the morning and after prolonged sitting. The pain typically improves after walking for several minutes. Physical examination reveals tenderness at the medial calcaneal tuberosity at the insertion of the plantar fascia. He is obese with a BMI of 33. Which of the following is the most likely diagnosis?

A. Plantar fasciitis

B. Achilles tendinitis

C. Stress fracture of the calcaneus

D. Tarsal tunnel syndrome

24. A 12-year-old obese boy presents with a 3-week history of progressive left hip pain and a limp. He reports pain in the left groin that radiates to the medial thigh and knee. Physical examination reveals limited internal rotation and obligatory external rotation of the hip with flexion. X-ray reveals posterior displacement of the left femoral epiphysis relative to the femoral neck. Which of the following is the most likely diagnosis?

A. Legg-Calvé-Perthes disease

B. Transient synovitis

C. Slipped capital femoral epiphysis

D. Septic arthritis of the hip

25. A 42-year-old woman with a history of systemic lupus erythematosus on chronic corticosteroid therapy presents with progressive left hip pain that is worsening despite rest. She has no history of trauma. MRI of the left hip reveals a crescent sign and subchondral collapse of the femoral head. Which of the following is the most likely diagnosis?

A. Osteoarthritis of the hip

B. Avascular necrosis (osteonecrosis) of the femoral head

C. Stress fracture of the femoral neck

D. Labral tear

26. A 50-year-old man presents with chronic low back pain, intermittent bilateral lower extremity pain and numbness, and difficulty walking long distances. He reports that his symptoms worsen with standing and walking (extension) and improve with sitting and leaning forward (flexion). MRI reveals moderate to severe central spinal canal narrowing at L3-L4 and L4-L5. Which of the following is the most likely diagnosis?

A. Lumbar disc herniation

B. Ankylosing spondylitis

C. Cauda equina syndrome

D. Lumbar spinal stenosis

27. A 7-year-old boy presents with a limp and right hip pain for the past two months. He has had no fever or recent illness. Physical examination reveals limited hip abduction and internal rotation on the right. X-ray of the pelvis reveals flattening, fragmentation, and increased density of the right femoral head. Which of the following is the most likely diagnosis?

A. Legg-Calvé-Perthes disease (avascular necrosis of the femoral head in children)

B. Slipped capital femoral epiphysis

C. Developmental dysplasia of the hip

D. Septic arthritis

28. A 40-year-old man with a history of psoriasis presents with asymmetric joint pain and swelling affecting the distal interphalangeal joints of his hands and the right knee. He has pitting of the fingernails and "sausage-shaped" swelling of his left third toe (dactylitis). X-ray reveals "pencil-in-cup" deformity at the DIP joints. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Gout

C. Psoriatic arthritis

D. Osteoarthritis

29. A 55-year-old woman presents with progressive difficulty opening her mouth, thickened skin on her fingers and face, Raynaud phenomenon, and dysphagia. Physical examination reveals sclerodactyly, digital pitting scars, and telangiectasias. She has positive anti-Scl-70 (anti-topoisomerase I) antibody. Which of the following is the most likely diagnosis?

A. Systemic lupus erythematosus

B. Dermatomyositis

C. Mixed connective tissue disease

D. Systemic sclerosis (scleroderma) — diffuse cutaneous form

30. A 28-year-old man presents with acute onset of low back pain and right buttock pain radiating down the posterior thigh, posterior calf, and to the plantar aspect of the foot. He reports numbness on the sole of the foot and weakness of ankle plantarflexion. The Achilles reflex is diminished on the right. MRI reveals a large disc herniation at L5-S1. Which of the following nerve root is most likely affected?

A. L4

B. S1

C. L5

D. S2

31. A 45-year-old woman presents with a painless, firm, slowly growing mass on the volar aspect of her right wrist that transilluminates with a penlight. It is mildly compressible and has been present for three months. It does not restrict range of motion. Which of the following is the most likely diagnosis?

A. Ganglion cyst

B. Lipoma

C. Giant cell tumor of the tendon sheath

D. Rheumatoid nodule

32. A 65-year-old man with a long history of poorly controlled gout presents with multiple firm, chalky-white subcutaneous nodules on his ears, olecranon processes, and Achilles tendons. X-rays reveal punched-out erosions with overhanging margins ("rat-bite" erosions) at multiple joints. Serum uric acid is 10.5 mg/dL. Which of the following best describes the subcutaneous nodules?

A. Rheumatoid nodules

B. Heberden nodes

C. Tophi (monosodium urate crystal deposits)

D. Xanthomas

33. A 30-year-old man presents with a two-week history of right knee swelling, urethritis, and bilateral conjunctivitis. He reports a recent episode of chlamydial urethritis four weeks ago. Arthrocentesis of the knee reveals inflammatory fluid with no crystals and negative Gram stain. Which of the following is the most likely diagnosis?

A. Gonococcal arthritis

B. Gout

C. Rheumatoid arthritis

D. Reactive arthritis (Reiter syndrome)

34. A 52-year-old woman presents with pain and a "catching" sensation in her right shoulder. She reports difficulty reaching behind her back and overhead. Physical examination reveals a positive O'Brien test (active compression test) and pain with cross-body adduction. MR arthrography reveals a tear of the superior labrum from anterior to posterior. Which of the following is the most likely diagnosis?

A. Rotator cuff tear

B. SLAP tear (superior labrum anterior to posterior)

C. Adhesive capsulitis

D. Biceps tendinitis

35. A 25-year-old female runner presents with anterior knee pain that worsens with climbing stairs, squatting, and prolonged sitting ("theater sign"). Physical examination reveals peripatellar tenderness, a positive patellar compression test (Clarke sign), and pain with resisted knee extension. There is no joint effusion or ligamentous instability. Which of the following is the most likely diagnosis?

A. Patellofemoral pain syndrome (chondromalacia patellae)

B. Meniscal tear

C. Patellar tendinitis

D. Anterior cruciate ligament tear

36. A 58-year-old woman presents with progressive difficulty raising her arm and weakness with overhead activities. She reports shoulder pain for the past year that has gradually worsened. Physical examination reveals a positive drop arm test (inability to slowly lower the arm from 90 degrees of abduction), weakness with external rotation, and a positive empty can test. MRI reveals a full-thickness tear of the supraspinatus tendon. Which of the following is the most likely diagnosis?

A. Rotator cuff impingement syndrome

B. Adhesive capsulitis

C. Complete rotator cuff tear

D. Biceps tendon rupture

37. A 70-year-old woman with a history of long-term bisphosphonate therapy (alendronate for 8 years) presents with a sudden onset of severe thigh pain without significant trauma. X-ray reveals a transverse fracture through the lateral cortex of the femoral shaft with focal cortical thickening ("beaking") and no comminution. Which of the following is the most likely diagnosis?

A. Pathologic fracture from metastatic disease

B. Atypical femoral fracture associated with long-term bisphosphonate use

C. Osteoporotic hip fracture

D. Stress fracture

38. A 20-year-old man presents with knee pain and a palpable mass above his right knee that has been growing over the past two months. X-ray reveals an aggressive-appearing lesion in the distal femoral metaphysis with a "sunburst" periosteal reaction and Codman triangle. The patient reports constitutional symptoms including low-grade fevers and weight loss. Which of the following is the most likely diagnosis?

A. Osteochondroma

B. Giant cell tumor

C. Ewing sarcoma

D. Osteosarcoma

39. A 62-year-old woman presents with gradually progressive stiffness and restricted range of motion of her right shoulder over the past four months. She has significant difficulty with external rotation and abduction. She has a history of type 2 diabetes. Physical examination reveals global restriction of both active and passive range of motion in all planes, with external rotation most severely affected. Which of the following is the most likely diagnosis?

A. Adhesive capsulitis (frozen shoulder)

B. Rotator cuff tear

C. Glenohumeral osteoarthritis

D. Cervical radiculopathy

40. A 45-year-old woman presents with fatigue, joint pain, malar rash, photosensitivity, and oral ulcers. Laboratory studies reveal a positive ANA (1:640), positive anti-double-stranded DNA antibody, low C3 and C4 complement levels, and proteinuria on urinalysis. Which of the following is the most likely diagnosis?

A. Rheumatoid arthritis

B. Dermatomyositis

C. Systemic lupus erythematosus

D. Sjögren syndrome

41. A 35-year-old man sustains a direct blow to the lateral aspect of his knee during a football tackle. He reports medial knee pain and a sense of instability. Physical examination reveals tenderness along the medial joint line, medial knee opening with valgus stress testing at 30 degrees of flexion, and a positive finding at 0 degrees of extension. Which of the following is the most likely diagnosis?

A. Anterior cruciate ligament tear

B. Lateral meniscus tear

C. Patellar dislocation

D. Medial collateral ligament tear

42. A 55-year-old man presents with right great toe pain. He has a history of chronic kidney disease and is unable to take NSAIDs. Arthrocentesis confirms acute gout. Which of the following is the most appropriate acute treatment for this patient?

A. Allopurinol

B. Colchicine

C. Ibuprofen

D. Febuxostat

43. A 40-year-old woman presents with pain and clicking in her right temporomandibular joint that worsens with chewing. She reports a history of nighttime teeth grinding (bruxism). Physical examination reveals tenderness over the TMJ, limited mouth opening, and a palpable click during jaw opening. Which of the following is the most likely diagnosis?

A. Trigeminal neuralgia

B. Mandibular fracture

C. Temporomandibular joint disorder

D. Temporal arteritis

44. A 75-year-old woman on chronic corticosteroid therapy presents for osteoporosis evaluation. DEXA scan reveals a T-score of -3.2 at the lumbar spine. She has a history of a prior vertebral compression fracture. Which of the following is the most appropriate initial pharmacologic treatment for her osteoporosis?

A. Bisphosphonate therapy (alendronate or zoledronic acid)

B. Calcium and vitamin D supplementation alone

C. Estrogen replacement therapy

D. Calcitonin nasal spray as first-line therapy

45. A 18-year-old male wrestler presents with right shoulder pain after being thrown to the mat with his arm overhead and externally rotated. He reports a sensation of his shoulder "popping out." Physical examination reveals a sulcus sign, positive apprehension test at 90 degrees of abduction and external rotation, and a positive relocation test. X-ray reveals a Hill-Sachs lesion on the posterolateral humeral head. Which of the following is the most likely diagnosis?

A. Acromioclavicular joint separation

B. Rotator cuff tear

C. Biceps tendon rupture

D. Anterior glenohumeral dislocation

46. A 50-year-old man presents with pain and stiffness in both hands that has developed over several years. Physical examination reveals bony enlargement of the DIP joints (Heberden nodes) and squaring of the base of both thumbs (first carpometacarpal joints). He has no involvement of the MCP joints or wrists. Which of the following features best distinguishes this condition from rheumatoid arthritis?

A. Presence of morning stiffness

B. DIP joint and first CMC joint involvement with sparing of MCP joints

C. Bilateral hand involvement

D. Presence of joint pain

47. A 40-year-old long-distance runner presents with insidious-onset medial tibial pain that worsens with running and improves with rest. Physical examination reveals diffuse tenderness along the posteromedial border of the tibia. X-ray is normal. MRI reveals periosteal edema along the medial tibia without a discrete fracture line. Which of the following is the most likely diagnosis?

A. Medial tibial stress syndrome (shin splints)

B. Tibial stress fracture

C. Chronic exertional compartment syndrome

D. Deep vein thrombosis

48. A 65-year-old man presents with sudden onset of right foot drop and inability to dorsiflex his right ankle or extend his toes. He reports prolonged leg crossing during a long car ride. Physical examination reveals weakness of ankle dorsiflexion and eversion, sensory loss over the lateral calf and dorsum of the foot, but preserved ankle plantarflexion and inversion. Which of the following is the most likely diagnosis?

A. L5 radiculopathy

B. Sciatic nerve injury

C. Common peroneal (fibular) nerve palsy

D. S1 radiculopathy

49. A 78-year-old woman with known osteoporosis falls from standing height and is unable to bear weight on her left leg. The left lower extremity appears shortened and externally rotated. X-ray reveals a displaced femoral neck fracture. Which of the following is the most appropriate surgical management?

A. Open reduction with internal fixation (ORIF) with screws

B. Closed reduction and hip spica casting

C. Total knee replacement

D. Hip arthroplasty (hemiarthroplasty or total hip replacement)

50. A 30-year-old man presents with chronic low back pain. He is HLA-B27 positive. X-ray of the lumbar spine reveals a "bamboo spine" appearance with syndesmophytes bridging adjacent vertebral bodies and fusion of the sacroiliac joints. Which of the following is the most likely diagnosis?

A. Diffuse idiopathic skeletal hyperostosis (DISH)

B. Advanced ankylosing spondylitis

C. Lumbar degenerative disc disease

D. Psoriatic spondylitis

51. A 48-year-old man presents with right shoulder pain following a fall on his outstretched hand. He reports pain localized to the top of the shoulder. Physical examination reveals tenderness at the acromioclavicular joint, a positive cross-body adduction test, and a visible step-off deformity at the AC joint. X-ray reveals widening of the AC joint with superior displacement of the distal clavicle. Which of the following is the most likely diagnosis?

A. Acromioclavicular joint separation

B. Clavicle fracture

C. Anterior glenohumeral dislocation

D. Rotator cuff tear

52. A 38-year-old woman presents with bilateral wrist pain, subcutaneous nodules on her elbows, and symmetric swelling of her MCP and PIP joints. X-rays of her hands reveal periarticular erosions, joint space narrowing, and periarticular osteopenia. She has had symptoms for over one year. Which of the following extra-articular manifestations is most commonly associated with this disease?

A. Tophi on the ears

B. Malar rash

C. Psoriatic plaques

D. Rheumatoid nodules

53. A 10-year-old boy presents with a painful, warm swelling of his left proximal tibia that has been present for six weeks. He reports night pain and low-grade fevers. X-ray reveals a periosteal "onion-skin" reaction with a permeative, moth-eaten pattern of bone destruction. MRI reveals a soft tissue mass extending from the bone. Biopsy shows small, round, blue cells. Which of the following is the most likely diagnosis?

A. Osteosarcoma

B. Osteochondroma

C. Ewing sarcoma

D. Osteoid osteoma

54. A 55-year-old man presents with sudden onset of severe pain in his right calf while playing tennis. He felt a "pop" in the back of his lower leg. Physical examination reveals a palpable gap in the Achilles tendon, a positive Thompson test (no plantar flexion with calf squeeze), and inability to perform single-leg heel raise on the right side. Which of the following is the most likely diagnosis?

A. Gastrocnemius muscle strain

B. Achilles tendon rupture

C. Deep vein thrombosis

D. Plantaris tendon rupture

55. A 35-year-old man presents with acute low back pain, bilateral lower extremity weakness, urinary retention, and saddle anesthesia (perineal numbness). He reports progressive difficulty with bowel and bladder function over the past 24 hours. MRI reveals a large central disc herniation at L4-L5 compressing the cauda equina. Which of the following is the most appropriate management?

A. Oral NSAIDs and physical therapy

B. Epidural corticosteroid injection

C. Bed rest and observation for 6 weeks

D. Emergent surgical decompression

PRACTICE TEST 10: ANSWER KEY WITH EXPLANATIONS

Musculoskeletal Medicine

1. B. Osteoarthritis. Osteoarthritis is the most common form of arthritis, resulting from progressive degeneration of articular cartilage. The hallmark features include pain that worsens with activity and improves with rest, brief morning stiffness (less than 30 minutes, distinguishing it from inflammatory arthritis), bony enlargement from osteophyte formation, crepitus from irregular joint surfaces, and radiographic findings of joint space narrowing, osteophytes, subchondral sclerosis, and subchondral cysts. Weight-bearing joints (knees, hips) and the hands (DIP, PIP, first CMC) are most commonly affected. First-line treatment includes acetaminophen, topical NSAIDs, exercise, weight management, and physical therapy. Intra-articular corticosteroid injections provide short-term relief.

2. D. Methotrexate. Methotrexate is the cornerstone first-line DMARD for rheumatoid arthritis, demonstrating the best balance of efficacy, safety, and tolerability. RA is a chronic systemic autoimmune disease characterized by symmetric polyarthritis affecting small joints (MCP, PIP, wrists) with prolonged morning stiffness (greater than 1 hour). Positive RF and anti-CCP (which is more specific) with elevated inflammatory markers confirm the diagnosis. Early DMARD initiation (within 3 months of diagnosis) is critical to prevent irreversible joint destruction. Biologic agents (TNF inhibitors like infliximab) are added when methotrexate alone is insufficient, not as first-line therapy. Long-term corticosteroid monotherapy is avoided due to adverse effects.

3. A. Acute gouty arthritis. Gout is caused by deposition of monosodium urate crystals in joints from chronic hyperuricemia. The first MTP joint (podagra) is the most commonly affected joint. Negatively birefringent, needle-shaped crystals on polarized light microscopy of synovial fluid are diagnostic and distinguish gout from pseudogout (positively birefringent, rhomboid-shaped crystals). Thiazide diuretics are a well-known precipitant by reducing renal uric acid excretion. Acute treatment includes NSAIDs (indomethacin), colchicine, or corticosteroids. Urate-lowering therapy (allopurinol, febuxostat) should not be initiated during an acute flare as it can worsen symptoms, but should be considered for recurrent gout after the acute episode resolves.

4. C. Anterior cruciate ligament tear. ACL tears are common sports injuries, particularly during non-contact pivoting, cutting, or deceleration maneuvers. Patients typically report hearing or feeling a "pop," followed by immediate hemarthrosis (knee swelling within hours). The Lachman test (anterior tibial translation with the knee at 20-30 degrees of flexion) is the most sensitive physical examination test, while the anterior drawer test (at 90 degrees of flexion) is more specific but less sensitive. MRI is the gold

standard for confirming the diagnosis and evaluating associated injuries (meniscal tears, bone bruises). Active patients typically undergo ACL reconstruction with a tendon graft.

5. B. Lateral epicondylitis (tennis elbow). Lateral epicondylitis results from overuse and degenerative tendinopathy of the common extensor tendon origin at the lateral epicondyle, particularly the extensor carpi radialis brevis. It is the most common cause of lateral elbow pain and is associated with repetitive wrist extension and forearm supination activities. Pain is reproduced with resisted wrist extension (Cozen test) and resisted middle finger extension (Maudsley test). Treatment includes activity modification, counterforce bracing, eccentric strengthening exercises, NSAIDs, and corticosteroid injection for refractory cases. Medial epicondylitis (golfer's elbow) involves the common flexor-pronator origin and causes medial elbow pain.

6. A. Colles fracture. A Colles fracture is a distal radius fracture with dorsal displacement and angulation of the distal fragment, producing the characteristic "dinner fork" deformity when viewed laterally. It is the most common wrist fracture, typically resulting from a fall on an outstretched hand (FOOSH) with the wrist in dorsiflexion, particularly in elderly patients with osteoporosis. A Smith fracture is the reverse pattern with volar displacement ("garden spade" deformity) from a fall on a flexed wrist. Treatment depends on stability — non-displaced or minimally displaced fractures are treated with closed reduction and casting, while displaced or unstable fractures require surgical fixation.

7. D. S1. A disc herniation at L5-S1 compresses the traversing S1 nerve root. The S1 dermatome covers the posterior calf, lateral foot, and plantar surface. S1 radiculopathy produces pain radiating down the posterior leg to the lateral foot, weakness of ankle plantarflexion and foot eversion, diminished or absent Achilles reflex, and sensory loss along the lateral foot. The straight leg raise test is positive when radicular pain is reproduced between 30-70 degrees of hip flexion, indicating nerve root tension. L5 radiculopathy would produce weakness of ankle dorsiflexion (foot drop) and great toe extension with sensory loss on the dorsal foot.

8. C. Osgood-Schlatter disease. Osgood-Schlatter disease is a traction apophysitis of the tibial tubercle caused by repetitive stress from the patellar tendon pulling on the immature tibial tuberosity apophysis. It is the most common cause of anterior knee pain in adolescents, particularly active boys aged 10-15 years during growth spurts. The hallmark finding is a prominent, tender tibial tubercle with pain worsened by running, jumping, kneeling, and resisted knee extension. X-ray may show fragmentation and irregularity of the tibial tubercle apophysis. Treatment is conservative — activity modification, ice, NSAIDs, and quadriceps stretching and strengthening. The condition is self-limited and resolves with skeletal maturity.

9. B. Ankylosing spondylitis. Ankylosing spondylitis is a chronic inflammatory spondyloarthropathy primarily affecting the axial skeleton, particularly the sacroiliac joints and spine. Key features include insidious onset of inflammatory back pain (onset before age 40, morning stiffness greater than 30 minutes, improvement with exercise, no improvement with rest), bilateral sacroiliitis on imaging, and strong HLA-B27 association (present in approximately 90% of patients). Extra-articular manifestations include anterior uveitis, aortitis, and apical pulmonary fibrosis. Late radiographic findings include "bamboo spine"

from bridging syndesmophytes and fusion. First-line treatment is NSAIDs, with TNF inhibitors for refractory disease.

10. A. Fibromyalgia. Fibromyalgia is a chronic widespread pain disorder characterized by diffuse musculoskeletal pain, fatigue, non-restorative sleep, cognitive dysfunction ("fibro fog"), and tenderness at multiple tender points. The diagnosis is clinical, based on the 2010/2016 ACR criteria — widespread pain index (WPI) and symptom severity scale (SSS) scores meeting threshold values. All laboratory studies are normal, distinguishing it from inflammatory conditions (RA, SLE, polymyalgia rheumatica). Central sensitization — amplified pain processing in the CNS — is the proposed pathophysiologic mechanism. Treatment is multimodal including exercise (most effective non-pharmacologic intervention), cognitive behavioral therapy, and medications (duloxetine, pregabalin, milnacipran).

11. D. Urgent hip joint aspiration. A febrile child who refuses to bear weight with a painful, restricted hip joint must be evaluated urgently for septic arthritis. The Kocher criteria (fever above 101.3°F, inability to bear weight, ESR above 40 mm/hr, and WBC above 12,000/μL) predict the probability of septic arthritis — this patient meets all four criteria, giving a greater than 99% probability. Urgent joint aspiration is essential for diagnosis (synovial fluid WBC typically above 50,000/μL with predominant neutrophils) and Gram stain and culture. Staphylococcus aureus is the most common causative organism across all age groups. Treatment requires emergent surgical drainage and IV antibiotics to prevent joint destruction.

12. C. Dermatomyositis. Dermatomyositis is an idiopathic inflammatory myopathy characterized by proximal muscle weakness and distinctive skin manifestations. The heliotrope rash (violaceous discoloration of the upper eyelids) and Gottron papules (erythematous papules over the knuckles, elbows, and knees) are pathognomonic. Proximal muscle weakness affects the shoulder and hip girdles, producing difficulty raising arms, climbing stairs, and rising from chairs. Markedly elevated CK confirms active muscle inflammation. EMG and muscle biopsy (perifascicular atrophy with perivascular inflammation) aid diagnosis. Dermatomyositis is associated with an increased risk of underlying malignancy (particularly ovarian, lung, and GI cancers), requiring age-appropriate cancer screening.

13. A. Rotator cuff impingement syndrome. Rotator cuff impingement occurs when the supraspinatus tendon and subacromial bursa are compressed between the humeral head and the coracoacromial arch during overhead activities. Neer impingement sign (pain with passive forward flexion of the shoulder) and Hawkins-Kennedy test (pain with internal rotation of the flexed shoulder) are sensitive tests. The painful arc (pain between 60-120 degrees of abduction) reflects tendon compression in this range. Importantly, strength testing is intact, distinguishing impingement from a complete rotator cuff tear (which produces weakness). Treatment includes activity modification, physical therapy focusing on rotator cuff strengthening, NSAIDs, and subacromial corticosteroid injection for refractory cases.

14. B. Meniscal tear. Meniscal tears typically result from twisting or rotational forces on a weight-bearing knee. Key clinical features include mechanical symptoms (locking — inability to fully extend the knee — and catching/clicking), joint line tenderness, and positive provocative tests. The McMurray test (palpable or audible click with tibial rotation during knee extension from a flexed position) and Thessaly test (pain with rotation on a weight-bearing, slightly flexed knee) are specific for meniscal injury. MRI is the

imaging study of choice with sensitivity and specificity exceeding 90%. Treatment depends on tear type, location, and patient factors — small peripheral tears may heal conservatively, while tears causing mechanical symptoms typically require arthroscopic meniscectomy or repair.

15. A. Osteoporotic vertebral compression fracture. Vertebral compression fractures are the most common osteoporotic fracture, often occurring with minimal trauma (bending, lifting, coughing) or even spontaneously. Risk factors include postmenopausal status, advanced age, chronic corticosteroid use, low body weight, and prior fragility fractures. The thoracolumbar junction (T12-L1) is the most common location. Treatment for stable compression fractures includes pain management (analgesics, calcitonin for acute pain), bracing, early mobilization, and osteoporosis treatment (bisphosphonates). Vertebral augmentation procedures (kyphoplasty, vertebroplasty) may be considered for severe pain refractory to conservative management after 4-6 weeks.

16. C. Heberden nodes. Heberden nodes are bony enlargements (osteophytes) of the distal interphalangeal (DIP) joints, pathognomonic for osteoarthritis of the hands. Bouchard nodes are similar bony enlargements at the proximal interphalangeal (PIP) joints. Both represent osteophyte formation from progressive cartilage degeneration and are named after the physicians who first described them. Rheumatoid nodules are subcutaneous nodules found at pressure points (extensor surfaces, particularly the olecranon) in rheumatoid arthritis. Tophi are deposits of monosodium urate crystals in gout. Hand OA characteristically affects the DIP joints, PIP joints, and first CMC joints while sparing the MCP joints and wrists — the opposite pattern of rheumatoid arthritis.

17. B. L4. A disc herniation at L3-L4 compresses the traversing L4 nerve root. L4 radiculopathy produces pain radiating down the anterior thigh to the medial leg, weakness of knee extension (quadriceps — L2, L3, L4) and ankle dorsiflexion, and a diminished patellar (knee jerk) reflex. The key nerve root-reflex associations are L4-patellar reflex, S1-Achilles reflex, and L5-no reliable reflex. Understanding the dermatomal and myotomal distributions is essential for localizing the level of nerve root compression. An L5-S1 herniation affects S1 (ankle plantarflexion, Achilles reflex), while an L4-L5 herniation affects L5 (foot dorsiflexion, great toe extension).

18. D. Septic arthritis. Septic arthritis is a medical emergency requiring immediate diagnosis and treatment to prevent irreversible joint destruction. This patient has classic features — acute monoarticular joint inflammation (pain, swelling, warmth, erythema), fever, and risk factors (diabetes, recent skin infection). Synovial fluid WBC count above 50,000/μL with greater than 75% neutrophils and positive Gram stain are diagnostic. Staphylococcus aureus is the most common causative organism in adults. The absence of crystals excludes crystal arthropathy. Treatment requires immediate joint drainage (repeated needle aspiration or surgical drainage) and empiric IV antibiotics (vancomycin for gram-positive coverage pending culture results) for a minimum of 4-6 weeks.

19. A. Polymyalgia rheumatica. PMR is an inflammatory condition affecting adults over age 50 (peak incidence 70-80 years), characterized by bilateral shoulder and hip girdle pain and stiffness with markedly elevated inflammatory markers (ESR typically above 40 mm/hr, often above 80). Morning stiffness lasting over 1 hour is prominent. Normal CK distinguishes PMR from inflammatory myopathies

(dermatomyositis, polymyositis), and the absence of skin rash excludes dermatomyositis. PMR is closely associated with giant cell (temporal) arteritis — approximately 15-20% of PMR patients develop GCA. Treatment is low-dose prednisone (12.5-25 mg daily), with dramatic and rapid improvement expected within 24-72 hours (a lack of response should prompt reconsideration of the diagnosis).

20. C. Lateral ankle sprain (anterior talofibular ligament injury). Lateral ankle sprains are the most common musculoskeletal injury, typically resulting from inversion and plantarflexion forces. The anterior talofibular ligament (ATFL) is the weakest lateral ligament and is injured first, followed by the calcaneofibular ligament (CFL) and posterior talofibular ligament (PTFL) in more severe sprains. Ankle sprains are graded I (stretch without macroscopic tear), II (partial tear), and III (complete rupture). The Ottawa ankle rules are a validated clinical decision tool — X-rays are indicated only if there is bony tenderness over the malleoli or inability to bear weight for four steps. Treatment follows RICE protocol (rest, ice, compression, elevation) with early functional rehabilitation.

21. B. Carpal tunnel syndrome. Carpal tunnel syndrome is the most common peripheral entrapment neuropathy, caused by compression of the median nerve within the carpal tunnel at the wrist. Symptoms follow the median nerve distribution — numbness and tingling in the thumb, index finger, middle finger, and radial half of the ring finger, with nocturnal symptom exacerbation. Tinel sign (percussion over the carpal tunnel producing paresthesias) and Phalen test (wrist flexion for 60 seconds reproducing symptoms) are provocative tests. Thenar atrophy indicates chronic, severe compression. Risk factors include pregnancy, diabetes, hypothyroidism, rheumatoid arthritis, and repetitive wrist activities. Nerve conduction studies confirm the diagnosis. Treatment ranges from splinting and corticosteroid injection to surgical carpal tunnel release.

22. D. Pseudogout (calcium pyrophosphate deposition disease). Pseudogout (CPPD) is caused by deposition of calcium pyrophosphate dihydrate crystals in joints, most commonly affecting the knee. The hallmark diagnostic finding is positively birefringent, rhomboid-shaped crystals on polarized light microscopy of synovial fluid — in contrast to gout, which shows negatively birefringent, needle-shaped monosodium urate crystals. Chondrocalcinosis (calcification of cartilage, particularly the meniscal fibrocartilage, triangular fibrocartilage of the wrist, and symphysis pubis) on X-ray is characteristic. Risk factors include advanced age, hemochromatosis, hyperparathyroidism, hypomagnesemia, and hypothyroidism. Acute treatment is similar to gout — NSAIDs, colchicine, or corticosteroids.

23. A. Plantar fasciitis. Plantar fasciitis is the most common cause of inferior heel pain, resulting from chronic degeneration and microtearing of the plantar fascia at its insertion on the medial calcaneal tuberosity. The hallmark symptom is "first-step pain" — severe heel pain with the first steps in the morning or after prolonged rest that typically improves with walking as the fascia stretches. Risk factors include obesity, prolonged standing, pes planus (flat feet), tight Achilles tendon, and running. Physical examination reveals point tenderness at the medial calcaneal tuberosity. Treatment includes stretching exercises, supportive footwear, orthotic insoles, night splints, NSAIDs, and corticosteroid injection for refractory cases.

24. C. Slipped capital femoral epiphysis. SCFE is the most common hip disorder in adolescents, occurring when the femoral head (epiphysis) slips posteriorly and inferiorly relative to the femoral neck through the physis (growth plate). Risk factors include obesity, male sex, and ages 10-16 (during rapid growth). Patients present with hip or groin pain (frequently referred to the knee), limp, and obligatory external rotation of the hip with flexion. Frog-leg lateral X-ray is the most sensitive view, showing posterior displacement of the epiphysis (Klein line — a line along the superior femoral neck fails to intersect the epiphysis). Treatment is urgent surgical in situ pinning with a single cannulated screw to prevent further slippage.

25. B. Avascular necrosis (osteonecrosis) of the femoral head. AVN results from disruption of blood supply to the femoral head, leading to bone cell death and eventual structural collapse. The most common risk factors are chronic corticosteroid use, alcohol abuse, SLE, sickle cell disease, and hip fracture/dislocation. Pain typically progresses insidiously, worsening with weight-bearing. MRI is the most sensitive imaging study for early detection, showing a "double line sign" (band of low signal surrounded by high signal) before structural changes are apparent on X-ray. The crescent sign on X-ray indicates subchondral fracture and impending collapse. Treatment depends on staging — core decompression for early disease, joint replacement for advanced collapse.

26. D. Lumbar spinal stenosis. Lumbar spinal stenosis results from progressive narrowing of the spinal canal, most commonly from degenerative changes including disc bulging, facet hypertrophy, and ligamentum flavum thickening. The hallmark symptom is neurogenic claudication — bilateral lower extremity pain, numbness, and weakness that worsens with standing and walking (spinal extension narrows the canal further) and improves with sitting and forward flexion (which opens the canal). This distinguishes it from vascular claudication, which improves with standing still. The "shopping cart sign" describes patients leaning forward for relief. Treatment includes NSAIDs, physical therapy, epidural steroid injections, and surgical decompression (laminectomy) for refractory cases.

27. A. Legg-Calvé-Perthes disease. Legg-Calvé-Perthes disease is idiopathic avascular necrosis of the femoral head in children, typically affecting boys aged 4-10 years. It presents with insidious onset of hip or groin pain, limp, and limited hip range of motion (particularly abduction and internal rotation). X-ray findings progress through stages — initial femoral head opacity and sclerosis, followed by fragmentation, then reossification, and finally healed remodeling. The afebrile presentation and absence of systemic illness distinguish it from septic arthritis. Prognosis depends on age at onset (younger is better) and degree of femoral head involvement. Treatment ranges from observation and activity restriction to bracing and surgical containment procedures.

28. C. Psoriatic arthritis. Psoriatic arthritis is a seronegative spondyloarthropathy occurring in approximately 30% of patients with psoriasis. Characteristic features include asymmetric oligoarthritis (though polyarthritis patterns occur), DIP joint involvement (distinguishing it from RA which spares the DIPs), dactylitis ("sausage digits" from inflammation of the entire digit), enthesitis (inflammation at tendon/ligament insertions), nail changes (pitting, onycholysis), and the pathognomonic "pencil-in-cup" deformity on X-ray from destructive erosive changes. RF is typically negative (seronegative). Treatment

includes NSAIDs, DMARDs (methotrexate), and biologic agents (TNF inhibitors, IL-17 inhibitors, IL-23 inhibitors).

29. D. Systemic sclerosis (scleroderma) — diffuse cutaneous form. Diffuse cutaneous systemic sclerosis is an autoimmune connective tissue disease characterized by progressive fibrosis of the skin and internal organs. Diffuse disease involves skin thickening proximal to the elbows and knees (trunk, face) with early visceral involvement (lungs, kidneys, GI tract, heart). Anti-Scl-70 (anti-topoisomerase I) antibody is associated with diffuse disease, while anti-centromere antibody is associated with limited cutaneous disease (CREST syndrome). Raynaud phenomenon is often the earliest manifestation. Sclerodactyly (thickened, tight skin of the fingers), digital pitting scars, telangiectasias, and esophageal dysmotility (causing dysphagia) are characteristic features. There is no cure; treatment targets specific organ involvement.

30. B. S1. A disc herniation at L5-S1 compresses the S1 nerve root, producing pain radiating down the posterior thigh, posterior calf, and plantar foot (following the S1 dermatome). S1 radiculopathy causes weakness of ankle plantarflexion (gastrocnemius-soleus complex) and foot eversion, diminished Achilles reflex, and sensory loss over the posterior calf, lateral foot, and plantar surface. The S1 nerve root is tested by having the patient stand on tiptoe (plantarflexion), which will be weak on the affected side. This contrasts with L5 radiculopathy, which causes weakness of ankle dorsiflexion (foot drop) and great toe extension with sensory loss on the dorsal foot.

31. A. Ganglion cyst. Ganglion cysts are the most common soft tissue masses of the hand and wrist, arising from joint capsules or tendon sheaths. They contain viscous, mucinous fluid and most commonly occur on the dorsal wrist (60-70%). Key features include a firm, smooth, well-circumscribed mass that transilluminates (indicating fluid-filled content) and is mildly compressible. They are typically painless unless compressing adjacent structures. Diagnosis is usually clinical based on characteristic appearance and positive transillumination. Treatment options include observation (many resolve spontaneously), aspiration (high recurrence rate of 50%), and surgical excision (lowest recurrence rate). Ultrasound can confirm the cystic nature if the diagnosis is uncertain.

32. C. Tophi (monosodium urate crystal deposits). Tophi are pathognomonic for chronic tophaceous gout, representing deposits of monosodium urate crystals surrounded by granulomatous inflammatory tissue. They develop after years of inadequately treated hyperuricemia and deposit in subcutaneous tissue, joints, and periarticular structures. Common locations include the ears (helix), olecranon bursa, Achilles tendon, and fingers. Radiographic findings of gout include punched-out erosions with overhanging margins ("rat bite" erosions) and preserved joint space until late disease. Tophaceous gout is an indication for long-term urate-lowering therapy (allopurinol or febuxostat) targeting serum uric acid below 6 mg/dL (below 5 mg/dL if tophi present).

33. D. Reactive arthritis (Reiter syndrome). Reactive arthritis is a seronegative spondyloarthropathy triggered by a preceding genitourinary (Chlamydia trachomatis) or gastrointestinal (Salmonella, Shigella, Campylobacter, Yersinia) infection. The classic triad — "can't see, can't pee, can't climb a tree" — refers to conjunctivitis, urethritis, and arthritis. Arthritis is typically asymmetric oligoarthritis affecting large

joints of the lower extremities, developing 1-4 weeks after the triggering infection. Joint aspiration shows inflammatory fluid without crystals and negative cultures (the joint is sterile — the arthritis is reactive, not infectious). HLA-B27 is positive in approximately 60-80% of patients. Treatment includes NSAIDs, and refractory cases may require DMARDs or biologic agents.

34. B. SLAP tear (superior labrum anterior to posterior). A SLAP tear involves the superior glenoid labrum where the long head of the biceps tendon attaches, typically from repetitive overhead activities (throwing athletes) or acute trauma (fall on an outstretched hand). Symptoms include deep shoulder pain, catching or clicking, and difficulty with overhead and behind-the-back activities. The O'Brien active compression test (pain with resisted forward flexion at 90 degrees with the arm adducted and internally rotated that improves with supination) is the most commonly used physical examination test. MR arthrography (MRI with intra-articular gadolinium) is the most sensitive imaging study for labral tears. Treatment ranges from conservative management to arthroscopic repair or biceps tenodesis depending on tear type and patient factors.

35. A. Patellofemoral pain syndrome (chondromalacia patellae). Patellofemoral pain syndrome is the most common cause of anterior knee pain, particularly in young female athletes. It results from abnormal tracking of the patella within the trochlear groove due to muscle imbalance (weak vastus medialis oblique), malalignment, or overuse. The hallmark symptom is anterior knee pain worsened by activities that load the patellofemoral joint — stair climbing, squatting, running, and prolonged sitting ("theater sign" or "movie sign"). Clarke test (patellar compression test) reproduces pain with quadriceps contraction against the patella. Treatment is conservative with quadriceps strengthening (particularly VMO), hip abductor strengthening, patellar taping or bracing, and activity modification.

36. C. Complete rotator cuff tear. A complete (full-thickness) rotator cuff tear is characterized by weakness and functional loss beyond what is seen with impingement alone. The drop arm test (inability to slowly lower the arm from 90 degrees of abduction — the arm drops suddenly) is highly specific for a complete supraspinatus tear. The empty can test (Jobe test — weakness with resisted abduction in the scapular plane with the thumb pointing downward) evaluates supraspinatus function. Weakness with external rotation indicates infraspinatus and/or teres minor involvement. MRI is the gold standard for confirming tear size and extent. Treatment for complete tears in active patients is typically surgical repair (arthroscopic or open), while elderly, sedentary patients may be managed conservatively.

37. B. Atypical femoral fracture associated with long-term bisphosphonate use. Atypical femoral fractures are a rare but recognized complication of prolonged bisphosphonate therapy (typically more than 3-5 years), occurring in the subtrochanteric or femoral shaft region. Characteristic features include transverse or short oblique fracture pattern, lateral cortical thickening or "beaking" at the fracture site, minimal or no comminution, minimal or no trauma, and prodromal thigh pain preceding the fracture. The proposed mechanism is oversuppression of bone remodeling, impairing the repair of microdamage and leading to stress fracture propagation. A "drug holiday" (temporary discontinuation of bisphosphonates) is recommended after 3-5 years of therapy to reduce this risk while monitoring bone density.

38. D. Osteosarcoma. Osteosarcoma is the most common primary malignant bone tumor, predominantly affecting adolescents and young adults (second peak in elderly patients with Paget disease). The distal femoral metaphysis is the most common location, followed by proximal tibia and proximal humerus (around the knee accounts for approximately 50% of cases). The "sunburst" periosteal reaction (radiating spicules of new bone formation) and Codman triangle (elevation of periosteum by tumor) are characteristic radiographic findings. Serum alkaline phosphatase and LDH are often elevated. Treatment is neoadjuvant chemotherapy followed by limb-salvage surgery and adjuvant chemotherapy. Five-year survival for localized disease is approximately 70%.

39. A. Adhesive capsulitis (frozen shoulder). Adhesive capsulitis is characterized by progressive fibrosis and contracture of the glenohumeral joint capsule, resulting in painful restriction of both active and passive range of motion in all planes, with external rotation most severely affected. It progresses through three stages — freezing (painful, 2-9 months), frozen (stiffness predominates, 4-12 months), and thawing (gradual recovery, 5-24 months). Risk factors include diabetes mellitus (5-fold increased risk), thyroid disease, female sex, and prolonged immobilization. The restriction of passive motion distinguishes adhesive capsulitis from rotator cuff pathology (in which passive motion is typically preserved). Treatment includes physical therapy, NSAIDs, intra-articular corticosteroid injection, and in refractory cases, manipulation under anesthesia or arthroscopic capsular release.

40. C. Systemic lupus erythematosus. SLE is a chronic multisystem autoimmune disease predominantly affecting women of childbearing age (9:1 female-to-male ratio). The 2019 EULAR/ACR classification criteria include a positive ANA (entry criterion) plus weighted criteria across clinical and immunologic domains. This patient demonstrates multiple classic features — malar rash ("butterfly rash"), photosensitivity, oral ulcers, arthritis, positive ANA, positive anti-dsDNA (most specific for SLE and correlates with disease activity), low complement levels (C3, C4 consumed during immune complex formation), and proteinuria suggesting lupus nephritis. Anti-dsDNA and hypocomplementemia are particularly useful for monitoring disease activity. Treatment ranges from hydroxychloroquine (for all patients) to immunosuppressants based on organ involvement severity.

41. D. Medial collateral ligament tear. The MCL is the most commonly injured knee ligament, typically resulting from a valgus force (lateral blow to the knee pushing it medially), as occurs with a direct tackle to the lateral knee. The MCL resists valgus stress, and injury produces medial joint line tenderness and medial joint opening with valgus stress testing. Testing at 30 degrees of flexion isolates the MCL (the joint opens from MCL insufficiency alone), while opening at 0 degrees (full extension) suggests combined MCL and cruciate ligament injury, indicating more severe damage. Isolated MCL tears are typically treated conservatively with bracing and physical therapy because the MCL has good blood supply and healing capacity.

42. B. Colchicine. For acute gout in a patient who cannot take NSAIDs (due to CKD), colchicine is an appropriate treatment option. Colchicine works by inhibiting neutrophil migration and phagocytosis of urate crystals, reducing the inflammatory response. It is most effective when initiated within the first 24-36 hours of a gout flare. The low-dose regimen (1.2 mg initially, then 0.6 mg one hour later) is equally

effective and better tolerated than the older high-dose regimen. Corticosteroids (oral, intra-articular, or IM) are another alternative for acute gout in patients with contraindications to NSAIDs. Allopurinol and febuxostat are urate-lowering agents for chronic management and should not be initiated or adjusted during an acute flare.

43. C. Temporomandibular joint disorder. TMJ disorders encompass a spectrum of conditions affecting the temporomandibular joint, masticatory muscles, and associated structures. Common features include jaw pain (especially with chewing), clicking or popping during jaw movement (from disc displacement), limited mouth opening, and muscle tenderness. Bruxism (teeth grinding) is a major contributing factor that produces excessive force on the TMJ and masticatory muscles. Internal derangement (anterior disc displacement) is the most common structural abnormality. Treatment includes soft diet, jaw exercises, NSAIDs, muscle relaxants, stress management, and occlusal splint (night guard) for bruxism. Severe refractory cases may require arthroscopic surgery or joint replacement.

44. A. Bisphosphonate therapy (alendronate or zoledronic acid). Bisphosphonates are the first-line pharmacologic treatment for osteoporosis, inhibiting osteoclast-mediated bone resorption and reducing fracture risk at the spine, hip, and non-vertebral sites by 40-70%. This patient has severe osteoporosis based on a T-score below -2.5, a prior fragility fracture (vertebral compression), and ongoing corticosteroid use — all strong indications for pharmacologic treatment. Oral alendronate (weekly) or IV zoledronic acid (annual) are the most commonly prescribed bisphosphonates. Calcium (1000-1200 mg daily) and vitamin D (800-1000 IU daily) supplementation is essential but insufficient as sole therapy. Alternative agents for bisphosphonate-intolerant or refractory patients include denosumab, teriparatide, and romosozumab.

45. D. Anterior glenohumeral dislocation. Anterior dislocations account for approximately 95% of glenohumeral dislocations and typically result from forced abduction, external rotation, and extension of the arm. The apprehension test (anxiety and resistance when the arm is placed in 90 degrees of abduction with external rotation) and relocation test (relief of apprehension when posterior force is applied to the humeral head) assess anterior instability. A Hill-Sachs lesion is a compression fracture of the posterolateral humeral head from impaction against the anterior glenoid rim during dislocation. A Bankart lesion (avulsion of the anteroinferior glenoid labrum) is the most common associated injury. Treatment is closed reduction followed by immobilization and rehabilitation, with surgical stabilization for recurrent dislocations.

46. B. DIP joint and first CMC joint involvement with sparing of MCP joints. The distribution of joint involvement is the most reliable clinical feature distinguishing osteoarthritis from rheumatoid arthritis in the hands. OA characteristically affects the DIP joints (Heberden nodes), PIP joints (Bouchard nodes), and first CMC joints (thumb base) while sparing the MCP joints and wrists. In contrast, RA characteristically affects the MCP joints, PIP joints, and wrists while typically sparing the DIP joints. Both conditions can cause bilateral hand involvement, morning stiffness (though briefer in OA), and joint pain. The absence of systemic inflammation (normal ESR, CRP), seronegative status (negative RF, anti-CCP), and bony rather than soft tissue swelling further distinguish OA from RA.

47. A. Medial tibial stress syndrome (shin splints). Medial tibial stress syndrome is the most common cause of exercise-induced leg pain in runners and military recruits, resulting from periosteal inflammation along the posteromedial tibial border from repetitive stress. The hallmark features are diffuse tenderness (greater than 5 cm) along the posteromedial tibial border (distinguishing it from stress fracture, which produces focal point tenderness), pain with activity that improves with rest, and normal X-rays. MRI may show periosteal edema without a discrete fracture line. MTSS exists on a continuum with stress fracture — if overuse continues, the periosteal reaction may progress to cortical microdamage and eventually a complete stress fracture. Treatment includes relative rest, activity modification, ice, stretching, and gradual return to activity.

48. C. Common peroneal (fibular) nerve palsy. The common peroneal nerve is the most frequently injured nerve in the lower extremity, vulnerable to compression as it wraps around the fibular head. Prolonged leg crossing, tight casts, and direct trauma are common causes. Injury produces foot drop (weakness of ankle dorsiflexion from tibialis anterior paralysis) and weakness of toe extension and foot eversion, with sensory loss over the lateral calf and dorsum of the foot. Ankle plantarflexion and inversion are preserved (tibial nerve function). This pattern distinguishes peroneal nerve palsy from L5 radiculopathy, which would additionally cause weakness of hip abduction and foot inversion, and may be accompanied by back pain and positive straight leg raise.

49. D. Hip arthroplasty (hemiarthroplasty or total hip replacement). Displaced femoral neck fractures in elderly patients are treated with hip arthroplasty rather than internal fixation because of the high rate of nonunion (30%) and avascular necrosis (15-30%) associated with fixation in this population. The femoral head blood supply is predominantly from the medial femoral circumflex artery via the retinacular vessels, which are disrupted by displaced femoral neck fractures. Hemiarthroplasty (replacing only the femoral head) is appropriate for less active patients, while total hip replacement (replacing both the femoral head and acetabulum) is preferred for more active patients with pre-existing acetabular disease. Non-displaced femoral neck fractures may be treated with internal fixation (cannulated screws) regardless of age.

50. B. Advanced ankylosing spondylitis. The "bamboo spine" appearance is the hallmark radiographic finding of advanced ankylosing spondylitis, resulting from progressive ossification of the annulus fibrosus (syndesmophytes) that bridges adjacent vertebral bodies, eventually fusing the entire spine into a rigid structure. This combined with complete sacroiliac joint fusion represents late-stage disease. The fused spine is prone to fracture even with minor trauma (particularly cervical spine fractures), and patients should be evaluated with a high index of suspicion after any fall or injury. Diffuse idiopathic skeletal hyperostosis (DISH) produces flowing osteophytes along the anterolateral spine but does not cause sacroiliac joint fusion.

51. A. Acromioclavicular joint separation. AC joint separation results from disruption of the acromioclavicular and coracoclavicular ligaments, typically from a direct blow to the acromion (falling on the point of the shoulder) or FOOSH injury. Classification ranges from Grade I (AC ligament sprain without displacement) to Grade VI (inferior clavicle displacement). The cross-body adduction test (pain at the AC joint with passive horizontal adduction of the arm across the body) is the most specific physical

examination test. A visible step-off deformity with superior displacement of the distal clavicle indicates Grade III or higher separation. Treatment for Grades I-II is conservative (sling, ice, NSAIDs, rehabilitation), while Grades IV-VI typically require surgical reconstruction.

52. D. Rheumatoid nodules. Rheumatoid nodules are the most common extra-articular manifestation of rheumatoid arthritis, occurring in approximately 20-30% of patients, almost exclusively in RF-positive (seropositive) disease. They are firm, nontender subcutaneous nodules found at pressure points and extensor surfaces, most commonly the olecranon process, forearm, and fingers. Histologically, they consist of a central zone of fibrinoid necrosis surrounded by palisading histiocytes and chronic inflammatory infiltrate. Periarticular erosions, joint space narrowing, and periarticular osteopenia are characteristic radiographic findings of RA. Other extra-articular manifestations include pulmonary nodules (Caplan syndrome with pneumoconiosis), pericarditis, vasculitis, scleritis, and Felty syndrome (splenomegaly with neutropenia).

53. C. Ewing sarcoma. Ewing sarcoma is the second most common primary malignant bone tumor in children and young adults (peak incidence 10-20 years), caused by a characteristic chromosomal translocation t(11;22) producing the EWS-FLI1 fusion gene. The diaphysis of long bones (particularly the femur and tibia) and flat bones (pelvis, ribs) are common locations. The "onion-skin" periosteal reaction (concentric layers of periosteal new bone formation) and permeative, moth-eaten pattern of bone destruction are characteristic radiographic findings. Histologically, Ewing sarcoma consists of small, round, blue cells that are PAS-positive (glycogen containing). Treatment is multimodal chemotherapy plus surgery and/or radiation, with a five-year survival of approximately 70% for localized disease.

54. B. Achilles tendon rupture. Achilles tendon rupture typically occurs during sudden, forceful plantarflexion, commonly in middle-aged men during recreational sports ("weekend warrior" injury). The patient reports a sudden "pop" with immediate pain and inability to push off the foot. Physical findings include a palpable gap in the tendon (2-6 cm above the calcaneal insertion), positive Thompson test (absent plantarflexion when the calf is squeezed with the patient prone), inability to perform single-leg heel raise, and increased passive dorsiflexion compared to the unaffected side. Diagnosis is clinical but can be confirmed with ultrasound or MRI. Treatment is surgical repair (preferred in active patients) or functional rehabilitation with early weight-bearing in equinus positioning.

55. D. Emergent surgical decompression. Cauda equina syndrome is a surgical emergency caused by compression of the cauda equina nerve roots, most commonly from a large central disc herniation. The classic presentation includes bilateral lower extremity weakness, saddle anesthesia (perineal and perianal numbness), urinary retention (overflow incontinence from detrusor dysfunction), fecal incontinence, and reduced anal sphincter tone. Emergent MRI is the diagnostic study of choice, and emergent surgical decompression (laminectomy) should be performed ideally within 24-48 hours of symptom onset to maximize neurologic recovery. Delay in surgical intervention results in permanent neurologic deficits including paraplegia and bladder/bowel dysfunction. Urinary retention is the most sensitive indicator of cauda equina syndrome.