Case Scenario 1

A physical therapist has just completed the initial examination of a 45-year-old female patient who presented with a chief concern of right lumbosacral pain. She is currently unable to participate in her normal exercise routine, and while she can still perform her work duties as a human resources manager, she is limited in the amount of time she can spend sitting at her desk. This is her second episode of pain in the same area; the first episode occurred 6 months ago after moving to a new home, and resolved 80% after 3 weeks without treatment. Her pain has recently increased again after lifting boxes of books from her garage up into her attic, and she became worried that her pain was not settling on its own. She is very concerned she may have done some permanent damage that will limit her ability to return to her normal active lifestyle. The patient’s symptoms are nonirritable, and following the physical examination, the physical therapist concludes that she fits the criteria for application of the clinical prediction rule for spinal manipulation. \(^1\,^2\)

1. What further considerations need to be reasoned through by this therapist in order to determine whether or not it is appropriate to include lumbar spinal manipulation as part of this patient’s plan of care?
   a. consideration of whether or not the patient is comfortable and amenable to trying this type of intervention.
   b. consideration of whether or not the patient is similar enough to the population in which the rule has been validated.
   c. no further considerations are necessary as the patient’s examination findings fit the clinical prediction rule.
   d. both a and b are correct.

2. Which clinical reasoning strategies should be employed in order to develop a diagnostic understanding of this patient, consistent with a biopsychosocial approach to practice?
   a. diagnostic reasoning and narrative reasoning strategies.
   b. diagnostic reasoning and teaching as reasoning strategies.
   c. predictive reasoning and interactive reasoning strategies.
   d. procedural reasoning and narrative reasoning strategies.

3. What clinical reasoning error would this therapist be at risk of committing if, at the first follow-up visit, she assumed her reasoning was of good quality based only on the patient’s reports of improvement in symptoms with sitting at work?
   a. confirmation bias.
   b. inadequate testing of hypotheses.
c. outcome bias.
d. overemphasis on experiential knowledge.

4. Which of the following questions should be considered by this therapist in order to facilitate critical reflection about the clinical reasoning processes used?
   a. How did you empirically validate any cause and effect relationship you have recognized?
   b. What do you think your assumptions are about the way this type of patient usually presents?
   c. What is your understanding of the patient’s perspective on her problem?
   d. Will you think or do anything differently in the future based on this experience?

Case Scenario 2

A 52-year-old woman was seen in physical therapy approximately 3 months after the onset of shoulder pain when her dog pulled on the leash she was holding. Pain was minimal at first but approximately 3 weeks later she began to have difficulty sleeping and noticed progressive pain and loss of shoulder motion. The patient is a computer programmer and has been able to work without much difficulty.

On examination the patient has active elevation of 120°, external rotation with the arm at the side is 30°, and functional internal rotation is to the sacrum. Passively, elevation is 110°, external rotation with the arm at the side is 20°, and functional internal rotation reach is to the level of L5 vertebra on the spine. All active and passive end ranges are painful. Resisted abduction and external rotation are strong with slight pain. Both Neer and Hawkins impingement signs are positive.

5. Which of the following is the most likely diagnosis?
   a. biceps tendinitis.
   b. frozen shoulder (adhesive capsulitis).
   c. full thickness subscapularis tear.
   d. full thickness supraspinatus tear.

6. If symptoms worsened with physical therapy intervention, which of the following would be indicated?
   a. acupuncture.
   b. intraarticular glenohumeral corticosteroid injection.
   c. long head of the biceps corticosteroid injection.
   d. subacromial corticosteroid injection.

7. What stretching has been advocated to promote plastic deformation of the capsular tissue when working with a patient with frozen shoulder (adhesive capsulitis)?
   a. high load brief stretching.
   b. low load prolonged stretching.
   c. manipulation.
   d. shoulder thrust maneuvers.
8. According to the capsular pattern description provided by Cyriax,\(^2\) which of the following best describes the typical capsular response to a frozen shoulder?
   a. forward flexion is less limited than external rotation range of motion.
   b. forward flexion is more limited in range of motion than internal rotation.
   c. forward flexion is the most limited range of motion.
   d. internal rotation is always the most limited range of motion.

**Case Scenario 3**

A 38-year-old male electrician complains of numbness and tingling into his hand with “clumsiness” holding and operating various tools of his profession. He recounts an insidious onset of symptoms. Now the symptoms have progressed to the point where they are interfering with his job tasks. He reports mild pain on the inside of his elbow and some “clicking” that is not painful. He is a smoker, mildly overweight, and states that he may have “hypertension.”

Observation reveals a well developed male with hypertrophy throughout the upper extremities, especially of the brachium and forearm. He exhibits a forward head posture, increased thoracic kyphosis, bilateral humeral internal rotation with forward positioning of the glenohumeral heads, and scapular abduction. Visually, there is atrophy at the medial aspect of the hand and hypothenar region. The resting position of the 5th digit is in mild abduction. You palpate subluxation of the ulnar nerve in the cubital tunnel during passive flexion and extension of the elbow.

9. In best practice, which of the following physical examination tests would demonstrate the greatest diagnostic accuracy for determining if this patient has ulnar nerve compression or neuritis?
   a. elbow flexion test.
   b. Froment sign.
   c. pressure provocative test.
   d. scratch collapse test.

10. Which of the following is correct for patient education and activity modification in this case?
    a. avoid elbow flexion or excessive wrist flexion/finger flexion.
    b. immobilize daily in full extension and forearm supination.
    c. self massage of the compression sites of the ulnar nerve.
    d. stretch the pectoral muscles with the shoulder positioned in 90° abduction.

11. Which of the following is a key component of his initial visit?
    a. discovery of possible underlying irritants of the nerve.
    b. kinetic chain strengthening of the shoulder.
    c. operative management should be recommended.
    d. provide the patient with an elbow pad to protect the medial elbow.

12. The patient has noted a decrease in the frequency and intensity of his symptoms of numbness and tingling during daily tasks. The atrophy of the hypothenar region has maintained but has not progressed. Which of the following is most appropriate to advance the plan of care?
a. mobilization of the fascia of wrist flexors and pronators with the elbow in flexion.
b. prescribe elastic band exercises into full shoulder external rotation with humerus at 0° of adduction.
c. stretches of the pectoralis minor at the 90–90 position of the shoulder.
d. thoracic spine mobilizations in the posterior to anterior direction of grades III–IV.

Case Scenario 4

Your new patient is a 21-year-old right-hand dominant female who lacerated her index and long finger flexor digitorum superficialis and flexor digitorum profundus tendons in Zone 2 with a knife while cooking 3 days ago. She is 2 days status post primary repair. She presents to the clinic in a postoperative dressing with a referral that says: “Evaluate and treat with flexor tendon protocol.”

13. Which of the following sutures allows light active range of motion throughout the recovery?
   a. 2-strand core with a peripheral epitendinous suture.
   b. 4-strand core with a peripheral epitendinous suture.
   c. 6-strand core with a peripheral epitendinous suture.
   d. 6-strand core without a peripheral epitendinous suture.

14. What is the primary goal for this phase of the recovery?
   a. a strong repair that glides freely.
   b. extrinsic muscle flexibility.
   c. restoration of grip strength.
   d. scar mobilization.

15. Prior to proceeding with the examination, the therapist should determine:
   a. if there are any associated injuries (ie, nerve or artery repair).
   b. the patient’s occupation.
   c. the type of suture.
   d. all of the above.

16. The therapist contacts the physician and ascertains the Duran protocol is preferred in this case. Therefore, the first therapy visit should include:
   a. application of a volar forearm splint with the wrist and digits held at neutral.
   b. application of rubber band traction to hold the digit in flexion.
   c. initiation of active proximal interphalangeal and distal interphalangeal joint motion exercises with the metacarpophalangeal joints in slight flexion.
   d. initiation of passive proximal interphalangeal and distal interphalangeal joint flexion with the metacarpophalangeal joints in slight flexion.

Case Scenario 5

DD is a 29-year-old female attorney who complains of the inability to open her mouth upon awakening in the morning over several days. She needs to move her jaw around many times to “pop it open.” She is worried that her mouth will not open without this maneuver. She
also reports pain over her right temporomandibular joint and right ear, as well as constant headaches.

The patient’s history revealed similar locking episodes in the past (about one year earlier), and the symptoms were relieved by hot pack or cold pack application. DD also reports a scooter accident a few years ago that resulted in her falling, with the right side of her face hitting the ground.

Objective assessment revealed limited mouth opening to 25 mm without deviation and pain. However, the patient is able to open wide to 40 mm after moving her jaw around which causes a “popping” of the joint. Intermittent opening clicks were audible through auscultation. The patient also reports a softer closing click. Lateral deviation is 10 mm to the right, and 7 mm to the left. Palpable tenderness was noted intraorally and extraorally around the right temporomandibular joint area. DD is currently wearing a night splint to prevent clenching and bruxing.

17. Using the information above, which of the following is the most likely diagnosis for DD’s temporomandibular joint dysfunction?
   a. anterior disk displacement without reduction.
   b. anterior disk displacement with reduction.
   c. myofascial pain disorder syndrome.
   d. posterior disk displacement.

A physical therapy program was provided to DD with emphasis on postural correction, oral habit modification, modality treatment, and joint mobilization to the temporomandibular joint and upper cervical spine. After two weeks of treatment, DD reports a decrease in earaches and headaches. Her pain-free opening range has increased to 31 mm, yet she still complains of tenderness around her mandibular angle intraorally and extraorally.

18. To relieve tension in DD’s mandibular elevators, which of the following is the most beneficial exercise program?
   a. condylar remodeling exercise.
   b. isometric closing exercise against finger above chin.
   c. isometric opening exercise against hand under chin.
   d. therapeutic exercise for clicking due to anterior disk displacement with reduction.

After 4 weeks of physical therapy, the patient’s condition is stabilized at a 34-mm opening, but she still has the urge to “pop” open her mouth to “unlock” her jaw. The reciprocal noise is no longer present, and the pain still persists. At this time, you recommend DD to have a consultation with an oral surgeon. After that, arthrocentesis was recommended and performed.

19. Following a successful outcome from surgery, you would expect to see DD’s condition improved with decreased pain and __________:
   a. opening to two fingers’ width, lateral excursion is one-fourth of opening bilaterally.
   b. opening to two fingers’ width, lateral excursion is one-third of opening bilaterally.
   c. opening to 3 fingers’ width, lateral excursion is one-fourth of opening bilaterally.
   d. opening to 3 fingers’ width, lateral excursion is one-third of opening bilaterally.
20. Which of the following programs is most appropriate for postoperative management?
   a. modalities and condylar remodeling exercise.
   b. modalities, myofascial release, joint mobilization, and stretching exercise.
   c. modalities only, no exercise.
   d. modalities, self stretching only.

Case Scenario 6
A 39-year-old right-handed male patient is referred to physical therapy with a chief complaint of neck and arm pain. The pain is located on the left side of the neck and down the left arm. He describes the location on left lateral neck, left anterolateral shoulder, and lateral arm down to mid forearm. The pain is a constant, sharp shooting, radiating pain that he rates as an 8/10 on a numerical pain rating scale. He also states that he has numbness and tingling along the lateral arm and forearm. The physical therapist begins the examination with postural assessment. The physical therapist notices that the patient maintains a slightly side bent head to the right. The next step is a range of motion assessment. Flexion appears to be within normal limits with no change in the patient’s pain; extension is limited to 35° with increased pain in the neck, shoulder, and arm; rotation to the right is 78° with no change in symptoms; and rotation to the left is 49° with slight increase in symptoms. Neurological testing is performed and the patient has weakness in the left biceps brachii and extensor carpi radialis longus and brevis, absent sensation on the left distal thumb, and diminished deep tendon reflexes at the brachioradialis. All other areas tested normal. The Spurling test is performed and is positive on the left while negative on the right. An upper limb tension test with a median nerve bias is also performed on this patient. The results on the right show that the patient is able to get shoulder abduction to 100°, external rotation to 85°, full forearm pronation, ulna deviation, wrist extension, and elbow extension 20° from full extension. The left shows 100° shoulder abduction, external rotation to 60°, forearm pronation to 50°, full ulnar deviation and wrist extension, and elbow extension 45° from full elbow extension.

21. The physical therapist has completed his evaluation. Given the above findings, the physical therapist classified this patient into which category?
   a. neck pain with headaches.
   b. neck pain with mobility deficits.
   c. neck pain with movement coordination deficits.
   d. neck pain with radiating pain.

22. What is the next physical examination test the physical therapist should conduct?
   a. distraction test.
   b. neck flexor endurance test.
   c. radial nerve tension test.
   d. Sharp-Purser test.

23. What intervention will be the most beneficial for this patient?
   a. cervical collar and stabilization exercises.
   b. cervical manipulation and stretching.
   c. cervical traction and thoracic manipulation.
24. The patient is a right-handed 39-year-old male. The treatment plan consists of manual therapy, intermittent cervical traction, and deep neck flexor exercises throughout the course of care. Which other factor will help predict a favorable outcome in this patient?
   a. flexion does not worsen symptoms.
   b. no numbness present.
   c. normal deep tendon reflexes.
   d. positive median nerve tension test.

Case Scenario 7
A 43-year-old male reports to physical therapy with a chief complaint of lower thoracic pain. He is employed as a police officer and enjoys golfing and jogging. His symptoms are located in the right lower thoracic region. He denies radiating pain, numbness, tingling, and pain that wakes him at night. His pain is increased with full inspiration, activities involving left trunk rotation such as his golf swing, and sitting in his police cruiser for longer than one hour. His symptoms are eased with lying down and ibuprofen. The symptoms began 3 weeks ago after he lifted a heavy washing machine out of his basement. He experienced immediate sharp pain in the right lower thoracic region that gradually worsened throughout the day. He went to his primary physician a week later who prescribed ibuprofen, ordered thoracic spine radiographs, and referred him to physical therapy. The radiographs were interpreted as normal. His past medical history is unremarkable and this is his first episode of back pain. He has been able to continue his work activities but has not been able to play golf since his injury. He rates his pain on average as 6/10.

25. Given the location of the patient's pain, which of the following nonmusculoskeletal conditions is most likely?
   a. bony metastasis.
   b. cholecystitis.
   c. kidney stone.
   d. peptic ulcer.

26. Which of the following outcome measures is most appropriate for this patient?
   a. Neck Disability Index.
   b. Oswestry Disability Index.
   c. Patient-Specific Functional Scale.
   d. either b or c.

27. Which of the following musculoskeletal conditions is most likely?
   a. mechanical thoracic spine pain.
   b. thoracic compression fracture.
   c. thoracic facet joint dysfunction.
   d. thoracic herniated disk.
The patient presents with a normal lower quarter neurological examination, an increased lower thoracic kyphosis, and 50% limitation in left thoracic rotation. His symptoms are reproduced with left trunk rotation and right unilateral posterior to anterior spring testing over T10-11.

28. Which of the following interventions is best indicated for this patient?
   a. prone lower thoracic manipulation.
   b. seated middle thoracic manipulation.
   c. seated thoracolumbar rotation manipulation.
   d. supine middle thoracic manipulation.

Case Scenario 8
The patient is a 33-year-old man who works in a factory where he is responsible for driving a fork-lift and lifting heavy cases of soft drinks several times throughout the day. He presents with a chief complaint of chronic low back pain that ranges from 3/10 at rest to 9/10 at the end of the day. His symptoms began several years ago when he tried to stop a pallet of soft drinks from falling off a truck. He felt a sudden “pop” in his back and indicates that it has not been “right” since that time. He has had several periods of lost work time due to low back pain and has currently been out of work on a Worker’s Compensation claim for one month. This patient has had 2 lumbar magnetic resonance imaging examinations that revealed mildly degenerative, bulging disks at L4-5 and L5-S1. His previous physical therapy treatment has been centered on pain control approaches using moist heat and ultrasound. He indicates that he was instructed in the performance of sit-up exercises but stopped doing them after a couple of days because they increased his pain. He has avoided physical activity and exercise since that time.

29. Which of the factors listed below is least likely to contribute to a poor prognosis for improvement of this patient’s functional capacity?
   a. a history of multiple episodes of lost work time.
   b. a physically demanding job.
   c. high pain intensity at the end of the day.
   d. the presence of bulging disks.

30. What components of the patient’s history suggest the presence of yellow flags?
   a. a history of multiple episodes of lost work time.
   b. avoidance of exercise and physical activity.
   c. current Worker’s Compensation claim.
   d. the presence of chronic symptoms.

31. Upon further evaluation your patients states that “I keep thinking about my pain, it is there constantly and I can’t forget about it.” This is an example of:
   a. acute depression.
   b. kinesophobia.
   c. low self-efficacy.
   d. pain catastrophizing.

32. During your physical examination of this patient you note that, surprisingly, he has full range of motion of his lumbar spine and lower extremities; however, he has great
difficulty controlling the position of his spine and pelvis when trying to perform a simulated lift that is similar to his job requirements. This task also increases his pain intensity but does not cause it to peripheralize. Using ultrasound imaging of his abdominal wall you notice that he has great trouble independently contracting his transverse abdominis muscle. Given only the information you have so far, which of the treatment approaches listed below is most supported by the literature?

a. a lumbar orthosis.
b. joint manipulation stressing lumbar rotation.
c. McKenzie approach stressing lumbar extension.
d. motor control exercise in stage 1 as described by Costa et al.¹⁰³

Case Scenario 9

You have examined a 38-year-old female who reports recurring low back pain, 10 years duration stemming from her first pregnancy (she has had 3 children). She can hurt for a couple of days or even weeks, and then the pain disappears for no apparent reason. She is worse during menstruation. The pain is in the lower lumbar and medial to the posterior superior iliac spine and radiates to her buttock, especially when sitting. She reports that she runs 5 days per week and is training for her third marathon. Imaging studies or other diagnostic testing have not been done. The significant findings from the examination are as follows: normal muscle and joint flexibility, positive active straight leg raise on the right, perturbed core ratios, tenderness to long and short sacroiliac ligaments bilaterally, tenderness to superior pubic ligament bilaterally, positive thigh thrust right, positive sacroiliac joint compression test right, positive Gaenslen left, and positive posterior-anterior springing L3-L5 spinous processes, especially L5. Muscle tenderness was found in the left iliocostalis lumborum, bilateral erector spinae, and right multifidus. Repeated flexion has no effect on her symptoms but extension worsens her symptoms. During the standing hip flexion test, the patient loses her balance and appears to hike her hip on the right when testing the right.

33. Based on the evidence presented in this paper, what is the most significant finding?
   a. extension provokes her symptoms.
   b. her history and pain pattern.
   c. ligament tenderness.
   d. positive active straight leg raise on the right.

34. Based on the examination findings, your best working hypothesis would be:
   a. bilateral sacroiliac joint dysfunction.
   b. impaired stability.
   c. muscle weakness.
   d. spondylolisthesis.

35. Initial home instruction should include:
   a. home mobilizations to be done to balance the sacroiliac joint when symptomatic.
   b. pelvic belt should be issued and the patient should be instructed in its use.
   c. plank exercises to restore core ratios to normal.
   d. posture instruction and core muscle education.
36. Based on the examination findings you should consider:
   a. diagnostic injections.
   b. lumbar involvement.
   c. prolotherapy.
   d. referring patient for radiographs.

**Case Scenario 10**

The patient is a 38-year-old active male banker with right groin, thigh, and buttock pain. He reports that he slipped on the ice 3 months ago and pulled his groin, but did not fall. He did not seek medical attention and continued with his daily activities. He tried to stretch his groin similar to how he had done it when he was in high school athletics, but did not experience any change in symptoms.

He reports that his initial pain was previously mild and intermittent, but it has been constant and more severe over the past, due to increasing his frequency of playing golf. The patient experiences aching pain (1-2/10) and stronger stretching pain with selected movements (4-5/10) in his groin and buttck. The pain worsens after completing his walking program, and golfing. Additionally, he experiences increased sharp groin pain while performing his yoga routine. He states that his pain is not severe but bad enough where it limits him in his golf game. He has a history of low back pain and stiffness in the morning, which has been coming and going for the previous 8 years (approximately 2-3 times per year, lasting 2-3 weeks per episode).

Inspection was unremarkable. The only salient findings from his clinical examination were as follows:

- Passive right hip flexion was moderately limited (by 30°) and produced mild groin pain (3/10). Endfeel was increased in firmness.
- Passive right hip internal rotation (in supine and prone) was moderately limited (by 15°) and produced moderate groin and buttck pain (6/10). Endfeel was increased in firmness.
- Passive hip abduction was trace limited (by 5°) with both knees extended and flexed, producing mild stretch pain in the groin (2/10). Endfeel was increased in firmness.
- Passive hip extension was moderately limited (by 10°) with a firmer endfeel. Pain was mild at end range (2/10).
- Passive resisted hip flexion, extension, adduction (in all 3 positions), external rotation and internal rotation produced mild discomfort in the groin (1-2/10).
- The circumduction test produced mild pain in the groin when the hip was internally rotated.
- All other tests were negative for limitation, sensory disturbance, weakness, and pain.

37. This patient suffers from which of the following conditions?
   a. coxafemoral primary arthrosis.
   b. coxafemoral traumatic arthritis.
   c. hamstring syndrome.
   d. intraarticular loose body.

38. Which might be the best treatment choice for the condition in the case?
   a. intraarticular injection.
   b. joint-specific traction mobilization.
   c. resistive exercise.
d. transverse friction massage.

39. Extension limitations can be best treated in supine by pre-positioning the hip in extension at the limit, along with what other two submaximal pre-positions?
   a. abduction and external rotation.
   b. abduction and internal rotation.
   c. adduction and external rotation.
   d. adduction and internal rotation.

40. A high-velocity, low-amplitude mobilization/manipulation maneuver is indicated as a primary intervention for what condition?
   a. femoral osteonecrosis.
   b. idiopathic loose body.
   c. osteochondritis dissecans.
   d. synovial osteochondromatosis.

Case Scenario 11
The patient is a 79-year-old woman referred to the clinic 3 weeks after a left total knee arthroplasty. She had received home physical therapy for 4 visits to initiate range of motion and strengthening after surgery. At the time of the initial evaluation, she complained of intermittent central knee pain with walking; she denied pain at rest. Her goal was to be able to walk through a large mall without pain in order to shop with her daughter. She had a right total knee arthroplasty 2 years ago. Comorbidities include hypertension and gastroesophageal reflux disease.

Upon evaluation, the patient’s involved leg active range of motion was lacking 2° extension and she was able to flex her knee to 128°. Active range of motion on the uninvolved was 0° to 132°. Her incision was well healed with puckering at rest; hypomobility of the scar was noted with palpation. Her patellar mobility was slightly decreased superiorly and inferiorly. Measurements at mid-patella revealed a girth 5 cm greater on the left. A quadriceps lag was observed with straight leg raise. Quadriceps maximum voluntary isometric contraction testing at 60° was 425 N on the right and 202 N on the left, indicating the left quadriceps force was 48% of the right. Strength testing of the hip flexors, abductors, and ankle dorsiflexors was 4/5. She was utilizing a rolling walker for ambulation. The authors noted her stance time was equal, but decreased weight bearing on the left was observed. In addition, she ambulated with a flexed knee gait. Her Knee Outcome Scale was 66%. Functional testing included the Timed Get Up and Go Test, measured at 9.8 seconds, and the Stair-climbing test, which she performed in 25.6 seconds.

41. Your initial tactics to address the range of motion impairments would include:
   a. edema massage, supine wall slides, and exercise bike.
   b. leg press, step-down exercises, and straight leg raise.
   c. patellar mobilizations and passive stretching to increase flexion and extension.
   d. splint or drop-out cast immobilization in extension.

Along with the range of motion activities listed above, treatment also included soft tissue manipulation to increase scar mobility and progressive resistive exercises including sitting knee
extension, short arc quads, and straight leg raise (hip flexion and abduction). Neuromuscular electrical stimulation was also applied to the quadriceps muscle as an adjunct to strengthening. The stimulation was done at 60° of knee flexion and the intensity was increased to at least 30% of the patient’s daily maximum voluntary isometric contraction, as described previously. This patient was also progressed to a cane to facilitate more symmetrical weight bearing and greater functional use of the left lower extremity.

By week 2 she had full active knee extension. During gait, she continued to ambulate with a flexed knee during stance since she was not functionally using her extension. Standing terminal knee extension with resistance band (Figure) was added to her program. Cues to increase knee extension during stance were reinforced during gait training.

42. The patient’s main impairment at this time is:
   a. decreased quadriceps strength.
   b. increasing swelling.
   c. nonfunctional knee range of motion.
   d. utilizing a cane with ambulation.

At this point, step-downs were added to her program as well as mini wall squats. Instruction in functional quadriceps use from sit to stand was also initiated to overload the quadriceps and incorporate thigh strengthening into her daily activities.

The patient was able to perform lateral step-downs on a 4-inch step 15 times before she became fatigued. During her execution of this exercise, you noticed that her pelvis was dropping on the uninvolved side.

43. What is your hypothesis regarding the cause of the pelvic drop?
   a. gluteus medius weakness.
b. hip flexor weakness.
c. residual knee pain from the total knee arthroplasty.
d. she is apprehensive about the step-down exercise and knowingly altering her mechanics.

The following visit, the patient came in complaining of increased knee pain. She noted an increase in soreness of her knee joint since the last treatment. She had been actively working on the step-down and hip abduction strengthening exercises over the weekend and thought she had overdone it. She had also been standing for prolonged periods cooking for relatives and had not been using her cane as much as she had been previously. Her range of motion was lacking 1° of extension; she was able to flex to 125°.

44. According to the soreness rules stated previously, what should be your course of action?
   a. continue with this patient’s current program.
   b. decrease her program because you probably did too much last time.
   c. have the patient warm up on the bike and see how this affects her soreness before you make a decision.
   d. increase her program because her soreness is probably muscular.

After 18 visits (3 months after total knee arthroplasty), the patient was discharged since she had met all her goals and was independent with her home strengthening program. Upon discharge, her active range of motion was 0° to 130°. No adhesions of her scar or quadriceps lag were noted. There was a 2.2-cm difference midpatella left to right. Manual muscle testing of the lower extremity was symmetrical side to side. She was using a cane only in crowded public places. Her quadriceps maximum voluntary isometric contraction testing demonstrated a force production of 457 N on the right while the left produced 330 N. The left quadriceps was 72% of the right. The Timed Get Up and Go Test score was 8.27 seconds and the Stair-climbing test was finished in 15.66 seconds. Her Knee Outcome Survey was 80%.

Case Scenario 12

The patient is a 22-year-old female with complaints of bilateral medial leg pain. She started “boot camp” at the regional army training facility 3 weeks ago and the pain has been progressively increasing since that time. She states she has had similar pain before but it has always resolved on its own. This time it seems to be getting worse, and she really wants to get back to her squad. The current pain ranged from 4/10 to 7/10 increasing with activity. The pain can be mostly described as a relative ache but local to the medial side of her leg. She is overweight with a BMI of 29 but has been losing weight over the last year after she decided to enlist with the army. She also starting running. She quit smoking 6 months ago.

45. Current theories on the cause of medial tibial stress syndrome most supported by the literature include:
   a. foot and ankle weakness leading to altered loading up the chain during running.
   b. hip weakness altering lower kinetic chain mechanics leading to overload during running.
   c. periosteal modeling to reinforce the tibia where it bears the greatest stress and/or inflammation of the periosteum due to excessive traction.
d. strain of the soleus muscle.

Upon observation the patient had low medial longitudinal arches and a valgus position of the hindfoot bilaterally. Sensation tested with light touch was normal in bilateral lower extremities. Pain to palpation was present along the distal half of the posterior medial tibial border extending down to just above the medial malleolus. Passive ROM at the ankle was full in all planes except limited dorsiflexion to 8° when the knee was flexed. The patient was able to complete 25 single leg heel raises on the right with pain and 20 on the left, again with pain.

46. The presence of the following signs may support a diagnosis of medial tibial stress syndrome:
   a. exercise-induced pain that lasts for hours or days after exercise.
   b. focal pain on the posteromedial border of the tibia produced with palpation.
   c. presence of pain with exercise that immediately reduces when exercise is stopped.
   d. presence of paresthesias.

47. Tibial stress fracture is a concern for this patient and in the differential diagnosis of medial tibial stress syndrome. Factors that may be suggestive of stress fracture include:
   a. a focal area of pain.
   b. frequency of exercise such as running.
   c. pronated foot postures.
   d. symptoms of tibial nerve compression.

48. Treatment for medial tibial stress syndrome should begin with:
   a. hip strengthening.
   b. relative rest.
   c. stretching of the soleus.
   d. use of a shin splint strap.