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4 **Appendix A**
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8 Year in program:
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- 10 a) 4th year medical student
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12 b) PGY-1
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14 c) PGY-2
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16 d) PGY-3
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18 e) Faculty
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22 Gender
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- 24 a) Male
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26 b) Female
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28 c) Prefer not to say
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32 Age (short answer)
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34 Medical school:
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- 36 a) Allopathic medical school
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38 b) Osteopathic medical school
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44 Please take a moment to comment on the readability of this exam. (i.e. exam questions
45
46 were clear, question x was confusing etc.) (Long answer text)
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Appendix B Musculoskeletal assessment tool

Note: Please feel free to use the exam. We ask that you notify us if you plan to use the exam. We are willing to analyze the results and provide a detailed answer set that can be used for didactics.

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1. A 41-year-old woman presents with a 1-day history of a painful and swollen left elbow. She reports sustaining a puncture wound to her elbow several days prior but denies any major trauma. On exam, her elbow is erythematous and extremely tender to palpation with a deep puncture wound noted on lateral aspect of the elbow. Active and passive range of motion is markedly limited by pain. Vitals signs notable for temperature of 100.4F (38C). What is the best next step in management?

- a. Prescribe a course of antibiotics and follow up after completed
- b. Treat empirically with colchicine and allopurinol
- c. Arthrocentesis
- d. Relative rest, ice, and NSAID's

2. A 22-year-old male soccer player falls on an outstretched hand. He comes to clinic the next day complaining of wrist pain. On exam, he has tenderness over the anatomic snuffbox. X-rays of the wrist are negative. Of the choices below, the best next step in management is:

- a. Immediate surgical management
- b. Relative rest and NSAID's for pain
- c. Short-arm thumb Spica cast and follow up in 2 weeks
- d. Long-arm cast for 6-8 weeks

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7 3. A 17-year-old rugby player catches his ring finger on an opponent's shorts and feels
8 immediate pain. On sideline examination, there is swelling of the distal ring finger and
9 tenderness on the volar aspect of the finger. When the DIP joint is isolated, the patient
10 is unable to flex. Most appropriate management after the match is:
11
12
13

- 14 a. Buddy tape the ring finger to the long finger until symptoms resolve
- 15 b. Place in extension splint for 6 weeks
- 16 c. Referral to orthopedics
- 17 d. Relative rest for 2 weeks and re-evaluate

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19 4. A 43-year-old male comes into clinic with worsening back pain for the last week. The
20 pain is located in the lumbar region and is noted to be severe in nature. On exam, there
21 is no bony tenderness but there is decreased sensation on the medial aspect of the
22 thighs bilaterally. Review of systems reveals overflow incontinence for 2 days. What is
23 the most appropriate next step in management?
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- 26 a. NSAID's and follow up in 2 weeks
 - 27 b. Physical therapy
 - 28 c. Corticosteroid injection
 - 29 d. Urgent MRI
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4 5. A 16-year-old female distance runner comes into clinic with left-sided anterior knee
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6 pain. She says the pain feels like it is beneath her knee-cap and is worse with going up
7
8 and down stairs and running. What is the most appropriate management of this
9
10 condition?
11
12

- 13 a. Addressing the underlying cause and targeted physical therapy
- 14 b. Order MRI now
- 15 c. Referral to orthopedics for surgical management
- 16 d. Straight knee immobilizer for 2 weeks and gradual resumption of activity

17
18 6. An 18-year-old football player injured his foot and ankle after it was stepped on during
19
20 a game. He is able to bear weight on the foot but has significant pain in the midfoot
21
22 region. Which of the following findings on history and physical exam would be an
23
24 indication for x-rays?
25
26

- 27 a. Pain with weight-bearing on injured foot/ankle
- 28 b. Tenderness on palpation of the navicular bone
- 29 c. Tenderness over the lateral foot distal to the fibula
- 30 d. Pain with passive dorsiflexion of the ankle

31
32 7. A 28-year-old new mother presents with right sided wrist pain. She locates the pain to
33
34 the distal aspect of her radius. On exam, forced ulnar deviation of the wrist with the
35
36 thumb grasped in a fist reproduces the patient's pain. The most likely diagnosis is:
37
38

- 39 a. Arthritis of the 1st carpometacarpal (CMC) joint
 - 40 b. Distal radioulnar dissociation
 - 41 c. De Quervain's tenosynovitis
 - 42 d. Triangular fibrocartilage complex injury
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4 8. A 17-year-old high school football player is tackled and lands directly on the point of
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6 his left shoulder, causing him immediate pain. He points to the superior aspect of his
7
8 shoulder when asked to locate the pain. On exam, his pain is reproduced when he
9
10 attempts to reach across his body with the affected arm. What is the most likely
11
12 diagnosis?
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14

- 15 a. Deltoid muscle tear
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- 17 b. Acromioclavicular joint sprain
- 18
- 19 c. Rotator cuff tear
- 20
- 21 d. Labral tear
- 22
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- 24

25
26 9. A 64-year-old male with past medical history of hypertension, hyperlipidemia, and
27
28 prostate cancer comes to the clinic complaining of new onset back pain that has woken
29
30 him up from sleep on multiple occasions. Physical exam is unremarkable. The best next
31
32 step in management is:
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- 35 a. Physical Therapy
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- 37 b. NSAID's
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- 39 c. Imaging of spine
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- 41 d. Rest and follow up in 2 weeks
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4 10. An 18-month-old toddler is brought to the emergency department for irritability,
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6 fever of 101.5°F, and refusal to walk or bear weight. The infant refuses to move the right
7
8 hip and cries with passive motion. Ultrasound of the hip shows fluid in the joint. Of the
9
10 choices listed, what is the most likely diagnosis?
11
12

- 13 a. Septic hip
- 14
- 15 b. Transient synovitis
- 16
- 17 c. Legg-Calve-Perthes disease
- 18
- 19 d. Developmental dysplasia of the hip
- 20
21
22

23 11. A man collapsed near the finish line of a marathon and was brought to the race
24
25 medical tent. On exam, he is confused and has hot, dry skin. His core temperature is
26
27 105°F, what is your next immediate step in management?
28
29

- 30 a. Transfer to closest emergency department 30 minutes away
- 31
- 32 b. Immediate cooling with best method available
- 33
- 34 c. Administration of IV fluids
- 35
- 36 d. Rehydrate with oral fluids
- 37
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40 12. A high school football player comes into clinic after injuring his knee when he was
41
42 tackled during practice. On inspection of the knee, he has a moderate effusion.
43
44 Examination of the knee is limited by guarding and he has pain with motion of the knee.
45
46 Which of the following should be included high on the differential diagnosis?
47
48

- 49 a. ACL tear
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- 51 b. Osteochondral lesion
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- 53 c. Medial meniscus tear
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- 55 d. All of the above
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4 13. An athlete who suffered a concussion and is still symptomatic with some light
5
6 sensitivity and mild exertional headache. He can be allowed to return to play if:
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8

- 9 a. The athlete's symptoms have been improving for at least 2 weeks
10
11 b. Imaging of the head is normal
12
13 c. The athlete has physically and mentally rested for at least 1 week
14
15
16 d. The athlete should never return to play while symptomatic
17
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19 14. A 42-year-old woman comes into clinic with 3 weeks of right-sided anterolateral
20
21 shoulder pain that is made worse when reaching overhead and laying on the affected
22
23 side at night. Forward flexion of the shoulder to 90 degrees and forced internal rotation
24
25 reproduces her pain. What is the initial step in management of this condition?
26
27

- 28 a. Intra-articular corticosteroid injection
29
30 b. MRI for suspected rotator cuff tear
31
32 c. Arthroscopic subacromial decompression
33
34
35 d. Activity modification and physical therapy
36
37

38 15. A 31-year-old male comes into clinic with 2 weeks of lower back pain after helping a
39
40 friend move into a new house. He describes the pain as dull and says it is diffuse but
41
42 does not radiate down his leg. Physical exam reveals tenderness to the paraspinal
43
44 muscles in the lumbar region but is otherwise unremarkable. What is the most
45
46 appropriate next step in management?
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- 49
50 a. X-rays of lumbar spine
51
52 b. Oxycodone
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54 c. Referral for epidural steroid
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57 d. None of the above
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4 16. An 18-year-old female who runs cross country comes into clinic with 1 month of
5
6 worsening right-sided deep groin pain. Pain is made worse with any weight-bearing
7
8 activities. Review of systems is remarkable for amenorrhea and a BMI of 19. What is
9
10 the best next step?
11
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- 13 a. Imaging
- 14
- 15 b. Physical therapy
- 16
- 17 c. NSAIDs
- 18
- 19 d. Intra-articular corticosteroid injection
- 20
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23 17. Last night, a 25-year-old male sustained a displaced tibial fracture after a fall which
24
25 was surgically repaired. Today, he complains of increasing pain in his leg and some
26
27 tingling in his toes. On physical exam, he is afebrile and has a tense anterior
28
29 compartment. When you consult the on call orthopaedic surgeon, what diagnosis are
30
31 you most concerned about?
32
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- 34 a. Infection
- 35
- 36 b. Deep venous thrombosis
- 37
- 38 c. Redisplacement of the fracture
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- 40 d. Compartment syndrome
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4 18. A 15-year-old girl fell off her bike and landed on her shoulder. She complains of
5
6 severe pain with movement of the shoulder. There is bruising and tenderness over the
7
8 midpoint of the clavicle. X-ray shows non-displaced mid-shaft clavicular fracture. Which
9
10 of the following is the most appropriate treatment for this patient?
11
12

- 13 a. Sling for comfort and early range of motion as pain improves
- 14
- 15 b. Referral to orthopedics for surgical repair
- 16
- 17 c. Shoulder immobilization for 4-6 weeks until evidence of fracture healing
- 18
- 19 d. Return to activity as tolerated without restrictions
- 20
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23 19. A 21-year-old male presents with severe back and leg pain as well as dark urine
24
25 after a strenuous weightlifting workout yesterday. His initial creatine kinase (CK) level is
26
27 17,523U/L (reference 25-90U/L). What is the next step in management for this patient?
28
29

- 30 a. Aggressive hydration
- 31
- 32 b. Muscle biopsy
- 33
- 34 c. NSAID's and reassurance
- 35
- 36 d. Follow up CK measurement in 72 hours
- 37
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40 20. A 45-year-old female who recently started playing tennis regularly comes into clinic
41
42 with pain in her Achilles tendons bilaterally. Ultrasound confirms mid-substance Achilles
43
44 tendinopathy bilaterally. The most appropriate initial management of this condition is:
45
46

- 47 a. Referral to orthopedics for surgical management
- 48
- 49 b. Corticosteroid injection
- 50
- 51 c. Rehabilitation focused on eccentric exercises
- 52
- 53 d. Platelet-rich plasma injection
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4 21. A 10-year-old basketball player comes in to clinic with gradual onset of left heel pain
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6 which is worse with running and jumping. On examination, he has tightness of the
7
8 gastroc-soleus complex and pain with the calcaneal squeeze test. What is the most
9
10 likely diagnosis?
11
12

- 13 a. Sever's disease (calcaneal apophysitis)
- 14
- 15 b. Calcaneal stress fracture
- 16
- 17 c. Achilles tendinopathy
- 18
- 19 d. Plantar fasciopathy
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23 22. A 59-year-old woman comes in to clinic with 2 weeks of pain and numbness in her
24
25 thumb, index finger, and long finger. She says the pain is worse at night and is relieved
26
27 by shaking or flicking her wrist. Inspection of the hand reveals atrophy of the thenar
28
29 eminence. What is the next best step in management?
30
31

- 32 a. Refer to occupational therapy
- 33
- 34 b. Corticosteroid Injection
- 35
- 36 c. Lifestyle modification
- 37
- 38 d. Referral to orthopedics
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43 23. A 68-year-old male comes to the physician with worsening neck pain with radiation
44
45 down his right arm, consistent with cervical radiculopathy. Which of the following
46
47 findings would necessitate immediate referral to a spine surgeon?
48
49

- 50 a. Pain exacerbated by forced extension of the neck
- 51
- 52 b. Hyperreflexia of the lower extremities
- 53
- 54 c. Decreased sensation to light touch in the lateral arm
- 55
- 56 d. Pain isolated to the shoulder girdle
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4 24. A 24-year-old male presents with several months of low back pain which lasts for 60
5
6 minutes in the morning and improves with activity but not with rest. Physical exam is
7
8 remarkable for tenderness at the SI joints and positive FABER test. Review of systems
9
10 is positive for increased fatigue lately. What x-ray finding is characteristic of this
11
12 condition?
13
14

- 15 a. Sclerosis of iliac side of sacroiliac joints
- 16
- 17 b. Anterior displacement of L5 on S1
- 18
- 19 c. Excessive lumbar lordosis
- 20
- 21 d. Fracture of the pars interarticularis
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26 25. A tall, lanky 13-year-old boy presents with vague left knee pain and a limp for one
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28 week, but a normal knee exam and pain with internal rotation of the hip. Xray shows
29
30 concern for femoral epiphysis (growth plate) injury. What is the next step in
31
32 management?
33
34

- 35 a. Allow to return to sports as tolerated
- 36
- 37 b. Refer for physical therapy and follow up in 4-6 weeks
- 38
- 39 c. Joint aspiration and synovial fluid analysis
- 40
- 41 d. Immediately make non-weightbearing and refer to orthopedics
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4 26. A 12-year-old boy severely twists his ankle. Radiographs show only soft-tissue
5 swelling. He is only tender at the distal aspect of the fibula. What diagnosis must be
6 considered in addition to ligament sprain?
7
8
9

- 10
11 a. Physeal (growth plate) injury
12
13 b. Syndesmotic disruption
14
15 c. Peroneal tendon tear
16
17 d. Tarsal tunnel syndrome
18
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21 27. During a physical altercation, a 21-year-old male sustains a 5th metacarpal neck
22 fracture and a 3-mm wound proximal to the fracture. What is the next step in
23 management?
24
25
26

- 27 a. Closed reduction and casting
28
29 b. Reduce and splint fracture plus oral antibiotics
30
31 c. Irrigation and debridement of 5th MCP joint
32
33 d. Open reduction and internal fixation of fracture
34
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38 28. A 32-year-old male begins training for his first marathon and after 2 weeks
39 experiences left-sided heel pain that is worse with his first few steps in the morning and
40 gets better as the day goes on. Tenderness to what area of the foot would most likely
41 confirm your diagnosis?
42
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- 47 a. Medial calcaneal tubercle
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49 b. Achilles tendon insertion
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51 c. Navicular tuberosity
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53 d. Lateral calcaneal tuberosity
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4 29. A 62-year-old female with hypertension, diabetes, and obesity comes into clinic with
5
6 chronic left knee pain. Anterior-Posterior weight bearing radiograph of the knee shows
7
8 medial joint space narrowing and osteophyte formation. Which of the following is the
9
10 most appropriate initial management?
11

- 12 a. Referral to orthopedics for joint replacement
- 13
- 14 b. Obtain MRI of the knee
- 15
- 16 c. Limit weight bearing until pain resolves
- 17
- 18 d. Recommend weight loss and exercise program
- 19
- 20
- 21
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23 30. Which of the following findings during a pre-participation physical for a 16-year-old
24
25 male does not require further investigation before clearing the individual to participate?
26

- 27 a. A blood pressure of 138/89
- 28
- 29 b. A systolic murmur that increases in intensity with the valsalva maneuver
- 30
- 31 c. History of a recent concussion without successful completion of return to play
- 32
- 33 protocol
- 34
- 35 d. Family history of 2 male relatives dying prior to age 40 for unknown causes
- 36
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41 31. A 28-year-old new mother presents with right sided wrist pain. She locates the pain
42
43 to the distal radial styloid. She denies recent trauma or change in activity except for
44
45 taking care of a new baby at home. What physical exam maneuver would most likely
46
47 reveal the inciting pathology?
48

- 49 a. Finklestein Test
- 50
- 51 b. Tinel Test
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- 53 c. Resisted Wrist Extension
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- 55 d. Phalen Test
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32. A female runner completes her first marathon at a time of 6 hours and 10 minutes. She presents to the medical tent disoriented and extremely weak. She collapses while being triaged. Her initial core temperature is 101.3F. What is her most likely diagnosis?

- a. Heat Stroke
- b. Hypothermia
- c. Hyponatremia
- d. Heat exhausation

33. A 13-year old basketball player complains of increasing pain at the anterior aspect of his knee and has a palpable painful bump just at the attachment of the patella tendon to the tibia. He has sustained no trauma. What is his most likely condition?

- a. Osgood-Schlatter Disease
- b. Tibial plateau fracture
- c. Patellofemoral Pain Syndrome
- d. Iliotibial Band Syndrome

34. A tall, lanky 15-year-old boy presents with vague right knee pain and a limp for one week, but a normal knee exam and pain with internal rotation of the hip. X-rays of both hips shows concern for slipped capital femoral epiphysis injury. What concerning pathology is he most at risk for if not treated?

- a. Future amputation of the affected leg
- b. Peripheral neuropathy
- c. Avascular necrosis of the femoral epiphysis
- d. Compartment syndrome

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4 35. Which of the following findings during a pre-participation physical for a 17-year-old
5
6 male does not require further investigation before clearing the individual to participate?
7
8

- 9 a. History of exercise-induced asthma
10
11 b. Sudden death of an older brother while swimming
12
13 c. In-toeing as a toddler
14
15
16 d. Currently being followed by a neurologist for seizures
17
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19 36. Which statement is incorrect about physical activity recommendations?
20

- 21 a. Children and adolescents ages 6 through 17 years should do 60 minutes (1 hour)
22
23 or more of moderate-to-vigorous physical activity daily
24
25
26 b. Adults age 18-65 years old should do at least 150 minutes a week of moderate-
27
28 intensity aerobic physical activity.
29
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31 c. Adults age >65 years should do at least 60 minutes a week of moderate-intensity
32
33 aerobic physical activity.
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36 d. Women should do at least 150 minutes of moderate-intensity aerobic activity a
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38 week during pregnancy and the postpartum period
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Appendix C

Answer Key

1. C	21. A
2. C	22. D
3. C	23. B
4. D	24. A
5. A	25. D
6. B	26. A
7. C	27. C
8. B	28. A
9. C	29. D
10. A	30. A
11. B	31. A
12. D	32. C
13. D	33. A
14. D	34. C
15. D	35. C
16. A	36. C
17. D	
18. A	
19. A	
20. C	