CHAPTER 8: THE BIOMECHANICS OF THE HUMAN LOWER EXTREMITY

1. The hip joint is the articulation between the ______ and the _______.
   A. femur, acetabulum  
   B. femur, spine  
   C. femur, tibia  
   D. none of the choices are correct

2. Which of the following is not true about pelvic girdle movements?
   A. position the acetabulum favorably for femoral movement  
   B. occurs in all 3 planes  
   C. occurs around the lumbosacral joint  
   D. all of the choices are true

3. Which of the following is not true about the hip joint?
   A. triaxial  
   B. more stable than shoulder  
   C. several bursae present  
   D. all of the choices are true

4. Anterior pelvic tilt positions the acetabulum in a more favorable position for hip ______.
   A. flexion  
   B. hyperextension  
   C. abduction  
   D. adduction

5. Lateral pelvic tilt positions the acetabulum in a more favorable position for hip ______.
   A. flexion  
   B. extension  
   C. abduction  
   D. adduction

6. When the legs are not free to move (i.e. they are supporting your body weight), what action will result from contraction of the hip flexors?
   A. hip flexion  
   B. hip extension  
   C. anterior pelvic tilt  
   D. posterior pelvic tilt

7. Which of the following is not a hamstring muscle?
   A. semimembranosus  
   B. semitendinosus  
   C. biceps femoris  
   D. gluteus maximus
8. Which of the following is part of the pelvic girdle?
A. the ilium
B. the ischium
C. the pubis
D. all of the choices are part of the pelvic girdle

9. Which of the following statements is/are true?
A. The iliopsoas complex is the major flexor of the hip.
B. Two-joint muscles function more effectively at one joint when the position of the other joint stretches the muscle slightly.
C. Both that the iliopsoas complex is the major flexor of the hip and that the two-joint muscles function more effectively at one joint when the position of the other joint stretches the muscle slightly.
D. none of the choices are true

10. Which of the following is/are two-joint muscle(s)?
A. rectus femoris
B. sartorius
C. pectineus
D. both rectus femoris and sartorius
E. all of the choices are true

11. What is/are the purpose(s) of the patella?
A. increase the angle between the tendon and tibia
B. increase the mechanical advantage of the quadriceps
C. to protect the anterior aspect of the knee
D. all of the choices are purposes of the patella

12. Which of the following is not true about the menisci in the knee joint?
A. made of cartilage
B. larger surface area to distribute load
C. absorb shock
D. all of the choices are true

13. Which of the following muscles serves to “unlock” the knee from full extension?
A. plantaris
B. gracilis
C. popliteus
D. sartorius
14. Which knee ligament is most likely to be damaged from a lateral blow?
   A. medial collateral
   B. lateral collateral
   C. anterior cruciate (ACL)
   D. posterior cruciate

15. Knee extensors cross the joint ________ to the ________ axis.
   A. anterior, anteroposterior
   B. posterior, anteroposterior
   C. anterior, mediolateral
   D. posterior, mediolateral

16. Which muscle does not affect both the hip and the knee?
   A. rectus femoris
   B. vastus intermedius
   C. biceps femoris
   D. semimembranosus

17. Which of the following inserts on the patella?
   A. hamstrings
   B. quadriceps
   C. both hamstrings and quadriceps
   D. none of the choices are correct

18. The anterior and posterior cruciate ligaments limit which type of knee motion?
   A. knee hyperextension
   B. forward and backward sliding of the femur on the tibia during knee flexion and extension
   C. lateral knee motion
   D. both knee hyperextension and the forward and backward sliding of the femur on the tibia during knee flexion and extension
   E. all of the choices are correct

19. Which of the following conditions must be met for rotation of the tibia relative to the femur?
   A. the knee is not bearing weight
   B. the knee is in flexion
   C. the knee is in extension
   D. the knee both is not bearing weight and is in flexion
   E. all of these conditions must be met for rotation of the tibia
20. Which of the following statements is/are true?
A. When the knee undergoes a significant amount of flexion, it is necessary for the femur to slide forward on the tibia in order to prevent its rolling off of the tibial plateau.
B. During extension, the femur must slide backwards on the tibia.
C. Both that when the knee undergoes a significant amount of flexion, it is necessary for the femur to slide forward on the tibia in order to prevent its rolling off of the tibial plateau and that during extension, the femur must slide backwards on the tibia
D. None of the statements are true

21. Which of the following is the most common of all knee injuries?
A. rupture of the anterior cruciate ligament
B. rupture of the medial collateral ligament
C. tear of the lateral meniscus
D. tear of the medial meniscus

22. Which of the following is/are nonaxial joint(s)?
A. tarsometatarsal joint
B. intermetatarsal joint
C. subtalar joint
D. both the tarsometatarsal and intermetatarsal joint
E. all of the choices are nonaxial joints

23. Fractures in the ankle region occur most often to which of the following structures?
A. the lateral malleolus
B. the medial malleolus
C. the talus
D. none of the choices are correct

24. Which of the following is the most typical cause of ankle sprain?
A. forced inversion of the ankle during landing while the foot is plantar flexed
B. forced eversion of the ankle during landing while the foot is dorsiflexed
C. both a forced inversion of the ankle during landing while the foot is plantar flexed and a forced eversion of the ankle during landing while the foot is dorsiflexed
D. none of the choices are correct

25. Which of the following characterizes a “bow-legged” condition?
A. femoral varus and tibial valgus
B. femoral valgus and tibial varus
C. both femoral varus & tibial valgus and femoral valgus and tibial varus
D. none of the choices characterizes a “bow-legged” condition
26. Where is the weakest point of the femur?
A. head
B. neck
C. shaft
D. greater trochanter

27. Which of the following causes hip adduction?
A. adductor magnus
B. adductor longus
C. gracilis
D. both adductor magnus and longus
E. all of the choices cause hip adduction

28. Which of the following causes hip abduction?
A. gluteus medius
B. gluteus minimus
C. gluteus maximus
D. both gluteus medius and minimus
E. all of the choices cause hip abduction

29. What is the largest and most complex joint in the body?
A. hip
B. shoulder
C. knee
D. ankle

30. The medial and lateral collateral ligaments limit which type of knee motion?
A. knee hyperextension
B. forward and backward sliding of the femur on the tibia during knee flexion and extension
C. lateral knee motion
D. both knee hyperextension and forward and backward sliding of the femur on the tibia during knee flexion and extension
E. all of the choices are correct

31. Which of the following statements is true regarding ACL injuries?
A. occur more frequently in during player contact
B. occur more frequently during non-contact
C. occurrence is approximately equal between contact and non-contact
D. it is unknown whether contact or non-contact ACL injuries are more frequent

32. Which of the following statements is true regarding ACL injuries?
A. occur more frequently in women than in men
B. occur more frequently in men than in women
C. occurrence is approximately equal between men and women
D. frequency between men and women is sport specific
33. *Runner’s knee* is associated with which of the following structures?
A. lateral meniscus
B. ACL
C. iliotibial band
D. medial meniscus

34. Patellofemoral pain syndrome is likely associated with what?
A. weakness of vastus medialis relative to vastus lateralis
B. weakness of vastus lateralis relative to vastus medialis
C. weakness of biceps femoris relative to semitendinosus
D. weakness of semitendinosus relative to biceps femoris

35. Which of the following does not bear weight?
A. femur
B. tibia
C. fibula
D. talus

36. The strong layer of fibrous tissue which covers the plantar muscles of the foot is called what?
A. plantar fascia
B. plantar flexion
C. longitudinal ligament
D. plantar interossei

37. During walking, which of the following actions is combined to cause supination?
A. dorsiflexion, eversion, and abduction
B. dorsiflexion, inversion, and abduction
C. plantar flexion, inversion, and abduction
D. plantar flexion, inversion, and adduction

38. Symptoms of plantar fascitis include which of the following?
A. pain in the arch
B. pain in the heel
C. pain on top of the foot
D. pain in both the arch and the heel
E. all of the choices are correct

39. Which of the following does not attach to the calcaneus?
A. sartorius
B. gastrocnemius
C. plantaris
D. soleus
40. What is the anatomical name for the big toe?
   A. pollicis
   B. hallux
   C. digiti maximi
   D. digiti minimi