**MULTIPLE CHOICE**

1. Until the skeleton matures and adult stature is reached, where does growth in the length of bone occur?
   a. Epiphyseal line
   b. Physeal plate
   c. Epiphyseal cartilage
   d. Metaphyseal plate

   ANS: B
   Until the skeleton matures and adult stature is reached, growth in the length of bone occurs only at the physeal plate through endochondral ossification.

   PTS: 1 DIF: Cognitive Level: Remembering

2. A healthcare professional is educating an expectant parent class. Which skeletal deformity does the professional tell them is normal at birth but generally disappears by 2½ years of age?
   a. Genu varum (bowleg)
   b. Genu valgum (knock knee)
   c. Equinovarus (clubfoot)
   d. Pes planus (flat feet)

   ANS: A
   Genu varum (bowleg) generally resolves itself by 2½ years of age, whereas genu valgum (knock knee) maximizes by 5 to 6 years of age. This statement is not true of either equinovarus or pes planus.

   PTS: 1 DIF: Cognitive Level: Remembering

3. A healthcare professional wants to estimate the total mass of muscle in a patient's body. What serum laboratory test should the professional evaluate?
   a. Albumin
   b. Blood urea nitrogen
   c. Creatinine
   d. Creatine

   ANS: C
   The total mass of muscle in the body can be estimated from the amount of creatinine excreted in the urine, because the conversion of creatine to creatinine only takes place in muscle.

   PTS: 1 DIF: Cognitive Level: Remembering

4. A healthcare professional working with children learns that which is the *most* common congenital skeletal defect of the upper extremity?
   a. Vestigial tabs
   b. Paget disease
   c. Rickets
   d. Syndactyly

   ANS: D
   The most common congenital skeletal defect of the upper extremity is syndactyly, or webbing of the fingers.

   PTS: 1 DIF: Cognitive Level: Remembering

5. What diagnosis is given to parents when their infant's hip maintains contact with the acetabulum but is not well seated within the hip joint?
   a. Dislocatable hip
   b. Subluxated hip
   c. Dislocated hip
   d. Subluxable hip

   ANS: B
   Subluxated hip is the only option used to identify the condition when the hip maintains contact with the acetabulum but is not well seated within the hip joint. The dislocatable hip is sometimes located properly but can dislocate easily. A dislocated hip is out of its socket. "Subluxable" is often used interchangeably with subluxated.

   PTS: 1 DIF: Cognitive Level: Understanding

6. Which sign or symptom is a very late indication of developmental dysplasia of the hip?
   a. Asymmetry of the gluteal or thigh folds
   b. Leg-length discrepancy
   c. Waddling gait
   d. Pain

   ANS: D
   Pain is a very late sign of developmental dysplasia of the hip. Earlier signs include asymmetry of gluteal or thigh folds, leg-length discrepancy, and waddling gait.

   PTS: 1 DIF: Cognitive Level: Remembering

7. To assess for osteogenesis imperfecta, which laboratory result would the healthcare professional expect to find?
   a. Increased phosphorus
   b. Decreased calcium
   c. Increased alkaline phosphatase
   d. Decreased total protein

   ANS: C
   Serum alkaline phosphatase is elevated in all forms of osteogenesis imperfecta.

   PTS: 1 DIF: Cognitive Level: Remembering

8. A child has a disorder that resulted in the failure of bones to ossify, resulting in soft bones and skeletal deformity. What treatment plan does the healthcare professional discuss with the parents?
   a. Extremely careful handling
   b. Increasing vitamin D intake
   c. Revascularization
   d. Containment and motion therapy

   ANS: B
   This description characterizes rickets. Growing bone fails to mineralize because of a problem with vitamin D intake, absorption, or excretion. Treatment includes supplemental vitamin D. Extremely careful handling would be appropriate for osteogenesis imperfecta. Revascularization procedures would benefit a child with osteochondrosis. Containment and motion are the principles of treating Legg-Calvé-Perthes disease.

   PTS: 1 DIF: Cognitive Level: Applying

9. An insufficient dietary intake of which vitamin can lead to rickets in children?
   a. C
   b. $B_{12}$
   c. $B_6$
   d. D

   ANS: D
   Rickets results from either insufficient vitamin D, insensitivity to vitamin D, wasting of vitamin D by the kidney, or inability to absorb vitamin D and calcium in the gut. Vitamin D is the only vitamin associated with rickets.

   PTS: 1 DIF: Cognitive Level: Remembering

10. A child has scoliosis with a 40-degree curvature of the spine, and the parent is worried about pulmonary involvement. What statement by the healthcare professional is *most* appropriate?
    a. "Scoliosis is a bone disorder and does not affect the lungs."
    b. "Yes, we should obtain pulmonary function studies soon."
    c. "Scoliosis severe enough to involve the lungs would be fatal."
    d. "The lungs aren't affected until the curvature is over 80 degrees."

    ANS: D
    The professional should inform the parent that in scoliosis, curves in the thoracic spine greater than 80 degrees result in decreased pulmonary function. The other statements are inaccurate and should not be used to educate the parent.

    PTS: 1 DIF: Cognitive Level: Understanding

11. In osteomyelitis, bacteria gain access to the subperiosteal space in the metaphysis. What factor makes this route the easiest for bacteria to gain access to this area?
    a. Cortex of the bone in this area is porous or mazelike.
    b. Blood supply to the metaphysis is easily compromised.
    c. Macrophages and lymphocytes have limited access to the subperiosteal space.
    d. Bacteria usually spread down the medullary cavity of the bone.

    ANS: A
    The subperiosteal space in the metaphysis is the path of least resistance for bacterial invasion because the cortex of the bone in this area is porous or mazelike, and the inflammatory response blocks spread within the bone. Bacterial access to the subperiosteal space is not related to compromised blood supply, actions of macrophages and lymphocytes, or spread down the medullary cavity.

    PTS: 1 DIF: Cognitive Level: Remembering

12. The student wants to know how the clinical manifestations and onset of juvenile idiopathic arthritis (JIA) differ from those of rheumatoid arthritis (RA) in adults. What answer by the healthcare professional is *best*?
    a. JIA begins insidiously with systemic signs of inflammation.
    b. JIA predominantly affects large joints.
    c. JIA has more severe joint pain than adult RA.
    d. JIA has a rapid onset of generalized aches as the first symptom.

    ANS: B
    The onset of JIA is less gradual than it is in adult RA. JIA also differs from the adult form in that predominantly the large joints are affected in JIA. Pain is not as severe as in the adult type which often is first noticed as generalized aches.

    PTS: 1 DIF: Cognitive Level: Understanding

13. An adolescent has been diagnosed with osteochondrosis. How does the healthcare professional describe the pathophysiology to the teen?
    a. Imbalance between calcitonin and parathyroid hormone
    b. Nutritional deficiency of calcium and phosphorus
    c. Bacterial infection of the bone
    d. Vascular impairment and trauma to bone

    ANS: D
    Vascular impairment and trauma to bone, coupled with an underlying developmental or genetic predisposition, have been identified as probable causes of osteochondrosis. Often this is due to trauma and/or overuse. It does not involve hormonal imbalances, deficiency of minerals, or a bacterial infection.

    PTS: 1 DIF: Cognitive Level: Understanding

14. Which bones are affected in Legg-Calvé-Perthes disease?
    a. Heads of the femur
    b. Distal femurs
    c. Heads of the humerus
    d. Distal tibias

    ANS: A
    A recurrent interruption of the blood supply to the femoral heads presumably produces Legg-Calvé-Perthes disease, which is a self-limited disease of the hip.

    PTS: 1 DIF: Cognitive Level: Remembering

15. What *does the student learn about* the pain experienced with Legg-Calvé-Perthes disease?
    a. Elbow and upper and lower arm pain is aggravated by activity and relieved by rest.
    b. Knee, inner thigh, and groin pain is described as a continuous ache and relieved by antiinflammatory drugs.
    c. Knee, inner thigh, and groin pain is aggravated by activity and relieved by rest.
    d. Elbow and upper and lower arm pain is described as a continuous ache and relieved by antiinflammatory drugs.

    ANS: C
    The child with Legg-Calvé-Perthes disease often complains of a limp or pain for several months. The pain is usually referred to the knee, inner thigh, and groin and aggravated by activity and relieved by rest. This selection is the only option that accurately describes the pain associated with Legg-Calvé-Perthes disease.

    PTS: 1 DIF: Cognitive Level: Remembering

16. The healthcare professional directs a student to assess a teen who has Osgood-Schlatter disease. What assessment finding does the student anticipate for this disorder?
    a. Lateral epicondylitis of the elbow
    b. Inflammation of the anterior cruciate ligament
    c. Bursitis of the subscapular bursa in the glenohumeral joint
    d. Tendinitis of the anterior patellar tendon

    ANS: D
    Tendinitis of the anterior patellar tendon, within which the patella (kneecap) is embedded, and associated osteochondrosis of the tubercle of the tibia are characteristics of Osgood-Schlatter disease. The upper extremities are not involved.

    PTS: 1 DIF: Cognitive Level: Remembering

17. At birth, the diagnosis of cerebral palsy (CP) may be made based on what factor?
    a. Brain trauma
    b. Prematurity
    c. Major brain malformation
    d. Genetic defect

    ANS: C
    The diagnosis of CP is often made when gross motor milestones are not met by predicted ages. In some infants, diagnosis is made at birth because the child has an underlying diagnosis, such as a major brain malformation that is known to be associated with CP. None of the other options are known triggers for CP.

    PTS: 1 DIF: Cognitive Level: Remembering

18. A child has Duchenne muscular dystrophy and the parents want to know how this occurred. Which statement by the healthcare professional is *most* accurate?
    a. X-linked recessive inheritance
    b. Common *SMN1* gene abnormality
    c. Autosomal dominant inheritance
    d. Inheritance is not well defined

    ANS: A
    A deletion of a segment of DNA or a single-gene defect on the short arm of the X chromosome is believed to be the cause of the X-linked inherited type of Duchenne muscular dystrophy. Spinal muscular atrophy is a common recessive genetic disorder due to an abnormality in the *SMN1* gene. Facioscapulohumeral muscular dystrophy is a mild progressive type of muscular dystrophy that is inherited in an autosomal dominant pattern. Limb girdle muscular dystrophy may be a recessive disorder but is not well defined.

    PTS: 1 DIF: Cognitive Level: Understanding