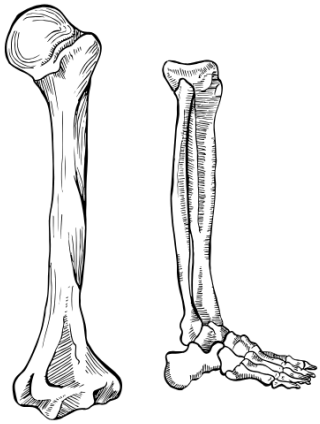


Test 3 Review: Skeletal, Muscular, and Joints

Skeletal System

What are the 5 types of bone cells?
Osteoblasts, Osteoclasts, Osteocytes, Osteogenic cells, and Bone-lining cells

In order, what are the steps of endochondral ossification?

1. Bone collar forms around diaphysis of the hyaline cartilage model
2. Central cartilage in diaphysis calcifies, then develops cavities
3. Periosteal bud invades cavities, leading to formation of spongy bone
4. Diaphysis elongates, and medullary cavity forms
5. Epiphyses ossify

What is intramembranous ossification?

a. Bone formation from a cartilage template in long bones
b. Bone formation directly from mesenchymal tissue without a cartilage precursor
c. The process of bone remodeling after a fracture
d. The replacement of bone with cartilage in flat bones

What are the steps of Intramembranous ossification?

1. Ossification centers are formed when mesenchymal cells cluster and become osteoblasts
2. Osteoid is secreted, then calcified
3. Spongy bone is formed when osteoid is laid down around blood vessels, resulting in trabeculae
4. Compact bone replaces spongy bone just under the periosteum. Red marrow appears.

What is the correct order of stages in fracture repair?

a. Bony callus, hematoma formation, fibrocartilaginous callus, remodeling
b. Hematoma formation, fibrocartilaginous callus, bony callus, remodeling
c. Remodeling, bony callus, hematoma formation, fibrocartilaginous callus
d. Fibrocartilaginous callus, hematoma formation, remodeling, bony callus

The epiphyseal plate is responsible for:

a. Bone widening
b. Bone remodeling
c. Bone repair
d. Bone lengthening

The hormone that stimulates osteoclast activity when blood calcium levels are low is:

a. Parathyroid hormone (PTH)
b. Calcitonin
c. Growth hormone
d. Thyroid hormones

Wolf's Law states that:

a. Bones grow in length until puberty
b. Bones remodel in response to mechanical stress
c. Calcium regulates bone growth
d. Hormones determine bone density

Which option correctly lists the zones of the epiphyseal plate and their primary activities?

a. Resting (inactive chondrocytes), proliferation (chondrocyte division), hypertrophic (matrix calcification), ossification (bone replacement)
b. Proliferation (inactive chondrocytes), resting (chondrocyte enlargement), hypertrophic (bone formation), calcification (cell division)
c. Resting (bone replacement), hypertrophic (chondrocyte division), proliferation (matrix calcification), ossification (inactive cells)
d. Calcification (inactive chondrocytes), proliferation (bone formation), resting (cell division), hypertrophic (matrix production)

What factors primarily control bone remodeling?

a. Blood flow, muscle size, joint flexibility
b. Hormones, mechanical stress, cytokines/growth factors
c. Skin tension, nerve density, tendon length
d. Bone color, cartilage thickness, ligament strength

Types of Joints

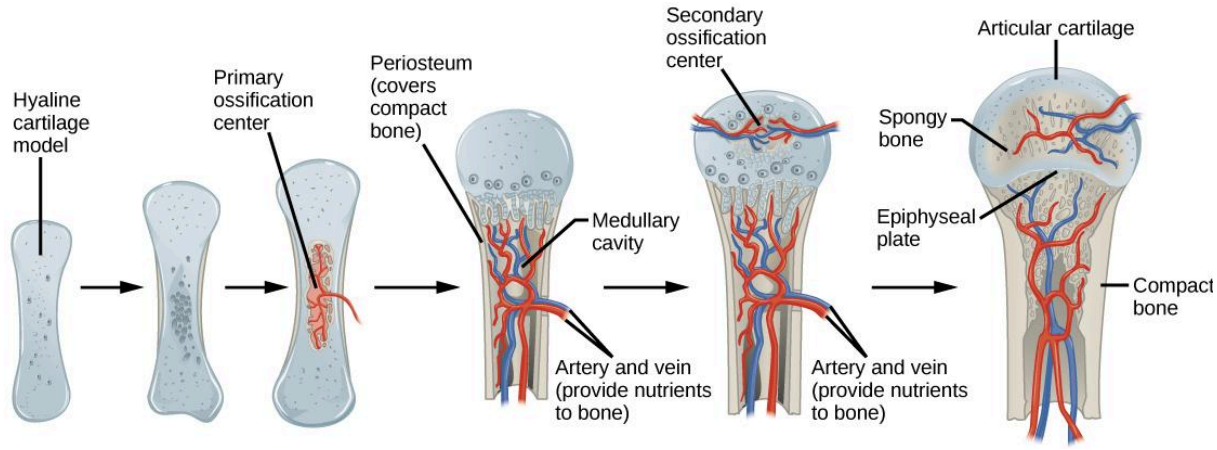
a. Synovial: Freely moveable
    i. Separated by: fluid joint cavity
    ii. Examples: Limp Joints
b. Cartilaginous: Slightly moveable
    i. United by: Cartilage (hyaline)
    ii. Examples: Pubic symphysis, Intervertebral disc
c. Fibrous: Immoveable
    i. United by: dense fibrous conn. tissue
    ii. Examples: sutures, gomphoses, syndesmosis

What are the 3 types of Arthritis?
Osteoarthritis (OA), Rheumatoid arthritis (RA), Gouty arthritis

HIGHLIGHTED IN LECTURE:

- Bone remodeling consists of both bone deposit and bone resorption
- Resorption is the function of osteoclasts
- Curved bones are thickest where they are most likely to buckle
- Deposit of new bone matrix is done by osteoblasts
- Bone lengthening ceases at 18 for females and 21 for males
- Growth hormone stimulates growth of cartilage

SKELETAL VITALS:



Muscular System

Types of muscle tissue

a. Skeletal tissue (voluntary)
    i. Cells: striated
    ii. Located: throughout the body, most between skin and bones
b. Cardiac tissue (involuntary)
    i. Cells: Striated
    ii. Located: Only in heart
c. Smooth tissue (Involuntary)
    i. Cells: not striated
    ii. Located: walls of hollow organs (bladder, lungs, stomach, etc)

Which option correctly lists four characteristics of muscle tissue?

a. Conductivity, rigidity, compressibility, regeneration
b. Excitability, contractility, extensibility, elasticity
c. Insulation, secretion, flexibility, adhesion
d. Permeability, durability, contractility, excitability

What is the process of movement in a joint that allows the muscle to shorten?

a. Isotonic contraction
b. Isometric contraction
c. Elastic contraction
d. Isocentric contraction

Which two substances are primarily stored in muscle tissue?

a. Collagen and hemoglobin
b. Glycogen and myoglobin
c. Calcium and keratin
d. Lipids and albumin

What defines a motor unit?

a. One motor neuron and all muscle fibers it innervates
b. A single muscle fiber and its blood supply
c. A group of ligaments stabilizing a joint
d. The sarcomeres within one muscle cell

What is the role of the axon terminal in the neuromuscular junction?

a. Stores calcium for muscle contraction
b. Binds actin to myosin during contraction
c. Pumps sodium into the muscle fiber
d. Releases acetylcholine into the synaptic cleft upon calcium influx

What triggers synaptic vesicles to release acetylcholine due to calcium entry?

a. Muscle fiber contraction
b. Sodium efflux from the synaptic cleft
c. Action potential at the axon terminal
d. Potassium influx into the muscle cell

What does acetylcholinesterase do?

a. Breaks down acetylcholine in the synaptic cleft to prevent continuous stimulation
b. Stimulates muscle contraction by releasing acetylcholine
c. Binds calcium to trigger neurotransmitter release
d. Repairs damaged muscle fibers after contraction

What occurs during repolarization?

a. Membrane potential returns to negative as potassium exits the cell
b. Membrane potential becomes more positive as sodium exits the cell
c. Membrane potential remains constant with no ion movement
d. Membrane potential becomes negative due to calcium influx

What channels open and close during repolarization?

a. Sodium channels open, potassium channels close
b. Calcium channels open, sodium channels close
c. Sodium channels close, potassium channels open
d. Potassium channels close, calcium channels open

What is the sliding filament model of muscle contraction?

a. Myosin filaments elongate to stretch the sarcomere
b. Actin filaments break down to release energy for contraction
c. Calcium binds directly to myosin to initiate movement
d. Actin slides past myosin, shortening the sarcomere via ATP-driven cross-bridges

How does calcium contribute to muscle contraction?

a. Binds to myosin, triggering ATP release
b. Binds to troponin, exposing actin's myosin-binding sites for cross-bridge cycling
c. Blocks actin sites, preventing myosin attachment
d. Breaks down acetylcholine in the synaptic cleft

What does troponin do when calcium binds to it?

a. Covers the myosin-binding sites
b. Shifts tropomyosin to expose myosin-binding sites
c. Breaks down ATP
d. Releases acetylcholine

Which option correctly lists the three phases of a muscle twitch?

a. Contraction, relaxation, recovery
b. Latent period, contraction, relaxation
c. Stimulation, force generation, elongation
d. Depolarization, repolarization, rest

Which type of muscle fiber is best suited for endurance activities such as Long-distance running?

a. Fast glycolytic (Type IIx): Low endurance, high power, fatigues quickly
b. Fast oxidative (Type IIa): Moderate endurance and speed
c. Slow oxidative (Type I): High endurance, fatigue-resistant, rich in mitochondria and myoglobin
d. None of the above

Which factors influence the velocity and duration of a muscle contraction?

a. Bone density, joint size, blood pressure, tendon length
b. Muscle color, nerve length, ligament strength, cartilage thickness
c. Skin tension, hormone levels, bone shape, joint fluid
d. Fiber type, load, motor unit recruitment

Which option correctly lists the three primary mechanisms for ATP production in cells?

a. Oxidative phosphorylation, glycolysis, citric acid cycle
b. Substrate-level phosphorylation, oxidative phosphorylation, photophosphorylation
c. Creatine phosphate, Anaerobic pathway, Aerobic pathway
d. Substrate-level phosphorylation, fermentation, Calvin cycle

<u>HIGHLIGHTED IN LECTURE:</u>

- Sarcomere: smallest functional unit of a muscle fiber,
- Myofilaments: arrangement of actin and myosin myofilaments within sarcomere
- Sarcolemma: muscle fiber plasma membrane
- Sarcoplasm: muscle fiber cytoplasm
- Myoglobin stores oxygen and gives red pigment to muscle

MUSCULAR VISUALS