

Module 14: Musculoskeletal System

Section 1: Anatomy and Physiology

- Lesson 1: Bone Function
 - Composition and Functions of the Musculoskeletal System
 - Composed of mainly muscles and bones
 - Supportive structures
 - Tendons
 - Cartilage
 - Bursae
 - Joints
 - Connect bones and muscles
 - Enable complex movements
 - Functions
 - Provide framework, protection and support for the body's internal organs
 - Enables movement (internal and external)
 - Provides its own storage areas for minerals needed for:
 - Bone growth
 - Development
 - Repair
 - Red bone marrow within bones aid in the formation of blood.
 - Osseous Tissue and Osteocytes
 - Osseous - bony
 - Bony tissue is suffused with a rich supply of blood vessels and nerves
 - Osteocytes
 - Bone cells (make up the osseous tissue along with dense connective tissue (collagen) and intercellular calcium salts.
 - Oste/o = bone
 - Cyte = Cell
 - Bone Formation
 - Cartilage (chondr/o)
 - Bones of an embryo begin as this.
 - Osseous tissue without intercellular calcium salts
 - Ossification
 - During fetal development, calcium salts are deposited within the cartilage
 - Bone Growth
 - Epiphyseal Line
 - Area of cartilage tissue that is being replaced by new bony tissue as the bone grows
 - Named because it marks the area of growth along the epiphysis
 - Bony end of a long bone
 - AKA = Epiphyseal Plate or Growth Plate
 - As cartilage cells at the edges of this plate form a new bone, the bone lengthens

- When bone achieves full length, epiphyseal plate calcifies
 - Kinds of Osteocytes
 - Osteoblasts
 - Smaller, immature osteocytes
 - Form bony tissue that replaces the cartilage
 - -blast = embryonic or immature
 - Osteoclasts
 - AKA Bone Phagocytes
 - Larger bone cells
 - Reabsorb or digest bony tissue and bone minerals inside-[each bone
 - Enlarging inner cavity
 - Process prevents the bone from becoming too thick and heavy
 - -clast = break
- Lesson 2 : Bone Composition and Structure
 - Bone Types
 - Long Bones
 - Found in legs and arms
 - Each end is called an epiphysis
 - Proximal Epiphysis
 - Closes to the midline of the body
 - Distal Epiphysis
 - Farther end
 - Diaphysis
 - Middle shaft
 - Metaphysis
 - When the epiphyseal plate and the epiphysis change and grow together
 - Articular cartilage
 - The end of any bone that meets another bone is protected from any bone-to-bone contact by this cushion of slick, smooth, but very tough fibrous tissue
 - Short bones
 - Found in wrists and ankles
 - Flat bones
 - Cover soft body parts
 - Includes
 - Shoulder blades, ribs, pelvic bones and skull.
 - Sesamoid Bones
 - Small rounded bones found near any joint
 - Increase the efficiency of the joint muscles around them
 - Patella
 - Largest of the sesamoid bones
 - Irregular bones
 - Bones that don't fit into the other 4 categories
 - Include

- Vertebrae
 - Bones of the spine
 - Ossicles
 - Bones of the ear
 - Bone Processes and Depressions
 - Bone Depressions
 - Any groove, opening or hollow space
 - Help join bones together and offer protection for blood vessels and nerves in the area
 - Bone Processes
 - When bone is raised or projected
 - Often areas of attachments for ligaments or muscles
 - Bone Layers
 - Periosteum
 - Structure that surrounds the bone
 - Is tough
 - Comprises the outermost surface of long bones
 - Except at the ends of epiphyses
 - Compact bone
 - Just below the periosteum
 - Strongest, hardest, densest layer
 - Contains blood vessels that deliver oxygen and nutrients to the bone while also removing waste products, such as: carbon dioxide.
 - Haversian Canals
 - Channels within the compact bone that blood vessels move through
 - Spongy Bone
 - AKA = Cancellous Tissue
 - Found in the interior of many bones
 - Spaces that are usually filled with marrow
 - Contains more holes than compact bones
 - Found in most bones beneath the compact bone
 - Bone Marrow
 - Red bone marrow
 - Thin layer of spongy bone
 - Called this because it is rich in blood in both mature and immature blood cells
 - Yellow Bone Marrow
 - Made up of mostly fat cells
 - Endosteum
 - Lines the medulla cavity within the compact bone
- Lesson 3: The Two Skeletons
 - Axial v. Appendicular Skeletons
 - Axial Skeleton
 - Consists of