7 Functions of Bones

Support

Bones provide Framework that supports the body and cradles its soft organs

Protection

Fused bones of the skull protect the brain

Anchorage

Skeletal muscles which attach to bones by tendons use bones as levers to move

Mineral Storage

Bone stores calcium and phosphate

Blood cell formation

Hematopoiesis occurs in the red marrow of certain bones

Fat storage

A source of energy for the body. Is stored as yellow marrow in cavities of long bone

Hormone production (osteocalcin)

Hormone that helps to regulate insulin secretion, glucose homeostasis and energy expenditure

Types of bone cells and their derivation

Osteoprogenitor Cells

Stem cells.

Osteoblasts

Matrix synthesizing cell. Responsible for bone growth

Osteocyte

mature bone cell. Monitors and maintains the mineralized bone matrix

osteoclast

Bone-resorbing cell

Types of Bone Fractures

Comminuted	Compression
Bone fragments into three or more pieces	Bone is crushed
Spiral	Epiphyseal
Ragged break occurs when excessive twisting force are applied	separates from the diaphysis along the spiphyseal plate
Depression	Greenstick
Broken bone portion is pressed inward	Bone break is incomplete, much in the way a green twig breaks

Classification of Joints

Fibrous	Cartil-aginous	synovial
Adjoining bones united by collagen fibers. Suture (short fibers)-immobile Syndes-omosis (long fibers) slightly movable and immobile	Adjoining bone nited by cartilage: Syncon-drosis (hyaline) immobile Symphysis (fibrocar-tilage) Slightly movable	Adjoingin bone covered with articular cartilage. Areas: Plane, hinge, Pivot, condylar, saddle, ball and socket

Axial Skeleton Vs. Appendicular Skeleton

Axial	Appendicular Skeleton
Long axis of the body and includes the bones of the skull, vertebral column, and rib cage	Bones of the upper and lower limbs and the girdles

Compact and Spongy Bone

compact Bone

External layer of the bone, is dense and looks smooth and solid to the naked eye

Spongy bone

Honeycomb like structure inside of compact bone that is called trabeculae and its filled with red and yellow marrow

Part of Long bone Explination

Epiphelysis is another name for the bone end of the long bone. When someone is growing, their Epiphyseal plate works to extend the bone. (this mostly happens in adolescent years). When someone gets to the age where this stops, the epiphyseal line forms which is basically the remnant of the epiphyseal plate

Chemical Composition of Bone

Organic Components	Inorganic components
Bone cells and osteoid-allow it to resist tension (stretch)	Mineral salts-allow to resist compression

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Postnatal Bone Growth

1) Resting Zone 2) Proliferation Zone: cartilage cells undergo mitosis 3) Hypertrophic Zone: Older cartilage cells enlarge 4) Calcification Zone: Matrix becomes calcified; cartilage cells die; matrix begins deteriorating 5) Ossification Zone: New bone is forming

Fibrous Joints

Suture	Sundesmosis	Gomphosis
Joint held together with very short, interconnecting fivers	joint held together by a ligament. Fibrous tissue can vary in length but is longer than in suture	peg in socket fibrous joint

range of motions allowed by Synovial joint

Nonaxial movement: Gliding uniaxial movement (movement in one lace) Biaxial movement (movement in two lanes. multiracial (movement in or around all three places space and axes

Long Bone

Structure of long bone

Shaft, bone ends, membranes

Diaphysis

Shaft: forms the long axis of the bone that surrounds the medullary cavity, which contains no bone tissue, but yellow bone marrow

Epiphyses

Long Bone (cont)

The bone ends: outer shell of compact bone that forms the epiphysis exterior and the interior contains spongy bone. Thin layer of hyaline cartilage covers the joint surface which cushions opposite ends of the bones

Membranes

Periosteum. covers the external surface of the bone and contains lots of nerve vessels which why it makes breaking a bone so painful

Endosteum

covers the internal bone surface. it covers the trabeculae of spongy bone and lines the canals that pass through the compact bone

Nutrient Foramen

Nutrient artery runs inward to supply the bone marrow and the spongy bone

Bone Growth

Endochondral ossification	Intramembranous ossification
bone develops by replacing hyaline cartilage which leads to endochondral bone	a bone develops from a fibrous membrane and theh bone is called a membranous bone

How the bone Grows Fetus to adolescence

1) Bone collar forms around the diaphysis of the hyaline cartilage model 2) Cartilage calcifies in the Center of the diaphysis and then develops cavities 3) the periosteal bud invades the internal cavities and spongy bone forms 4) The diaphysis elongates and a medullary cavity forms. Secondary ossification centers appears in the epiphyses 5) The epiphyses ossify when ossification is complete, hyaline cartilage remains only in teh epiphyses plates and articular cartilage

Synovial Joint

articular cartilage

glassy smooth hyaline cartilage covers the opposing bone surface

Joint cavity

contains a small amount of synovial fluid

Articular capsule

enclosed by a two layered joint capsule. A tough external fibrous slayer composed of dense irregular connective tissue that is continuous with the periostea of the articulating bone

reinforcing ligaments

reinforced and strengthen by a number of sandlike ligaments.