

The Skeletal System Part 1

I. Introduction

1. Bone is living tissue
2. Bones are the organs of the skeletal system.

A. provide points of attachment for:

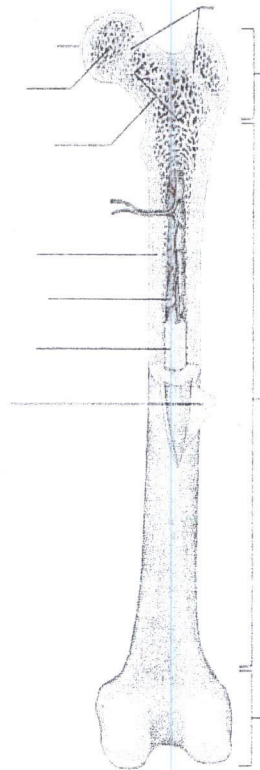
3. Bone contains a variety of active tissues:

- Bone
- Dense connective tissue
- Nervous Tissue
- Cartilage
- Blood

4. Parts of a Long bone

- A. Each end of a long bone has an expanded portion called the _____
- a. articulate (forms a joint) with another bone
 - Proximal Epiphysis-closest to body
 - Distal Epiphysis-Farthest from body
 - Outer surface of the articulating portion is coated with a layer of hyaline cartilage called articular cartilage.
 - b. The shaft of the bone is called the _____
 - c. A tough vascular coating of fibrous tissue called the _____ completely encloses the bone except for the articular cartilage on the ends.
 - d. Periosteal fibers are continuous with connecting ligaments and tendons

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II. Two Main Types of Bone

A. Compact or cortical bone

B. Spongy or cancellous bone

C. Hollow chamber called _____

D. Endosteum is a thin layer of cells lining areas a specialized type of soft connective tissue called marrow that fills them: yellow and red

****Microscopic Structures: Know the following terms

Osteocytes

Lacunae

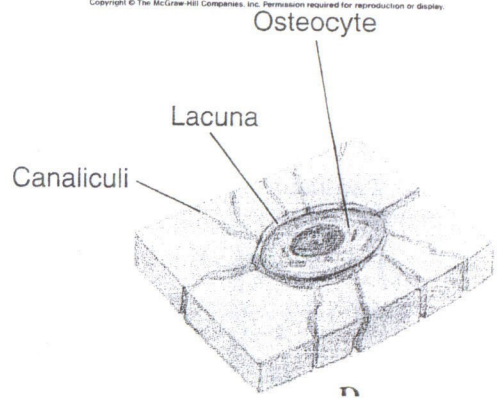
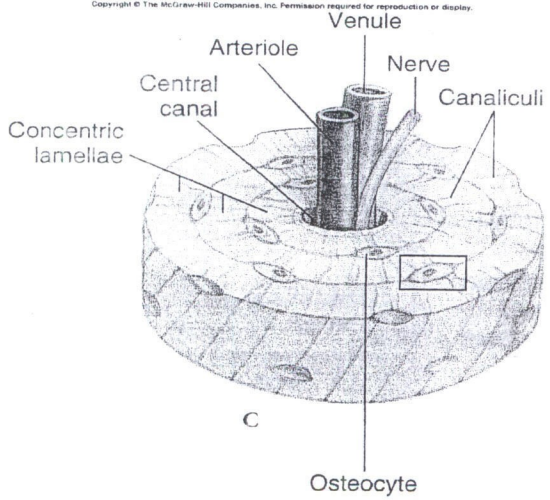
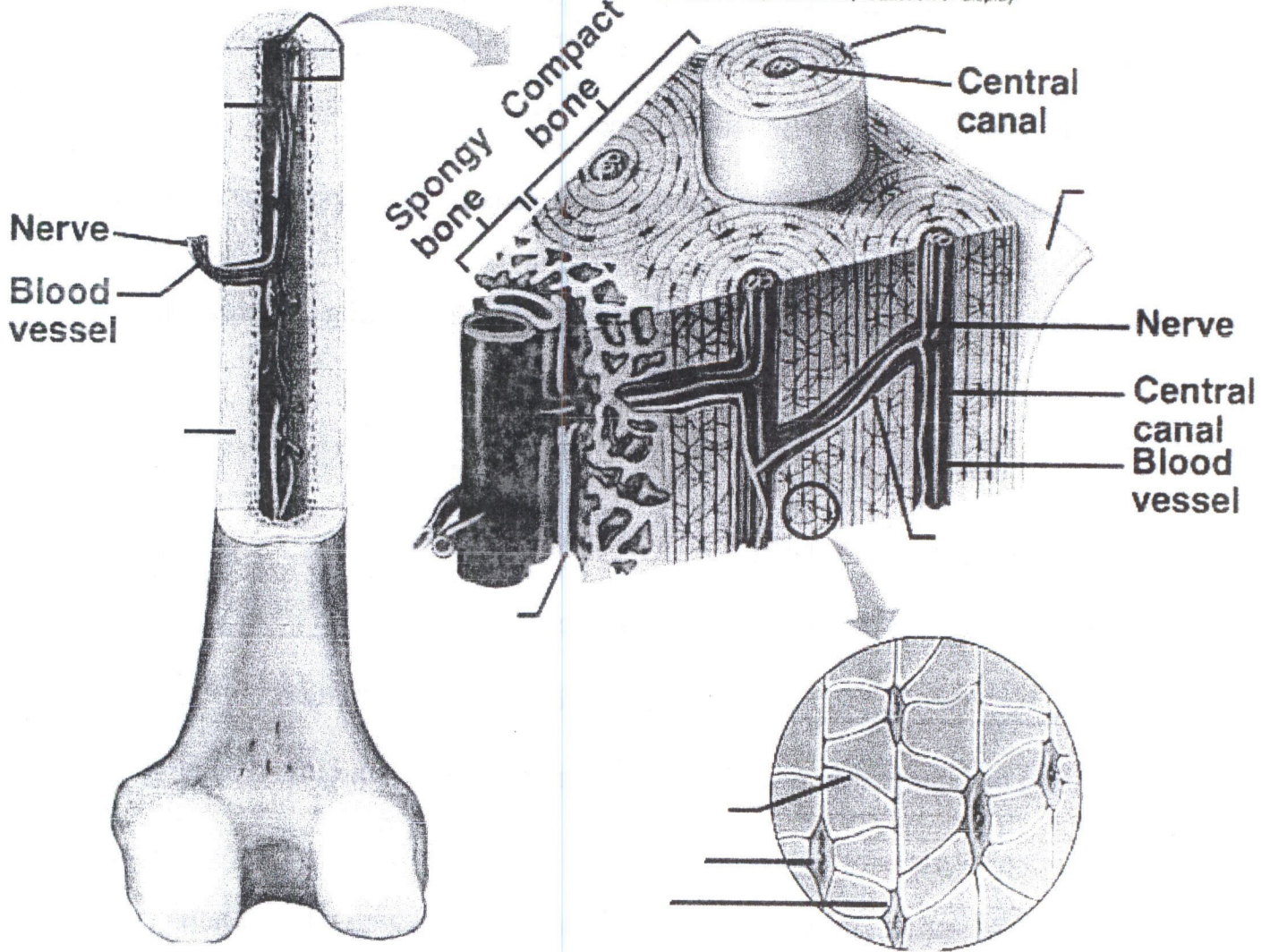
Central canal or Haversian canal

Canaliculi

Osteon

Perforating canals or Volkmann's canal

Bone matrix



A. Bones form in Two ways: intramembranous and endochondral

1. **Intramembranous bones** originate between sheet like layers of connective tissues

** The flat bones of the skull are intramembranous bones

a. During development, membrane-like layers of connective tissues appear at the sites of future bones

b. Connective tissue cells enlarge and differentiate into bones-forming cells called osteoblasts

c.

d. Spongy bone forms in all direction

e. Cells of the membranous tissue on the outside become _____

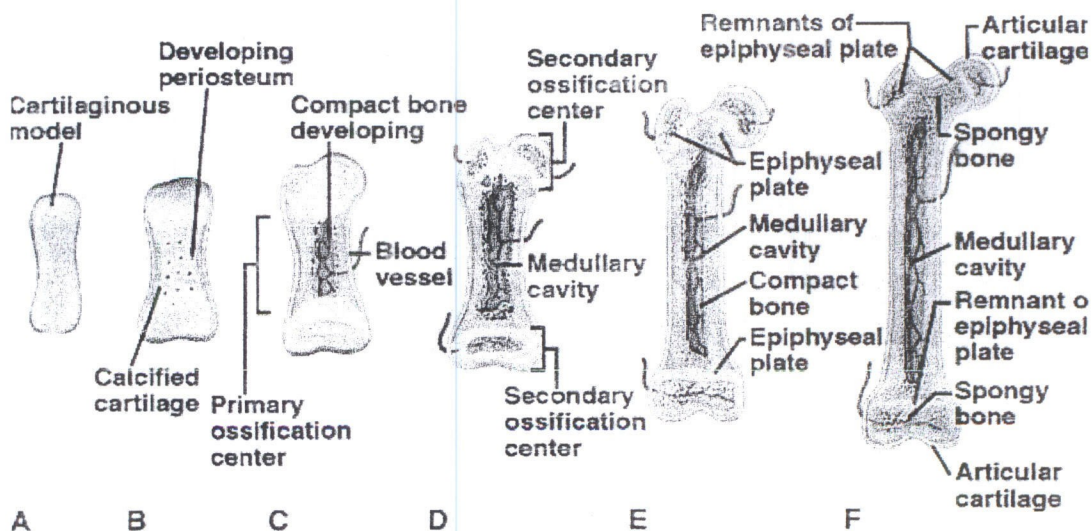
f. _____ on the inside formed spongy bone

g. When the extra cellular matrix completely surrounds the osteoblasts they become osteocytes

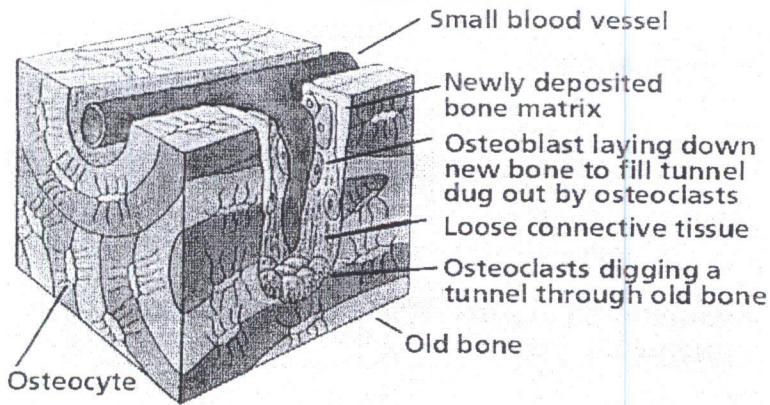
2. **Endochondral bones** (or replacement bone) begin as masses of cartilage the bone replaces later-shaped like future bony structures (i.e. hand)

a. Cartilage is replaced by bone beginning at the center(diaphysis)

b. Once the ossification centers of the diaphysis and the epiphyses meet, the epiphyseal plates ossify and growth stops



c. Osteoclasts vs Osteoblasts



d. Osteoclast and osteoblast continue to remodel

- i. Osteoclast reabsorb matrix; osteoblast replaces it
- ii. Hormones control resorption and deposition (read chapter 11 page 288)
- iii. Weight bearing activities important to break down bone and replace with new bone!

B. Blood Cell Formation: Hematopoiesis

- a. Begins in yolk sac that lies outside of the human embryo-Evolutionary links to our past
- b. Later in development formed in _____
- c. Still later they form in bone marrow
- d. Within irregular spaces of spongy bone and central canals of compact bone

C. 2 Kinds of Marrow

- i. Red Marrow-produces red blood cells (Erythrocytes), white blood cells (leukocytes), and blood platelets
- ii. Red due to the _____
- iii. The infants Red Marrow is found in cavities of most bones, as age increases it is replaced by yellow marrow
- iv. Yellow Marrow- _____

e. Storage of Inorganic Salts

- i. Extra cellular matrix of bone is rich in calcium phosphate and to a lesser degree calcium carbonate
- ii. Calcium is vital to many metabolic processes. Can you name some??
- iii. When blood is low in calcium the parathyroid hormone stimulates osteoclasts to break down bone tissue;
- iv. Calcium salts are released from the extra cellular matrix into the blood **See graphs

