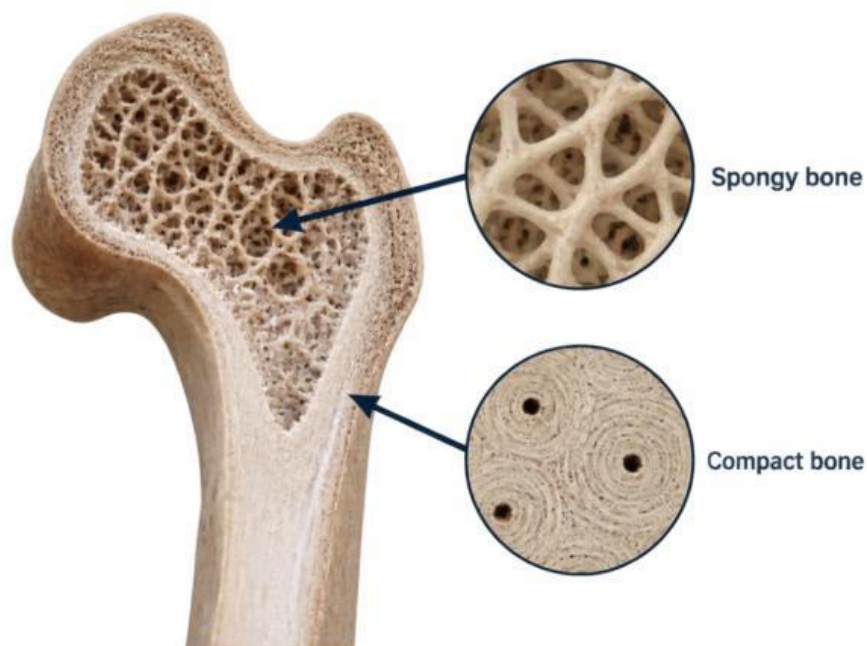


Section 2: Bone Classification and Tissue Structure

Learning Objective: Classify bones of the human skeleton into four morphological shape categories and compare the structural properties of compact versus spongy osseous tissue.

Key Vocabulary: Compact bone, spongy bone, trabeculae, epiphyseal plate, long bone, short bone, flat bone, irregular bone.

The adult human skeleton contains 206 bones classified by shape into long, short, flat, and irregular categories. Structurally, bones consist of dense, homogenous compact bone that resists compressive stress and porous spongy bone composed of needlelike trabeculae that minimize skeletal weight. During childhood and adolescence, longitudinal bone growth occurs at the cartilaginous epiphyseal plates located between the shaft and bone ends.



1. Classify each of the six listed bones by shape as long, short, flat, or irregular. Write the correct shape category in the table.

Bone Name	Shape Category
Femur	
Carpal (wrist bone)	

Sternum (breastbone)	
Lumbar Vertebra	
Radius	
Coxal (hip) bone	

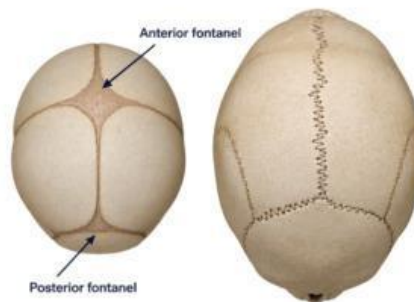
2. Read each structural characteristic and check the box for the type of bone tissue it describes: Compact or Spongy.

Structural Characteristic	Compact	Spongy
Dense, smooth, and homogeneous	☐	☐
Made of small, needlelike pieces with many open spaces	☐	☐
Organized into concentric cylindrical units called osteons	☐	☐
Has an interconnecting network of trabeculae with marrow-filled spaces	☐	☐
Forms the external layer of bones and the thick wall of long-bone shafts	☐	☐
Found inside short, flat, and irregular bones and at the ends of long bones	☐	☐

Section 3: Fetal Skull Versus Adult Skull

Learning Objective: Analyze developmental differences between fetal and adult skulls, evaluating proportional size discrepancies, incomplete ossification, and the functional significance of fontanelles.

An infant skull differs significantly from an adult skull in both anatomical composition and body proportions. In a fetus, the skull represents approximately one-fourth of total body length, whereas the adult skull accounts for only one-eighth, with the infant facial skeleton remaining small relative to its large cranium. Unossified fibrous membranes called fontanelles connect the cranial plates, permitting slight compression during birth and providing room for rapid postnatal brain enlargement.



1. Compare the overall body proportions of a newborn infant with those of a fully grown adult in terms of skull length relative to total body length, and explain why the infant facial skeleton appears so small compared to its cranium.

2. Describe the histological transition that occurs as an infant skull matures from hyaline cartilage and fibrous membranes into rigid adult bone tissue. Why would it be biologically disadvantageous for a human infant to be born with an entirely ossified, rigid skull?
