

# 4

## APPENDICULAR SKELETON AND LONG BONE DISSECTION

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### OBJECTIVES

- **How to get ready:** Read CHAPTERS 6 AND 8, MCKINLEY ET AL., *HUMAN ANATOMY*, 5E. All text references are for this textbook.
- Observe and dissect a fresh cow long bone. **YOU MUST BRING YOUR OWN GLOVES FOR THIS ACTIVITY.** Read dissection instructions **BEFORE** coming to lab.
- Identify the bones and bone markings from the upper limb and pectoral girdle.
- Identify the bones and bone markings from the lower limb and pelvic girdle.
- **Before next class:** Preview Appendicular (and Axial) Muscle terms lists from SLCC Anatomy Laboratory website or your printed laboratory manual and your textbook.

# Activity 4

## BONE DISSECTION

### *Dissection Instructions*

1. Acquire all dissection materials. (1 set per table)
  - Dissection tray
  - Scalpel
  - Probe
  - Cow bone
  - Gloves (supply your own)
  - Forceps
2. After getting the cow bone back to your table, place it on your tray, cut side up, and begin to examine it closely. Notice that within the compact bone there are red dots, which are blood vessels within the compact bone.

### *Procedure*

3. a. Take probe and carefully dig into the **yellow bone marrow** in an attempt to find a **nutrient artery** (unlikely). Bone is living tissue and is highly vascular. Next, dig out all of the marrow from the cavity to expose the **trabeculae** (spongy bone portions) visible on the side toward the epiphysis. These trabeculae are the network that makes up the spongy bone. Within this spongy bone you will find an area that will be red and bloody, this is the **red bone marrow** and the site of blood cell production (**hematopoiesis**).
- b. Now look toward the outside of the bone to the outer lining of the shaft. Take forceps and peel away the **periosteum**. The periosteum serves as a site of attachment for tendons and ligaments and an anchor for blood vessels.
- c. Now look for cartilage. **Hyaline cartilage** will be located in the **articular cartilage** at the ends where the bone will articulate with another bone. In some cases **fibrocartilage** will be visible in the shape of a 'C' on the end of the cow tibia. Closely look at the difference between the two cartilages.
- d. Identify all of the structures on the following list before properly disposing of your specimen.

**You must dispose of the cow bone as instructed, and completely clean, dry, and put away all instruments and trays in order to earn your participation grade for the lab.**

## Appendicular Skeleton and Long Bone Dissection

STRUCTURES TO IDENTIFY—COW BONE DISSECTION	TEXT REFERENCES AND SKETCH
<ul style="list-style-type: none"> <li>□ <b>diaphysis</b></li> <li>□ <b>compact bone tissue</b> (forming most of the diaphysis and the outside of all bones)</li> <li>□ <b>proximal and distal epiphysis</b> (form the ends of the long bone)</li> <li>□ <b>articular surface with articular (<i>hyaline</i>) cartilage</b></li> <li>□ <b>metaphysis</b></li> <li>□ <b>epiphyseal line or epiphyseal (growth) plate</b></li> <li>□ <b>medullary (marrow) cavity</b></li> <li>□ <b>yellow bone marrow</b></li> <li>□ <b>spongy bone tissue</b></li> <li>□ <b>red bone marrow</b></li> <li>□ <b>trabeculae</b> (thin bony plates running within spongy bone tissue) within spongy bone</li> <li>□ <b>periosteum</b> (dense irregular connective tissue covering the outside of all bones)</li> <li>□ <b>endosteum</b> (tissue lining the inside of the medullary cavity in the diaphysis)</li> <li>□ <b>nutrient artery</b> (if visible)</li> </ul>	<p>FIG. 6.4, P. 151</p>

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TABLE 4-1. Pectoral girdle		
BONE	BONE MARKINGS	TEXT REFERENCES, NOTES, AND SKETCH
<b>CLAVICLE</b>	□ sternal end (medial)	FIG. 8.2, P. 223
	□ acromial end (lateral)	
	□ conoid tubercle	
<b>SCAPULA</b>	□ superior border	FIG. 8.2, 8.3, PP. 223–224
	□ suprascapular notch	
	□ medial (vertebral) border	
	□ lateral (axillary) border	
	□ superior angle	
	□ inferior angle	
	□ spine	
	□ acromion	
	□ coracoid process	
	□ suprascapular fossa	
	□ infraspinous fossa	
	□ subscapular fossa	
	□ glenoid cavity (fossa)	
□ supraglenoid tubercle		
□ infraglenoid tubercle		

## Appendicular Skeleton and Long Bone Dissection

**TABLE 4-2. Upper limb – arm**

BONE	BONE MARKINGS	TEXT REFERENCES, NOTES, AND SKETCH
<b>HUMERUS</b>	□ head	FIG. 8.4, PP. 226–227
	□ greater tubercle	
	□ lesser tubercle	
	□ intertubercular sulcus/ groove	
	□ anatomical neck	
	□ surgical neck	
	□ deltoid tuberosity	
	□ radial groove	
	□ coronoid fossa	
	□ olecranon fossa	
	□ radial fossa	
	□ medial epicondyle	
	□ lateral epicondyle	
□ trochlea		
□ capitulum		

**TABLE 4-3. Upper limb – forearm**

BONE	BONE MARKINGS	TEXT REFERENCES, NOTES, AND SKETCH
<b>ULNA</b>	□ olecranon process	FIG. 8.5, PP. 228–229
	□ coronoid process	
	□ trochlear notch	
	□ radial notch	
	□ styloid process	
	□ head	
<b>RADIUS</b>	□ head	FIG. 8.5, PP. 228–229
	□ neck	
	□ radial tuberosity	
	□ ulnar notch	
	□ styloid process	

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TABLE 4-4. Upper limb – wrist and hand		
BONE	INDIVIDUAL BONES	TEXT REFERENCES, NOTES, AND SKETCH
<b>CARPAL BONES (8)</b>	<b>proximal row (lateral to medial)</b>	FIG. 8.6, P. 231
	□ scaphoid bone	
	□ lunate bone	
	□ triquetrum bone	
	□ pisiform bone	
	<b>distal row (lateral to medial)</b>	
	□ trapezium bone	
	□ trapezoid bone	
	□ capitate bone	
	□ hamate bone	
<b>METACARPAL BONES</b>	<b>I through V</b>	
<b>PHALANGES</b>	□ proximal phalanx	
	□ middle phalanx	
	□ distal phalanx	
	□ pollex (has no middle phalanx)	

# Activity 4

**TABLE 4-5.** Pelvic girdle: Each os coxa (pl., *ossa coxae*) is composed of three fused bones: ilium, ischium, and pubis.

BONE	BONE MARKINGS	TEXT REFERENCES, NOTES, AND SKETCH
<b>OS COXA (2)</b>	□ acetabulum	FIG. 8.7, 8.9, 8.10, PP. 232–237, TABLE 8.1
	□ obturator foramen	
<b>ILIUM</b>	□ iliac crest	
	□ anterior superior iliac spine	
	□ anterior inferior iliac spine	
	□ posterior superior iliac spine	
	□ posterior inferior iliac spine	
	□ greater sciatic notch	
	□ iliac fossa	
<b>ISCHIUM</b>	□ body	
	□ ischial spine	
	□ lesser sciatic notch	
	□ ramus or ischial ramus	
	□ ischial tuberosity	
<b>PUBIS</b>	□ body	
	□ pubic tubercle	
	□ superior pubic ramus	
	□ inferior pubic ramus	

## Appendicular Skeleton and Long Bone Dissection

**TABLE 4-6. Lower limb – thigh and knee**

BONE	BONE MARKINGS	TEXT REFERENCES, NOTES, AND SKETCH
<b>FEMUR</b>	<ul style="list-style-type: none"> <li>□ head</li> <li>□ fovea</li> <li>□ neck</li> <li>□ greater trochanter</li> <li>□ lesser trochanter</li> <li>□ intertrochanteric crest</li> <li>□ shaft</li> <li>□ gluteal tuberosity</li> <li>□ linea aspera</li> <li>□ medial condyle</li> <li>□ medial epicondyle</li> <li>□ adductor tubercle</li> <li>□ lateral condyle</li> <li>□ lateral epicondyle</li> <li>□ intercondylar fossa</li> </ul>	<b>FIG. 8.11, 8.12, PP. 238–240</b>
<b>PATELLA</b>		<b>FIG. 8.12, P. 240</b>



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TABLE 4-7. Lower limb – leg and foot		
BONE	BONE MARKINGS OR INDIVIDUAL BONES	TEXT REFERENCES, NOTES, AND SKETCH
<b>TIBIA</b>	<input type="checkbox"/> medial condyle	FIG. 8.13, 8.14, PP. 242–244
	<input type="checkbox"/> lateral condyle	
	<input type="checkbox"/> intercondylar eminence	
	<input type="checkbox"/> tibial tuberosity	
	<input type="checkbox"/> medial malleolus	
	<input type="checkbox"/> anterior border (crest)	
<b>FIBULA</b>	<input type="checkbox"/> head)	
	<input type="checkbox"/> neck	
	<input type="checkbox"/> lateral malleolus	
<b>TARSAL BONES (7 bones)</b>	<input type="checkbox"/> talus bone	FIG. 8.14, 8.15, PP. 244–245
	<input type="checkbox"/> calcaneus bone	
	<input type="checkbox"/> navicular bone	
	<input type="checkbox"/> medial cuneiform bone	
	<input type="checkbox"/> intermediate cuneiform bone	
	<input type="checkbox"/> lateral cuneiform bone	
	<input type="checkbox"/> cuboid bone	
<b>METATARSAL BONES</b>	<b>I through V</b>	
<b>PHALANGES</b>	<input type="checkbox"/> proximal phalanx	
	<input type="checkbox"/> middle phalanx	
	<input type="checkbox"/> distal phalanx	
	<input type="checkbox"/> hallux (has no middle phalanx)	

# Activity 4

## STUDY AIDS FOR APPENDICULAR SKELETON

Helpful bone marking terms used in Appendicular Skeleton

ANATOMICAL TERMS	DESCRIPTION
<b>acetabulum</b>	small receptacle, vinegar cup
<b>acromion</b>	summit of the shoulder, tip of the shoulder
<b>anatomical neck</b>	area between the head and greater/lesser tubercles of humerus
<b>calcaneus</b>	heel
<b>capitate</b>	having a caput (head)
<b>capitulum</b>	head
<b>clavicle</b>	key (old Roman keys were S-shaped)
<b>conoid</b>	resembling a cone, cone-shaped
<b>coracoid</b>	like a crow's beak
<b>cuboid</b>	cube-shaped
<b>cuneiform</b>	wedge-shaped
<b>deltoid</b>	Greek delta letter, triangular shape
<b>femur</b>	thigh
<b>fibula</b>	a clasp, as in a safety pin
<b>fovea</b>	a pit
<b>glenoid</b>	socket-shaped
<b>hamate</b>	hooked
<b>ilium</b>	bone of the groin or flank
<b>ischium</b>	socket, contributes to most of the acetabulum
<b>linea aspera</b>	rough line
<b>lunate</b>	moon-shaped
<b>malleolus</b>	hammer
<b>navicular</b>	little ship
<b>obturator</b>	a structure which closes a hole
<b>olecranon</b>	upper end of the ulna
<b>os coxae</b>	os=bone, coxae= hip, the hip bone
<b>patella</b>	a small pan
<b>phalanx</b> (pl., <i>phalanges</i> )	row of soldiers
<b>pisiform</b>	pea-shaped
<b>scaphoid</b>	boat-shaped
<b>scapula</b>	resembling a spade
<b>sciatic</b>	pertaining to the hips
<b>spinous</b>	sharp process
<b>surgical neck</b>	region distal to the tubercles and continuous with shaft of humerus
<b>talus</b>	ankle-bone
<b>tibia</b>	the shin-bone; flute-shaped
<b>trapezium</b>	a quadrilateral with two sides parallel
<b>trapezoid</b>	resembling a trapezium
<b>triquetrum</b>	three-cornered