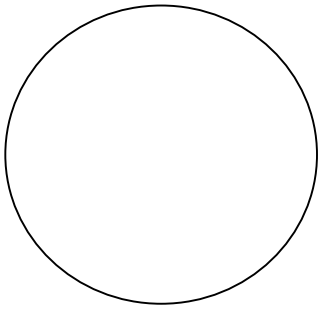
Labs 6, 7, 8: Skeletal System

Unit 6: Skeletal System: Bone tissue, Bones and Joints (p. 105-152)

Ex. 6-1: Histology of Osseous Tissue, p. 113

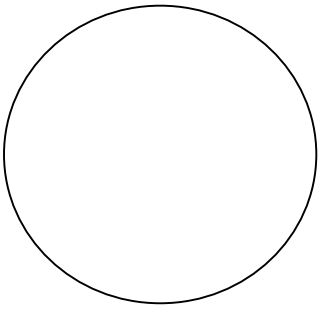
Model: Osteon
Lamella
Osteocyte
Lacunae
Canaliculi
Central canal

Slides: Ground Bone



Osteon
Lamella
Osteocyte
Lacunae
Canaliculi
Central canal

Cartilage (Monkey trachea)



Chondrocyte
Lacunae
Matrix

Ex. 6-2: Bone Shapes, Procedure 2: Anatomy of Long Bone, p. 115

Compact bone
Spongy (cancellous) bone
Diaphysis
Epiphysis

	Component Removed	Component Remaining	Characteristics
Bones in Acid			
Baked Bones			

Exercise 6-3: The Skull, p. 118

Adult Skull

Bony orbit (**FLEZMS**)

Frontal bone
- supraorbital foramen
- frontal sinus

Lacrimal bone

Ethmoid bone
- perpendicular plate of ethmoid
- middle nasal conchae
- cribriform plate
- crista galli

Zygomatic bone

Maxillary bone
- infraorbital foramen
- palatine process of maxilla

Sphenoid bone
- lesser wing and greater wing
- optic foramen (canal)
- sella turcica
- sphenoid sinus

Mandible
- mental foramen
- mental protuberance
- mandibular condyle

Palatine bone

Nasal bone

Vomer

Inferior nasal conchae

Parietal bone

Temporal bone
- zygomatic process of temporal
- mandibular fossa
- styloid process
- mastoid process
- external acoustic meatus
- petrous ridge
- internal acoustic meatus
- carotid canal
- jugular foramen

Occipital bone
- foramen magnum
- occipital condyle
- external occipital protuberance

Sutures
- coronal suture
- squamous suture
- lambdoid suture
- sagittal suture

Fetal Skull
- anterior fontanel
- posterior fontanel
- anterolateral (sphenoidal) fontanel
- posterolateral (mastoid) fontanel

Exercise 6-4: Remainder of the Skeleton, p. 127

Remainder of Axial Skeleton:

Hyoid bone

Typical vertebra (know on all vertebrae):
- body
- vertebral (spinal) foramen
- transverse process
- spinous process
- superior articular surface
- inferior articular surface
- lamina
- pedicle

Cervical vertebrae:
- C1 (atlas)
- C2 (axis)
  - dens (odontoid process)
- transverse foramen
- transverse process

Thoracic vertebrae:
- costal facets – locate 2 places
  - transverse costal facet [rib facet]
    - on transverse process (for tubercle of rib)
  - superior costal facet [demifacet]
    – on side of body (for head of rib)

Lumbar vertebrae:
- superior articular surface
- inferior articular surface

Sacrum
- sacral promontory
- sacral foramina

Coccyx

Ribs - true, false (vertebrochondral & floating)
- head
- tubercle
- shaft

Sternum (manubrium, body, xiphoid process)

Appendicular Skeleton:

- Clavicle
  - sternal (medial) end
  - acromial (lateral) end

- Scapula
  - acromion
  - coracoid process
  - glenoid cavity
  - lateral (axillary) margin
  - subscapular fossa
  - medial (vertebral) margin
  - supraspinous fossa
  - spine of scapula
  - infraspinous fossa

- Humerus
  - greater tubercle
  - lesser tubercle
  - head
  - anatomical neck
  - surgical neck
  - deltoid tuberosity
  - capitulum
  - trochlea
  - coronoid fossa
  - olecranon fossa

- Radius
  - head
  - neck
  - radial tuberosity
  - styloid process

- Ulna
  - coronoid process
  - olecranon process
  - trochlear (semilunar) notch
  - radial notch
  - styloid process

Wrist and Hand
- carpals
- metacarpals
- phalanges

Coxal bones (os coxae)
- Ilium
  - iliac crest, anterior superior iliac spine (ASIS)
- ischium
  - ischial tuberosity, ischial spine
- pubis
  - symphysis pubis
- sacrum articulating surface (sacroiliac joint)
- acetabulum
- obturator foramen
- greater sciatic notch

Femur
- head
- neck
- greater trochanter
- lesser trochanter
- linea aspera
- patellar surface
- medial condyle
- lateral condyle

Patella

Fibula
- head
- lateral malleolus

Tibia
- lateral condyle
- medial condyle
- tibial tuberosity
- medial malleolus

Foot
- tarsals - talus, calcaneus
- metatarsals
- phalanges

Skeletal System - Relationships

You will find it more interesting and significant to study the following list of relationships after you become familiar with the skeleton. Your lab instructor will help explain many of them while helping you with the skeleton. Please inquire about any that you do not understand.

Acromion - easily palpated as bone of the shoulder.

Anterior superior iliac spine - important radiologic landmark; origin of sartorius muscle.

Atlas - 1st cervical vertebrae, has no body.

Bony Orbit of Eye - FLEZMS: frontal, lacrimal, ethmoid, zygomatic, maxillary, sphenoid (and palatine)

Cribriform plate - also known as horizontal plate of ethmoid.

Crista galli - serves as attachment for meninges.

Deltoid tuberosity - insertion point for the deltoid muscle

Fontanels - where cranial bones of fetus or infant have not yet met; allows skull to change shape during parturition.

Foramen magnum - for passage of spinal cord.

Groove for radial nerve - where radial nerve passes on lateral side of humerus.

Groove for ulnar nerve - where ulnar nerve passes dorsal to elbow ("funny bone")

Hard palate - composed of palatine bone and palatine process of maxilla.

Intervertebral discs - discs of fibrocartilage between bodies of vertebrae.

Intervertebral foramina - openings for passage of spinal nerves.

Ischial spines - of obstetrical significance; too large in males to permit childbirth.

Ischial tuberosities - the part you sit on.

Jugular (suprasternal) notch - palpate as depression at superior end of sternum, sternal ends of clavicles.

Lacrimal fossa - location of nasolacrimal duct.

Mental foramen - for passage of nerves and blood vessels.

Nasal septum - composed of vomer, perpendicular plate of ethmoid, septal cartilage, and parts of palatine and maxillae.

Occipital condyles - articulate with the atlas.

Odontoid process - or Dens, peglike process which allows atlas to pivot on it.

Olecranon process - easily palpated as tip of elbow.

Olfactory foramina - for passage of olfactory nerves through cribriform plate.

Optic foramen - for passage of optic nerve.

Paranasal sinuses - ethmoid, maxillary, sphenoid, and frontal sinuses all drain into nasal cavity.

Radial tuberosity - point of attachment for biceps muscle (located on radius).

Sacral promontory - most anterior part of sacrum, obstetrical landmark.

Sacrum - made up of 5 fused bones.

Sella turcica - location of the pituitary gland.

Spina bifida - congenital condition in which laminae of vertebrae fail to close thus leaving the spinal cord exposed.

Tibial tuberosity - insertion point of Quadriceps femoris muscle.

Transverse foramina - openings in cervical vertebrae for vertebral arteries.

Zygomatic arch - composed of zygomatic and temporal bones.

Joint Models :

Shoulder

Elbow

Hip

Knee

Bio 103: Computer Exercise – Anatomy & Physiology Revealed (APR)

Skeletal System

A. See Lab Instructor to sign logbook for use of laptop and cd in the lab room.

B. Insert Anatomy & Physiology Revealed (APR) cd into cd drive and allow it to autoplay.

C. View Home Screen. Take one or more of the tours (select bottom right) to Familiarize yourself with the navigational tools:
Dissection – "melt-away" layers of dissection to reveal individual structures
Animation – view animations of anatomical structures and systems
Imaging – correlate dissected anatomy with radiologic images
Self-test – gauge proficiency with timed self-tests

Part I. Skull

i. Select System → **Skeleta**l. Select **Dissection** (scalpel icon) → Select Topic → **Head and Neck.** Select View → **Lateral**. Click the green **GO** button.

Review the following under **"Structure Group".** Study the unique feature under each group.

- Frontal
- Parietal
- Temporal
- Zygomatic
- Mandible

*More specific structures can be found under the second drop-down menu "Select Structure".

ii. Select **Change Topic/View** → **Head and Neck**. Select View → **Anterior**. Click the green **GO** button.

Review the following under **"Structure Group".** Study the unique features under each group.

- Ethmoid
- Maxilla
- Nasal
- Vomer

Select **Change Topic/View** → **Skull-Cranial Cavity**. Click the green **GO** button.

Review the following under **"Structure Group".** Study the unique features under each group.

- Cribriform plate
- Crista galli
- Foramen magnum
- Body / Greater & Lesser Wings of Sphenoid

Answer the following questions:

1. What is the only movable joint in the skull? _____

2. Which bones form the only movable joint in the skull? _____
(Be Specific)

3. Which bone contains the foramen magnum? _____

4. What structure passes through this opening? _____

5. Name the six bones that form the orbit of the eye:

_____ _____
_____ _____
_____ _____

Select **Animation** menu. Select **Skull**. Click the **Play** button.
<u>After viewing the animation, answer the following questions:</u>

1. What is the function of foramina? _____

2. Olfactory nerves pass through what structure?_____

Part II. Vertebrae, Ribs, Sternum

i. Select **Dissection** (scalpel icon) → Select Change Topic/View → **Thorax:Anterior.** Click the green **GO** button.

ii. Review the following under **"Structure Group".** Study the unique features under each group.
- Clavicle
- Sternum
- Vertebral Column
- Ribs

iii. <u>Answer the following questions:</u> (use definitions supplied by your lab manual)
1. Which ribs are called "true ribs"? _____
2. Which ribs are called "false ribs"? _____
3. Which ribs are called "floating ribs"? _____
   Why? _____

Part IV. Upper Appendicular

i. Select **Dissection** (scalpel icon) → Select Change Topic/View → **Scapula / Humerus / Radius and Ulna.** Click the green **GO** button.

ii. Review the following under **"Structure Group".** Study the unique features under each group.
- Scapula
- Humerus
- Radius
- Ulna

iii. Answer the following questions:

1. What part of the scapula articulates with the head of the humerus?

   _____

2. What part of the humerus is a common site of fractures?

   _____

3. The projection of the wrist, along the thumb side of the arm, is what structure?

   _____

Part V. Lower Appendicular

i. Select **Dissection** (scalpel icon) → Select Change Topic/View → **Hip and Thigh/Anterior**. Click the green **Go** button.

ii. Review the following under **"Structure Group".** Study the unique features under each group.

- Hip Bone (os coxa)
- Femur

iii. Select **Dissection** (scalpel icon) → Select Change Topic/View → **Tibia and Fibula/Anterior**. Click the green **GO** button.

iv. Review the following under **"Structure Group".** Study the unique features under each group.

- Tibia
- Fibula

v. Answer the following questions:

1. Name the part of the os coxa which provides attachment of back, thigh, and abdominal wall muscles; as well as serves as a landmark for intramuscular injections.

   _____

2. The lateral projection of the ankle is formed by which structure?

   _____

   What bone has this structure? _____

3. The "shin" is the common name for which bone? _____

   Close program.
   Remove CD & put in case before shutting down computer, shut down computer, and return hardware and software to your lab instructor.