

Anatomy Lab: The skeletal system

Part I: Vertebrae and Thoracic cage

Spine (Vertebrae)

Body

Vertebral arch

Vertebral canal

Pedicle

Lamina

Spinous process

Transverse process

Sup. articular facets

Inf. articular facets

Sup. vertebral notch

Inf. vertebral notch

Intervertebral foramen

Cervical vertebrae: 7

Typical (C3-C6)

 Transverse foramen

C1, Atlas

C2, Axis: dens

C7

Thoracic vertebrae: 12

Typical (T2-T10)

T1

T11, 12

Lumbar vertebrae: 5

Typical (L1-4)

Sacrum: 5

Ala

Anterior sacral foramina

Posterior sacral foramina

Sacral canal

Sacral hiatus
promontory
median sacral crest
intermediate crest
lateral crest

Coccyx

Horns
Transverse process

Thoracic cages

Ribs: 12 pairs

Typical ribs (R3-R10):

Head, 2 facets
intermediate crest
neck
tubercle
angle
costal cartilage
costal groove

R1

R2

R11,12

Sternum

Manubrium of sternum
 Clavicular notch for sternoclavicular joint
body
xiphoid process

Part II: Skull and Facial skeleton

Skull

Cranial skeleton, Calvaria (neurocranium)

Facial skeleton (viscerocranium)

Overview: identify the margin of each bone

Cranial skeleton

1. Lateral view

Frontal

Temporal

Parietal

Occipital

2. Cranial base

midline: Ethmoid, Sphenoid, Occipital

bilateral: Temporal

Viscerocranium

1. Anterior view

Ethmoid, Vomer, Mandible

Maxilla, Zygoma, Nasal, Lacrimal, Inferior nasal conchae, Palatine

2. Inferior view

Palatine, Maxilla, Zygoma

Sutures: external view vs. internal view

Coronal suture

Sagittal suture

Lambdoid suture

External appearance of skull

Posterior view

external occipital protuberance (inion)

external occipital crest

superior nuchal line

inferior nuchal line

Lateral view

Frankfurt plane (anatomical position, OrbitoMeatal line)

ext. acoustic meatus

level of orbit floor
superior temporal line
inferior temporal line
external acoustic meatus, mastoid process
level of anterior, middle, and posterior cranial fossae (lateral view vs. inner view)

Anterior view

Frontal bone

Frontal bone
Superciliary arch
Glabella
Supraorbital foramen (supra-orbital notch)
Zygomatic process (of frontal bone)

Zygoma (zygomatic bone)

Frontal process (of maxilla)
Frontal process (of zygoma)

Bones in the nose

Zygomatic bone
Nasion
Frontal process of zygoma and maxilla
Piriform aperture
Nasal septum (bony part)
Inferior nasal conchae

Maxilla

Zygomatic process
Infraorbital foramen
Alveolar process

Lateral view

Lateral portion of the calvaria

Coronal suture
Lambdoid suture
Greater wing of sphenoid bone
Pterion

Temporal bone

Squamous part

Zygomatic process; Zygomatic arch

Tympanic part

External acoustic meatus

Mastoid part

Mastoid process

Styloid process

Petrous part,

Posterior view

Occipital bone

Squamous part of occipital bone

External occipital protuberance

Superior nuchal lines

inion

Inferior nuchal lines

External occipital crest

Superior view

Bregma

Lambda

Inferior view

Anterior part

Alveolar process

Hard palate

Palatine process

Horizontal plates

Palatine bone

Intermaxillary suture

Incisive fossa/foramen

Incisive canals

Greater palatine foramina

Lesser palatine foramina

Middle part

Anterior half

Vomer

Sphenoid: Body, Greater wing, Lesser wings

Body

Pterygoid process

Medial plate

Lateral plate

Pterygoid fossa

Pterygoid hamulus

Posterior half

Occipital bone

Basilar part; Lateral parts; Squamous part

Foramen magnum

Pharyngeal tubercle

Temporal bone

Carotid canal

Pharyngotympanic tube (auditory tube) [bony part]

Mandibular fossa

Articular tubercle

Posterior part

Occipital bone

Occipital condyles

Hypoglossal canal

Jugular foramen

Temporal bone

Mastoid part

Styloid process

Stylomastoid foramen

Cranial cavity

Roof

Frontal crest

Groove for the superior sagittal sinus

Floor

Anterior cranial fossa

Ethmoid

Crista galli

Cribriform plate

Orbital part

Lesser wing of the sphenoid bone

Anterior clinoid process

Optic canal

Middle cranial fossa

Sphenoid bone

Sella turcica

Hypophyseal fossa

Tuberculum sellae

Middle clinoid process

Dorsum sellae

Posterior clinoid process

Fissure, Foramen, Groove

Superior orbital fissure

Foramen rotundum

Foramen ovale

Carotid canal

Groove for middle meningeal artery

Posterior cranial fossa

Clivus

Foramen magnum

Internal acoustic meatus

Hypoglossal canal

Squamous part of the occipital bone

Individual bones

Temporal bone

Squamous part

Zygomatic process [+ temporal process of zygomatic bone] = Zygomatic arch

Mandibular fossa + condylar process of the mandible = temporomandibular joint

Mastoid portion: Mastoid process

Petrous part

Internal acoustic meatus.

Stylomastoid foramen

Carotid canal

Jugular foramen

Tympanic part

External acoustic meatus

Styloid process

Sphenoid bone

Body

Sella turcica: Hypophyseal fossa

[Sphenoid sinus]

Lesser wing: Optic canal

Greater wing

Superior orbital fissure

Foramen rotundum

Foramen ovale

Foramen spinosum

Pterygoid process

Lateral pterygoid plate

Medial pterygoid plate

Ethmoid bone

Cribriform plate: Crista galli

Perpendicular plate

Superior nasal concha

Middle nasal concha

Facial skeleton

Maxilla

Body

Maxillary sinus

Infraorbital groove, Infraorbital canal, Infraorbital foramen

Processes

Frontal process

Zygomatic process

Palatine process (anterior $\frac{3}{4}$ hard palate)

Alveolar process
Inferior nasal conchae

Zygomatic bone (Zygoma)

Maxillary process
Frontal process
Temporal process

Palatine bone

Horizontal plate (hard plate)

Vomer: nasal septum

Nasal bone

Lacrimal bone

Mandible

Body

Ramus

Angle

Alveolar process

Oblique line

Condylar process

Coronoid process

Mandibular foramen, Mandibular canal, Mental foramen

Lingula

Mylohyoid groove, Mylohyoid line

Part III: Bones of Upper limb

Shoulder girdle: clavicle, humerus, scapula

Clavicle

Conoid tubercle

Trapezoid line

Scapula

Angle: lateral, superior, inferior

Border: superior, lateral, media

Surface: costal, posterior

Process: acromion, spine, coronoid process

Glenoid cavity

 Infraglenoid tubercle

 Supraglenoid tubercle

Spine

 Supraspinous fossa

 Infraspinous fossa

Acromion

Greater scapular notch (spinoglenoid notch)

Costal surface

 Subscapular fossa

Coracoid process

Suprascapular notch

Humerus

Head

Anatomical neck vs. Surgical neck

Greater tubercle

Lesser tubercle

Intertubercular sulcus (bicipital groove)

Deltoid tuberosity

Shaft

 Anterior border, Lateral border, Medial border

 [Anterolateral, Anteromedial, Posterior surfaces]

Deltoid tuberosity

Radial groove

Lateral supraepicondylar ridge (lateral supracondylar ridge)

Medial supraepicondylar ridge (medial supracondylar ridge)

Condyle

Capitulum

Trochlea

Epicondyle

Medial epicondyle

Lateral epicondyle

Fossa

Radial fossa

Coronoid fossa

Olecranon fossa

Radius

Head

Neck

Radial tuberosity

Shaft

[Anterior border; Posterior border; Interosseous border]

[Posterior surface; Dorsal tubercle; Lateral surface]

Radial styloid process

Ulnar notch

Ulna

Olecranon

Coronoid process

Trochlear notch

Radial notch

Supinator crest

Tuberosity of ulna

Shaft

[Anterior border; Posterior border; Interosseous border]

[Anterior surface; Medial surface; Posterior surface]

Ulnar styloid process

Bones of hand

Carpal bones

Metacarpals (1 to 5)

Phalanges

Carpal bones

Proximal row

Scaphoid

Lunate

Triquetrum

Pisiform

Distal row

Trapezium

Trapezoid

Capitate

Hamate, Hook of hamate

Carpal arch

Metacarpals

Base

Shaft (body)

Head

Phalanges

Proximal, middle, distal phalanx

Base

Shaft (body)

Head

Part IV: Bones of Lower limb

Hip bones

ilium

pubis

ischium

Ilium

Arcuate line

Iliac fossa

Anterior superior iliac spine

Posterior superior iliac spine

Iliac tuberosity

Anterior inferior iliac spine

posterior inferior iliac spine

Iliac crest

Tubercle of the crest

Iliopubic eminence

Inferior gluteal line

Anterior gluteal line

Posterior gluteal line

Pubis

Body

Pubic symphysis

Pubic tubercle

Superior pubic ramus

Pectineal line (pectin pubis)

Pubic crest

Inferior pubic ramus

Ischium

Ischial spine

Ischial tuberosity

Pelvis

Acetabulum

Obturator foramen, Obturator membrane, Obturator canal

Greater sciatic notch

Lesser sciatic notch

Acetabular notch

Acetabular fossa

Femur

Head: Fovea

Neck

Shaft

Greater trochanter

Lesser trochanter

Trochanteric fossa

Intertrochanteric line

Pectineal line

Linea aspera

Intertrochanteric crest

Quadrangle tubercle

Medial and lateral supracondylar lines

Adductor tubercle

Medial condyle

Condyle fossa

Lateral condyle

Medial epicondyle

Patella

Tibia

Medial condyle

Lateral condyle

Tibial condyles and intercondylar areas

Medial intercondylar tubercle

Lateral intercondylar tubercle

Intercondylar eminence

Tibial tuberosity

Shaft

[Anterior border; Interosseous border; Posterior border]

[Medial surface; Posterior surface; Lateral surface]

Soleal line

Medial malleolus

Fibular notch

Fibula

Head

Neck

Shaft

[Anterior border; Posterior border; Interosseous border]

[Medial surface; Lateral surface; Posterior surface]

Lateral malleolus

Malleolar fossa

Bones of the foot

Tarsal bones

Proximal group

Talus

Calcaneus

Intermediate tarsal bone

Navicular

Distal group

Cuboid

Cuneiforms-lateral, intermediate, medial

Metatarsals (1 to 5)

Phalanges

Talus

Calcaneus

Calcaneal tuberosity

Metatarsals

Head

Shaft

Base

Phalanges

Phalanx: Proximal, Middle, Distal

Base

Shaft

Head

Reference videos from **youtube**

Bones

Tutorials from **TheAnatomyZone** (animation)

Spine tutorial (1) - Vertebral Column

<http://www.youtube.com/watch?v=NAd9g5nUurE>

Skull tutorial (1) - Bones of the Calvaria

<http://www.youtube.com/watch?v=9I0t9N-GIRM&list=PL50C3BA936CECC303>

Scapula and Clavicle - Shoulder Girdle

<http://www.youtube.com/watch?v=5bneylG3w10&list=PL78D995229606FDE1>

Bones of the Pelvis - Hip Bones

<http://www.youtube.com/watch?v=3v5AsAESg1Q>

Osteology of the Skull 9 Sphenoid Bone

http://www.youtube.com/watch?v=AL8kbjtm_n0