

Chapter 14 Skeletal Nomenclature

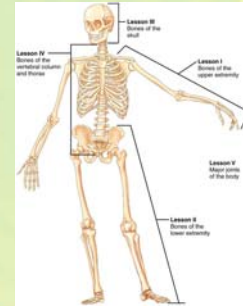
Susan G. Salvo

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Introduction

- Bones help locate muscles
- Can also be areas to avoid
- Chapter divided into 5 lessons covering bones, bony markings, and joints



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Lesson One: Bones of the Upper Extremity

- Clavicle
- Scapula
- Humerus
- Ulna
- Radius
- Carpals
- Metacarpals
- Phalanges

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Shoulder Girdle: Clavicle

- Acts as brace to hold arm away from top of thorax
- Has a sternal (medial) and acromial (lateral) end
- Most commonly fractured bone
- When broken, entire shoulder region caves in medially

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Shoulder Girdle: Scapula

- Triangular bone located between second and seventh ribs
- Floats against posterior aspect of rib cage
- Articulates with clavicle and humerus at shoulder

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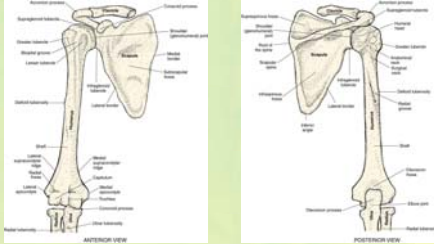
Scapula: Bony Markings

- Medial (vertebral) border
- Lateral (axillary) border
- Superior angle
- Inferior angle
- Scapular spine
- Root of spine
- Acromion process
- Coracoid process
- Supraglenoid tubercle
- Infraglenoid tubercle
- Glenoid fossa
- Supraspinous fossa
- Infraspinous fossa
- Subscapular fossa

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Shoulder Girdle & Arm



- Anterior view
- Posterior view

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Shoulder Girdle & Arm



- Lateral view

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Arm: Humerus

- Also called funny bone or crazy bone
- Proximal end of humerus articulates with scapula at shoulder
- Distal end articulates with radius and ulna at the elbow

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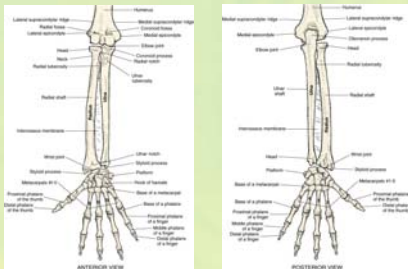
Humerus: Bony Markings

- | | |
|--------------------------------------|--------------------------|
| • Humeral head | • Olecranon fossa |
| • Surgical neck | • Coronoid fossa |
| • Humeral shaft | • Capitulum |
| • Greater tubercle | • Trochlea |
| • Lesser tubercle | • Medial epicondyle |
| • Intertubercular (bicipital) groove | • Lateral epicondyle |
| • Deltoid tuberosity | • Supracondylar ridge |
| • Radial fossa | • Anatomical neck |
| | • Radial (spiral) groove |

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Arm: Right Ulna, Radius, and Hand



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Forearm: Ulna and Radius

- Ulna is located on medial side of the forearm
 - It articulates with the humerus at its proximal end and with a carpal bone at its distal end
- Radius is lateral forearm bone; rotates over the ulna during pronation and supination
 - It articulates with the humerus and ulna at its proximal end and with carpal bones at its distal end

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Ulna: Bony Marking

- Olecranon process
- Trochlear (semilunar) notch
- Radial notch
- Ulnar shaft
- Ulnar tuberosity
- Coronoid process
- Ulnar head
- Styloid process

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Radius: Bony Marking

- Radial head
- Radial neck
- Radial shaft
- Radial (bicipital) tuberosity
- Ulnar notch
- Styloid process

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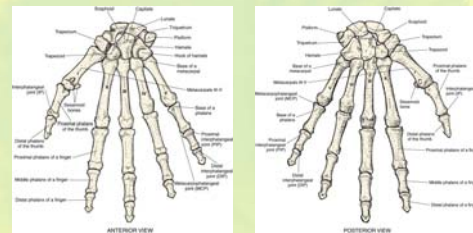
Wrists and Hand

- Each wrist and hand contains multiple joints and 29 bones:
 - Distal ends of radius and ulna (2)
 - Carpals (8): two rows of four bones
 - Metacarpals (5): distal ends form knuckles and number I through V
 - Phalanges (14): each finger has three, each thumb has two

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Wrist and Hand



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Carpals

- | | |
|--------------|-------------|
| • Scaphoid | • Trapezium |
| • Lunate | • Trapezoid |
| • Triquetrum | • Capitate |
| • Pisiform | • Hamate |

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Lesson Two: Bones of the Lower Extremity

- | | |
|-----------|---------------|
| • Ilium | • Tibia |
| • Ischium | • Fibula |
| • Pubis | • Tarsals |
| • Femur | • Metatarsals |
| • Patella | • Phalanges |

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Pelvic Girdle

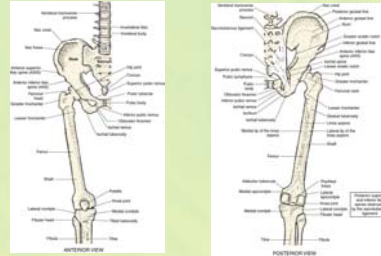
CE27

- Pelvic girdle also known as os coxa, coxal bones, hip bones, or innominate bones
- Each bone made up of three fused embryonic bones: ilium, ischium, and pubis
- Acetabulum: provides a deep socket for the femoral head
- Obturator foramen: foramen located inferior to the acetabulum

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Pelvic Girdle



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Ilium: Bony Markings

- Iliac crest
- Iliac fossa
- Anterior superior iliac spine (ASIS)
- Anterior inferior iliac spine (AIIS)
- Posterior superior iliac spine (PSIS)
- Posterior inferior iliac spine (PIIS)
- Anterior gluteal line
- Posterior gluteal line
- Greater sciatic notch

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Ischium: Bony Markings

- Ischial tuberosity
- Ischial spine
- Ischial ramus
- Lesser sciatic notch

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Pubis: Bony Markings

- Superior pubic ramus
- Inferior pubic ramus
- Pubic tubercle
- Pubic body
- Pubic symphysis

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Thigh: Femur and Patella

- Femur is longest, heaviest, and strongest bone in the body
- Curved ball at proximal end, two curved balls at distal end
- Articulates proximally with the acetabulum, distally with patella and tibia
- Patella (kneecap) is largest sesamoid bone; articulates with distal end of femur and is not involved with the knee joint

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Slide 19

CE27 new art, figure 14-7B, p. 349
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Femur: Bony Markings

- Femoral head
- Femoral neck
- Femoral shaft
- Greater trochanter
- Lesser trochanter
- Gluteal tuberosity
- Linea aspera
- Adductor tubercle
- Medial condyle
- Lateral condyle
- Medial epicondyle
- Lateral epicondyle
- Popliteal fossa

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Leg: Tibia and Fibula

- Tibia is most stout and straight long bone in body
- Tibia located on medial side of leg
- Fibula located on lateral side of leg
- Fibula is smaller in diameter than tibia

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Tibia: Bony Markings

- Tibial plateau
- Tibial shaft
- Anterior crest
- Tibial (patellar) tuberosity
- Soleal line
- Medial malleolus
- Medial condyle
- Lateral condyle

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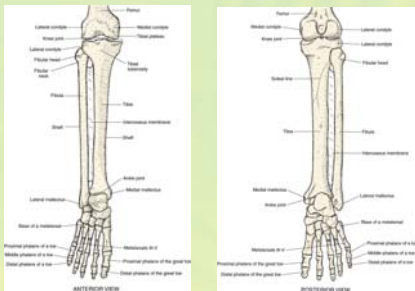
Fibula: Bony Markings

- Fibular head
- Fibular neck
- Fibular shaft
- Lateral malleolus

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Leg: Tibia and Fibula



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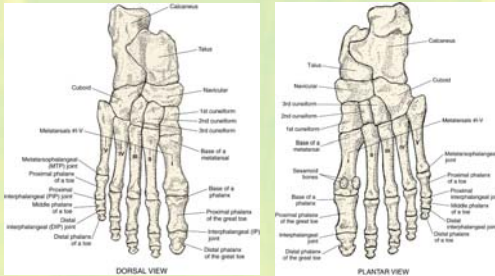
Ankle & Foot

- Contains numerous joints and 28 bones
- Distal ends of tibia & fibula (2)
- Tarsals (7): slide slightly over adjacent bones to provide motion
- Metatarsals (5): "knuckles" of toes formed by heads of metatarsals; number I-V
- Phalanges (14): each toe has three, except for big toe, which has two

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Ankle & Foot



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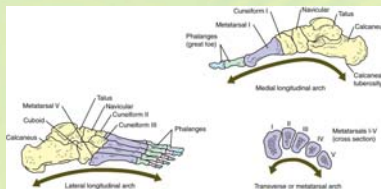
Tarsals

- Talus
- Cuneiforms: I (medial), II (intermediate), III (lateral)
- Navicular
- Cuboid
- Calcaneus

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Arches of Right Foot



- Arches of the right foot

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Lesson Three: Bones of the Skull

- Frontal
- Parietal
- Temporal
- Ethmoid
- Sphenoid
- Occipital
- Hyoid
- Nasal
- Vomer
- Zygomatic
- Lacrimal
- Inferior nasal concha
- Palatine
- Maxilla
- Mandible

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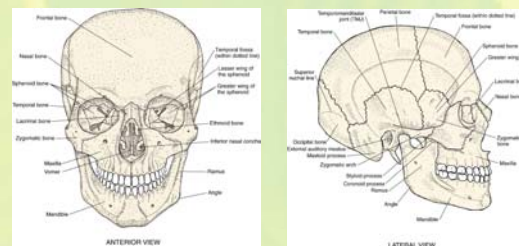
Cranial Bones

- Cranial vault:
 - Contains 8 bones
 - Protects brain and related nerves
 - Provides bony passageway for organs of sight, taste, hearing, and smell
 - Except for jaw, all skull bones are joined by sutures

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Cranial Bones

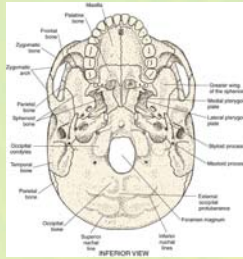


- Anterior view
- Lateral view

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Cranial Bones



- Inferior view

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Cranial Sutures

- Sagittal suture: between the two parietal bones
- Coronal suture: between the frontal bone and the parietal bones
- Lambdoidal suture: between the parietal bones and the occipital bone
- Squamosal suture: between the parietal bones and temporal bones

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Cranial and Facial Bony Markings

- Temporal bones: styloid and mastoid processes
- Occipital bone: foramen magnum, superior and inferior nuchal lines, external occipital protuberance, occipital condyles
- Sphenoid bone: sella turcica
- Mandible: mandibular ramus and angle, coronoid and condylar processes

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Hyoid

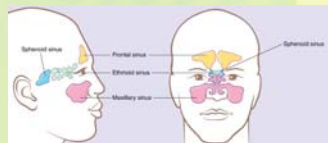
- Shaped like miniature mandible
- Found at level of C3
- Does not articulate directly with any other bone
- Suspended from styloid process of temporal bone by ligaments
- Serves as support for tongue

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Sinuses

- Function as air-containing spaces in skull and face
- Serve to lighten the head, provide mucus, and act as resonance chambers for sound
- Named for the bones where they are located



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Lesson Four: Bones of the Thorax and Vertebral Column

- Sternum
- Ribs
- Vertebrae

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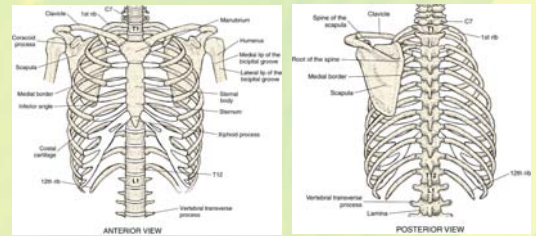
Thorax: Sternum & Ribs

- Sternum
 - Also known as breastbone
 - Forms anterior chest wall
 - Formed of three fused bones: manubrium, sternal body, and xiphoid process
- Ribs
 - Consist of 24 individual bones (12 pairs)
 - True ribs (7 pairs), false ribs (3 pairs), floating ribs (2 pairs)

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Thorax: Sternum & Ribs



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Vertebral Column

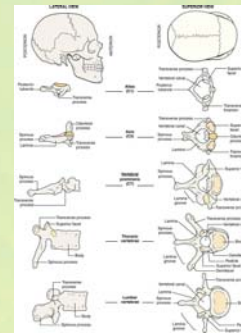
- Consists of 26 bones in adults, 33–34 in embryo
- Allows us to bend forward and backward, lean sideways, twist, and rotate
- S-shaped curve of spine is required for functional upright posture



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Vertebral Column

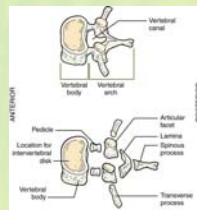


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Parts of a Typical Vertebra

- 2 main regions
 - Vertebral body
 - Arch
- Each vertebra varies only in location, shape, and size



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Vertebral Components

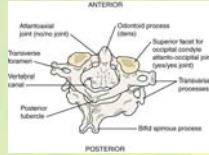
- Vertebral body
- Pedicle
- Transverse processes
- Lamina
- Spinous process
- Intervertebral disks
- Vertebral canal
- Articular facet (superior and inferior)
- Intervertebral foramen

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Atypical Vertebrae

- C1 (atlas): no body, pedicles, or laminae
- C2 (axis): thick, strongly bifurcated spinous process; contains odontoid process or dens
- C7 (vertebral prominens): long spinous process projects posteriorly



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Atypical Vertebrae

- T1–T12 (demifacets): located on body and transverse processes of thoracic vertebrae
- L1–L5: large lumbar vertebrae with a spinous process and short, thick transverse processes

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Lesson Five: Major Joints of the Body

- Shape of joint affects how it functions
- The more secure the joint, the more stable it is, but the less mobile it is



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Major Joints Types

- Ball and socket
- Hinge
- Pivot
- Saddle
- Ellipsoidal
- Gliding

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Lesson Five: Major Joints of the Body

- Ball and Socket
 - Glenohumeral
 - Iliofemoral
- Hinge
 - Temporomandibular
 - Humeroulnar and humeroradial
 - Tibiofemoral
 - Talocrural
 - Interphalangeal (proximal and distal)

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Major Joints of the Body

- Pivot
 - Atlantoaxial
 - Radioulnar (proximal and distal)
- Ellipsoidal
 - Temporomandibular
 - Radiocarpal
 - Metacarpophalangeal
 - Metatarsophalangeal
- Saddle
 - Carpometacarpal joint of the thumb

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Major Joints of the Body

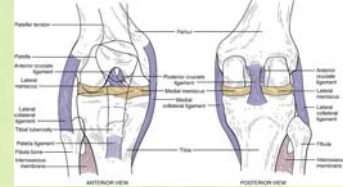
- Gliding
 - Intervertebral facet
 - Atlantooccipital
 - Temporomandibular
 - Acromioclavicular
 - Sternoclavicular
 - Intercarpal
 - Carpometacarpal
- Gliding, cont.
 - Sacroiliac
 - Lumbosacral facet
 - Patellofemoral
 - Tarsometatarsal
 - Intertarsal
 - Tibiofibular (proximal)
 - Costovertebral

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Knee Joint

- Has both an internal and external ligament system
- Supports static stabilization



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Summary

- Skeletal nomenclature is studied before the muscular system because bony markings provide a “road map” to the muscles
- Bones can be categorized by region
- Bones can be described by name, location, joint involvement, and important bony markings

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