CHAPTER 7-SKELTON FILL-IN NOTES

2 Axial skeleton: skull, vertebral column, thoracic cage

3 Fig. 7.1 pg. 199

4 I. Skull: two parts
A. Cranium: Encloses and protects the brain - 8 bones
B. Facial bones: 14 bones

Cranium
A. Frontal – Forehead (brain) Anterior part of the cranium forming the superior eye orbits then horizontal to form roof of eye and the floor of anterior cranial cavity

5 Figs. 7.4 A, Pg. 202

6 Figs. 7.4 b. 5, Pg. 202

7 Fig. 7. 5a, Pgs. 203

8 Fig. 7. 5b, Pg. 203

9 B. Parietal bones (2) bilateral posterior, lateral 2/3 of cranium (brain) fig. 7.5 a
C. Occipital: (brain) posterior/inferior part of the cranium .
D. Temporal: (2) bilateral, inferior to parietals
   1. houses: external auditory meatus (ear canal), middle & internal ear
   2. Zygomaticus: posterior part of zygomatic arch

10 Figures 7.5a; pg 203
12 Sutures: major, “immoveable” serrated joints between previous cranial bones (we’ll get back to remaining 2 skull bones latter)
Sagital sutures: lies in the mid-sagittal plane & separates the left & right parietals

13 Fig. 7.4b; pg. 202

14 B. Coronal suture: lies in coronal plane articulating both anterior parietals with the frontal bone
C. Lamboid suture: posterior skull articulating both posterior parietals with the occipital bone.
D. Squamous suture: articulates inferior border of parietals w/ superior border of the temporal bones.

Cranial bones & sutures: prenatal & newborns Cranial bones cartilagenous [fontanelles] & sutures flexible - child birth

15 fig. 7.5 a pg. 203

16 Last two cranial bones – cranial floor
E. Sphenoid – middle part of cranial floor
1. Weird, bat shaped bone that articulates w/ all the other 7 cranial bones
2. Superior surface contains sella turcica (turk’s saddle) hold the pituitary gland (hypophysis)
3. Forms part of the cranial floor
4. Part of external skull, anterior to temporal bone (greater wing)

17 Fig. 7.6a; pg 205
18 Fig. 7.7a; pg. 206

19 F. Ethmoid bone: another bizarre shaped bone.
1. Location: midline in anterior part of cranial floor medial to orbits
2. Includes the cribiform plate
   a. part of the roof of the nasal cavity
   b. foramina (holes) that carry olfactory nerves (smell) to brain

20 Figure 7.4a; page 202

21 Facial Bones
   A. Mandible – lower jaw bone
      1. Coronoid (l) (crown shaped)“process”
         a. insertion of temporals muscle – closes the jaw
      2. mandibular condyle: articulates with mandibular fossa of temporal bone – forms tempromandibular joint - TMJ.
         a. TMJ syndrome – symptoms from joint dysfunction

22 fig. 7.11 a pg. 210

23 fig. 7.5a pg. 203

24 B. Maxillary bones: upper jaw – 2, fused medially
   1. “Keystone” articulate w/ all other facial bones
       2. part of floor of orbit (eye)
       3. most of hed palate (roof of mouth)
       4. floor of nasal cavity
   C. Zygomatic bone: “Cheek bone” zygoma (L)” bar – lateral wall & floor of orbit (eye socket)
       1. Forms zygomatic arch w/ zygomatic process of temporal bone
28  D. Nasal bones: Thin bones fused medially forming the bridge of the nose.
a. Everything anterior to bridge is hyaline cartilage.
E. Siuses:
1. Hollow, cavities lined with mucous membranes – can become inflamed - allergies
2. Connect with nasal cavities
3. found in – frontal, sphenoid, ethmoid and maxillary bones

29  Figures 7.15 a  page 216

30  Figure: 7.15 b  page 216

31  Hyoid bone:
A. Anchor for the tongue
B. Horseshoe shaped
C. Anchored to styloid processes by thin ligaments

32  Figure 7.12  pg 211

33  Vertebral Column/Spinal Column
Spine 24 Vertebrae, sacrum & coccyx
Three regions
1. Cervical: 7 vertebrae; C1-C7
2. Thoracic: 12 vertebrae; T1-T12
3. Lumbar: 5 Vertebrae; L1- L5
4. Sacrum: 5 fused segments
5. Coccyx: 4 fused segments

3 Spinal Curves: 60 degrees
1. Cervical: forward curve & called a lordosis
2. Thoracic curve: reverse curve - kyphosis
3. Lumbar curve: forward curve – lordosis

34 Fig. 7.16; page 217

35 Fetus and newborns have one, thoracic (kyphotic) curve – 2 other curves develop as child develops and becomes active
Perfect Posture (biomechanical)
Digress
Vertebrae Structure - 2 parts
I. Body - large round thick bone disc
a. Weight is transmitted from body to body
c. Separated by intervertebral disc (“disc”)

36 Fig. 7.17 a; pg 218

37 Fig. 7.17 b; pg 218

38 Fig. 7.18; page 219

39 II. Posterior (neural) arch – posterior to body
A. Pedicles: project posteriorly from the body forming the lamina which meet medially forming the vertebral foramina
B. Transverse foramina: extend laterally for muscle attachment w/ leverage (mechanical advantage)
C. Spinous process: extends posteriorly for muscle attachment w/ leverage
   1. Bumps down one's back

40

41 D. Inferior notch: notch for spinal nerve forming the intervertebral foramen

E. Articular processes:
   1. Have a smooth articular face called facet
   2. Each vertebra has a superior articular process and an inferior articular process
   3. The inferior facet of a vertebrae will articulate (meet) with the superior facet of the vertebra just inferior to it.
   4. Facet joint: Where the facets articulate (meet)

42 Fig. 7.20b; pg. 221

43 III. Vertebral Regions
A. Cervical vertebrae
   1. C1 – Atlas – holds up the skull/head – Superior facets articulate w/ occipital condyles of skull
      a. No body or spinous process. Have anterior/posterior processes
   2. C2 – Axis
      a. Has odontoid/dens, a post that acts as an axle/axis for atlas to rotate on
      b. Majority of cervical rotation between C1 & C2
3. All cervical vertebrae, C1-C7, have transverse foramina for vertebral arteries
   4. Cervical vertebral bodies are small

B. Thoracic Vertebrae T1-T12
   1. Start out looking like cervicals T1 and become more like lumbar at T12
   2. Facets lie in coronal plane – lateral flexion only
   3. Have extra superior demifacets & inferior costal (rib) facets that articulate with ribs

C. Lumbar Vertebrae L1-L5
   1. Largest, strongest vertebrae
   2. Facets lie in sagittal plane forwards & backwards movement only

D. Sacrum S1 – S5 Solid _________ mass
   1. Functional joint between L5 and S1

E. Coccyx - tail bone
   1. _________ segments
   2. Attached to sacrum by ligaments and Can be sprained – coccydinia
   3. Vestigial tail – 1 of 100,000
51 Intervertebral disc – cushion like pad allowing motion between adjacent vertebrae
A. Anulus fibrosa: Fibrocartilage - 3 layers, each w/ fibers running 3 different ways.

B. Nucleus pulposa: gel-like ball in center of disc.
  1. Ball acts as cushion and vertebrae can “rock” in all directions
  2. If Anulus tears, gel starts oozing into tear and can form a bulge.
     a. bulge can press against nerve – pain, numbness, paralysis
     b. prolapse, herniation or “slipped disc” – diagram -?

52 Fig 7.17 c; pg 218

53 Thoracic Cage; Sternum & ribs
A. Sternum – “breastbone” – 3 parts
  1. Manubrium - Badge (l)
     a. medial articulation w/clavicle
  2. Body: main section of sternum – ribs attach to this
  3. Xiphoid process: inferior part of sternum
     a. Heimlich maneuver

54 Figure 7.22a; pg. 224

55 Ribs  12 pair
A. True ribs: 1-7, have hyaline cartilage going directly to sternum
B. False ribs: 8-12, Attach indirectly to the sternum or not at all
C. Floating ribs: 11 & 12, Don’t attach to sternum

56 Figure 7.22a; pg. 224
57 Rib structure
A. Flat, main part called “shaft”
   1. Head: posterior part, articulates with thoracic vertebrae at 2 points
      a. Rib’s superior costal facet articulates with vertebra of same number
      b. Ribs inferior costal facet articulates with vertebra just inferior

58 Fig. 7.23a; pg. 225

59 Appendicular Skeleton
I. Pectoral Girdle (shoulder) - Clavicle anteriorly & scapula posteriorly
A. Clavicle: (l) hook - “S” – shaped
   1. Articulates medially w/ manubrium of sternum and laterally w/ acromian process of scapula
      a. Acromio-clavicular joint—“AC” joint
      b. Shoulder separation

60 Fig. 7.24a; pg. 226

61 Fig. 7.24c; pg. 226

62 2. Strut or support holding shoulder in place
    3. Easily broken

B. Scapula – shoulder blade
   1. Spine: posterior & “horizontal”
      a. Lateral end is acromion process
      b. Superior to spine is supraspinatus fossa
      c. Inferior to spine is infraspinatus fossa
2. Coracoid process – crows beak (l)
   a. origin (attachment) bicep muscle
3. Glenoid fossa/cavity – articulates w/ head of humerus to form shoulder joint

63  Fig. 7.25b; pg 227

64  C. Upper extremity – arm
1. Humerous – upper arm bone
   a. Head: proximal “round” ball, articulates w/ glenoid fossa
2. Lesser & greater tubercle – anterior & lateral w/ intratrabecular groove (sulcus) between - for bicep tendon - transverse ligament
3. Deltoid tuberosity – Deltoid insertion
4. Capitulum – lateral & ball like articulates w/radius

65  Upper extremity – arm  Fig. 7.26 a pg. 229

66  5. Trochlea (l) pulley – hour glass shape – like pin, in a hinge
   6. Coronoid fossa – anterior, distal fossa accepts coronoid process of ulna in flexion
   7. Olecranon fossa – posterior, distal fossa accepts olecranon process process of ulna in extension.
   8. Lateral & medial epicondyles – rough processes on distal ends where muscles attach

67  Upper extremity – arm  Fig. 7.26b pg. 229

68  II. Upper extremity - Lower arm – radius & ulna
A. _Ulna – Medial (remember anatomical position)
   1. proximal end: olecranon process and coronoid process form trochlear notch
2. Trochlear notch fits around trochlea of Distal humerus
3. Olecranon process fits into olecranon of distal humerus on extension
4. Coronoid process fits into coronoid fossa on flexion
5. Distally - head w/ styloid process medial where ulna articulates with wrist/carpals

69 Figure 7.27 c; page 230

70 Figure 7.27a; page 230

71 B. Radius – lateral (thumb side)
1. Radial head – slightly concaved disc that rotates on capitulum of humerus
2. Radial tuberosity: distal, medial radius for bicep attachment
3. Styloid process: wrist ligament attachment
4. Ulnar notch articulation w/ ulna

72 figure 7.26 d pg. 229

73 figure 7.26 c pg. 229

74 C. Hand Fig. 7.28a & b; page 231
1. Wrist - carpals - 8 see diagrams
2. Metacarpals - hand bones numbered - lateral to medial - 1 through 5 – start with thumb
   a. proximal ends articulate w/ wrist
   b. distal ends articulate w/ fingers
3. Phalanges – finger bones (long bones)
   a. 3 rows proximal, middle & distal, except thumb w/o
       middle phalanx (singular)

75 C. Hand Figure 7.28 a & b; pg. 231

76 Hand diagram

77 III. Lower Extremity - pelvic girdle: ilium, ischium & pubic
       bone
   A. Collectively known as: coxa or inominates, left & right 
   B. Fused very early, indistinguishable
   C. Articulate anteriorly at pubic bones as pubic symphysis,
      fibrocartilagedisc
   D. Articulate anteriorly at the sacrum

78 Figure 7.29; pg. 233

79 E. Ilium: Superior, coxa bone
   1. Iliac crest – superior margin – muscle attachment
      Figure: 7.30 a,b,c,d pg. 234

80 2. Sacroiliac joint – sacrum and ilium 
    articulation - slight movement
F. Iscium: posterior, inferior coxa
   1. Ischium: inferior aspect – sit on it - for muscle attachments
G. Pubis: anterior, inferior coxa – left & right, form symphysis
   pubes.
H. Acetabulum: junction of ischium, Pubis & Ilium – socket of
   hip, ball & socket joint

81 Figure: 7.30 a pg. 234
Lower Limb

A. Femur - thigh/upper leg, longest bone in body.
1. Proximally, head articulates with acetabula of coxa
2. Neck: laterally connects head & shaft
   a. weak (osteoporosis)
3. Epicondyles: lateral & medial – articulate with proximal (on top of condyles)
4. Trochanters: greater/lesser, superior, lateral & medial for muscle attachment

5. Patella: (knee cap) embedded in patellar tendon, which rides on the patellar surface, between the condyles.

B. Tibia – shin bone (lower leg) – carries body weight from femur.
1. Condyles: lateral & medial articulate with condyles of femur, with meniscus in between
2. Tibial tuberosity: Superior/ anterior diaphysis – quadricep attachment – Osgood Schlater’s disease
3. Distal inferior surface articulates with talus, a bone of the ankle (tarsal) with the medial maleolus hanging over medial articulation.
89 C. Fibula: lateral and thinner lower leg bone, superiorly articulates w/ tibia
1. Inferiorly articulates w/ talus the of ankle & has a lateral maleolus hanging over lateral articulation
2. Interoseous membrane: Holds lower leg bones together – no movement

90 Fig. 7.32; pg. 239

91 D. Foot: __________ (ankle), ___________ (foot) & ___________ (toe)
   Figure 7.33; page 240
   See Handout

1. Tarsals 7
a. Calcaneous: heel bone – attaches to Achille’s tendon/ calf muscle (gastrocnemius)
b. Talus - articulates with inferior tibia & fibula
c. Navicular, cuboid & 3 cuneiforms

92 Figure 7.33; page 240
Right hand, anterior view

Radius
Ulna

CARPALS

METACARPALS

PHALANGES

Schematic of the hand

Carpals (color)
Metacarpals (gray)
Phalanges (white)

SKELETAL SYSTEM—Appendicular Skeleton
Hand—Conquering the car;

The carpals should be viewed as two rows of 4 bones each.

You can use the mnemonic,

"Sandy Left The Party To Take Cathy Home"

Move across the top row beginning at the thumb side. Then, proceed in the same direction for the bottom row.
SKELETAL SYSTEM—Appendicular Skeleton

Foot—Targeting the tarsals

The tarsals should be viewed as the schematic diagram above.

You can use the mnemonic, "Chris Told Nora, Milk Is Like Cream!"

Right foot, superior view

TARSALS

PHALANGES

8.
9.
10.