Chapter 7
The Skeletal System: The Axial Skeleton

- Axial Skeleton
  - 80 bones
  - lie along longitudinal axis
  - skull, hyoid, vertebrae, ribs, sternum, ear ossicles

- Appendicular Skeleton
  - 126 bones
  - upper & lower limbs and pelvic & pectoral girdles
Types of Bones

- 5 basic types of bones:
  - long = compact
  - short = spongy except surface
  - flat = plates of compact enclosing spongy
  - irregular = variable
  - sesamoid = develop in tendons or ligaments (patella)

- Sutural bones = in joint between skull bones
Bone Surface Markings

- Surface features: rough area, groove, openings, process
- Specific functions:
  - passageway for blood vessels and nerves
  - joint formation
  - muscle attachment & contraction
Bone Surface Markings from Table 7.2

- Foramen = opening
- Fossa = shallow depression
- Sulcus = groove
- Meatus = tubelike passageway or canal
- Condyle = large, round protuberance
- Facet = smooth flat articular surface
- Trochanter = very large projection
- Tuberosity = large, rounded, roughened projection
- Learning the terms found in this Table will simplify your study of the skeleton.
• 8 Cranial bones
  – protect brain & house ear ossicles
  – muscle attachment for jaw, neck & facial muscles

• 14 Facial bones
  – protect delicate sense organs -- smell, taste, vision
  – support entrances to digestive and respiratory systems
The 8 Cranial Bones

Frontal
Parietal (2)
Temporal (2)
Occipital

Sphenoid
Ethmoid
Frontal Bone

- Forehead, roof of orbits, & anterior cranial floor
- Frontal suture gone by age 6
Parietal & Temporal Bones

- Parietal
  - sides & roof of cranial cavity

- Temporal
  - zygomatic process forms part of arch
Temporal and Occipital bones

- Temporal
- Occipital
Sphenoid bone

- Base of skull
- Pterygoid processes are attachment sites for jaw muscles
Sphenoid in Anterior View

- Resembles a bat (the mammal)
Sphenoid from Superior View

- Lesser wing & greater wing
- Sella turcica holds pituitary gland
- Optic foramen
Ethmoid Bone

- Cranial floor, lateral nasal walls & nasal septum
- Cribriform plate & olfactory foramina
- Crista galli for attachment of membranes cover the brain
Ethmoid bone

- Perpendicular plate is upper part of nasal septum
- Nasal concha
  - filters & warms air
14 Facial Bones

- Nasal (2)
- Mandible (1)
- Inferior nasal conchae (2)
- Maxillae (2)
- Lacrimal (2)
- Zygomatic (2)
- Palatine (2)
- Vomer (1)
Maxillary bones

- Floor of orbit, floor of nasal cavity or hard palate
- Maxillary sinus
- Alveolar processes hold upper teeth
- Cleft palate is lack of union of maxillary bones
Zygomatic Bones

- Cheekbones
- Lateral wall of orbit along with sphenoid
- Part of zygomatic arch along with part of temporal
Lacrimal Bones

- Lacrimal bones
  - part of medial wall of orbit
  - lacrimal fossa houses lacrimal sac
Palatine & Vomer

- Palatine
  - part of hard palate
- Vomer
  - posterior part of nasal septum
Mandible

- Alveolar processes for lower teeth
Sutures

- Lambdoid suture unites parietal and occipital
- Sagittal suture unites 2 parietal bones
- Coronal suture unites frontal and both parietal bones
- Squamous suture unites parietal and temporal bones
Paranasal Sinuses

- Paired cavities in ethmoid, sphenoid, frontal and maxillary
- Lined with mucous membranes and open into nasal cavity
- Resonating chambers for voice, lighten the skull
- Sinusitis is inflammation of the membrane (allergy)
Fontanels of the Skull at Birth.

- Dense connective tissue membrane-filled spaces (soft spots)
- Unossified at birth but close early in a child's life.
- Fetal skull passes through the birth canal.
- Rapid growth of the brain during infancy
Nasal Septum

- Divides nasal cavity into left and right sides
- Formed by vomer, perpendicular plate of ethmoid and septal cartilage
- Deviated septum does not line in the midline
  - developmental abnormality or trauma
Hyoid Bone

- U-shaped single bone
- Articulates with no other bone of the body
- Suspended by ligament and muscle from skull
- Supports the tongue & provides attachment for tongue, neck and pharyngeal muscles
Vertebral Column

• Backbone or spine built of 26 vertebrae
• Five vertebral regions
  – cervical vertebrae (7) in the neck
  – thoracic vertebrae (12) in the thorax
  – lumbar vertebrae (5) in the low back region
  – sacrum (5, fused)
  – coccyx (4, fused)
Intervertebral Discs

- Between adjacent vertebrae absorbs vertical shock
- Permit various movements of the vertebral column
- Fibrocartilagenous ring with a pulpy center
Normal Curves of the Vertebral Column

- **Primary curves**
  - thoracic and sacral are formed during fetal development
- **Secondary curves**
  - cervical is formed when infant raises head at 4 months
  - lumbar forms when infant sits up & begins to walk at 1 year
Thorax

- Bony cage flattened from front to back
- Sternum (breastbone)
- Ribs
  - 1-7 are true ribs (vertebrosternal)
  - 8-12 are false ribs (vertebrochondral)
  - 11-12 are floating
- Costal cartilages
- Bodies of the thoracic vertebrae
Sternum

- **Manubrium**
  - 1st & 2nd ribs

- **Body**
  - costal cartilages of 2-10 ribs

- **Xiphoid**
  - ossifies by 40
  - CPR position
Herniated (Slipped) Disc

- Protrusion of the nucleus pulposus
- Most commonly in lumbar region
- Pressure on spinal nerves causes pain
- Surgical removal of disc after laminectomy