Chapter 3
General Anatomy and Radiographic Positioning Terminology

General Anatomy

Definition of Terms
- Anatomy - term applied to the science of the structure of the body
- Physiology - study of the function of the body organs
- Pathology - study of disease
- Osteology - the detailed study of the body of knowledge relating to the bones of the body

Anatomical Terms
- Anatomical position - standing upright, facing front, palms facing front, and feet together
- Supine - lying on back; palms up
- Prone - lying face down; palms down
- Laying down - recumbent
- Standing - erect

Body Planes
- Imaginary planes, divide body in reference to anatomical position.
- Planes slice body in all directions at designated levels.
- We use planes to center body to IR (image receptor ex. Film)

Fundamental Planes
- Sagittal - slices up/down in body. Forms right/left segments.
  - Midsagittal - right down the middle. Forms equal right/left halves. (aka MSP)
- Coronal - slices side to side. Divides into anterior and posterior.
  - Midcoronal - (aka MCP aka Midaxillary plane) Divides into equal anterior/posterior.
- Horizontal - Slices horizontally. Divides into superior/Inferior.
  - Aka transverse aka axial aka cross-sectional
- Oblique - slices at any angle between the others.
  - Used in radiographic positioning to center a body part to the IR or CR.

Special Planes - localized to specific parts or areas of the body
- Interiliac plane - transects the body at the pelvis at the top of the iliac crests
- Occlusal plane - formed by the biting surfaces of the upper and lower teeth with jaws closed.
Divisions of the Body
- Head
- Neck
- Trunk
  - Thorax
  - Abdomen
  - Pelvis
- Limbs
  - Arms (superior)
  - Legs (inferior)

Body Cavities
- Two great cavities:
  - Thoracic
    - Contains:
      - Pleural membranes
      - Lungs
      - Trachea
      - Esophagus
      - Pericardium
      - Heart and great vessels
  - Abdominal
    - Abdominal cavity has no lower partition, but the lower portion is called the pelvic cavity
    - It is often referred to as the abdominopelvic cavity
    - Contains:
      - Peritoneum
      - Liver
      - Gall bladder
      - Pancreas
      - Spleen
      - Stomach
      - Intestines
      - Kidneys
      - Ureters
      - Major blood vessels
    - Pelvic portion contains:
      - Rectum
      - Urinary bladder
      - Part of reproductive system
Divisions of the Abdomen

- Bordered superiorly by the diaphragm.
- Bordered inferiorly by the superior pelvic aperture (pelvic inlet)
- Abdomen divided in two methods
  - Quadrants
    - Quadrants are useful for describing the location of various abdominal organs
      - Right Upper RUQ
      - Right Lower RLQ
      - Left Upper LUQ
      - Left Lower LLQ
  - Regions
    - Divided into 9 regions
    - Not used as often as quadrants
      - Superior regions
        - Right hypochondrium
        - Epigastrium
        - Left hypochondrium
      - Middle regions
        - Right lateral
        - Umbilical
        - Left lateral
      - Inferior regions
        - Right inguinal
        - Hypergastrium
        - Left inguinal

Regions of the abdomen

Regional Areas

- Axilla- armpit
- Groin- oblique crease
- Loin- lateral side of abdomen, between last rib and ileum
- Lumbar-
- Perineum- space between legs. Contains: vaginal opening, anus, urethra.

Surface landmarks

Table 3-1 on page 63
Xiphoid process= t9-body  t10- tip

Body Habitus

- Defined as the common variations in the shape of the human body
- Important in radiography because habitus determines size, shape, and position of organs of the thoracic and abdominal cavities
• Organs affected by body habitus
  o Heart
  o Lungs
  o Diaphragm
  o Stomach
  o Colon
  o Gallbladder
• Four major types of body habitus
  o Sthenic- 50%
  o Hyposthenic- 35%
  o Asthenic- 10%
  o Hypersthenic- 5%
• Average: sthenic and hyposthenic
• Extremes: hypersthenic and asthenic
• Box 3-1 on page 65
• KNOW ORGAN PLACEMENT AND CHARACTERISTICS of the 4 body habitus
• Affects:
  o Positioning
  o IR selection
  o Technique selection

Body Systems
• Skeletal
  o Bones, joints
• Integumentary
  o Skin, hair, nails
• Muscular
  o Muscles
• Circulatory
  o Vessels, heart, lymphatics
• Respiratory
  o Lungs, trachea, diaphragm, mouth, nose
• Digestive
  o Stomach, gallbladder, liver, intestines
• Urinary
  o Kidneys, ureters, bladder, urethra
• Reproductive
  o Ovaries/testis
• Endocrine
  o Glands (hormones)
• Nervous
  o Neurons
Osteology

- Skeletal divisions
- General bone features
- Bone development
- Classification of bones

Bone functions

- Attachment for muscles
- Mechanical basis for movement (works as levers; along with adjacent joints form levers for movement)
- Protection of internal organs
- Support frame for body
- Storage for calcium, phosphorous, and other salts
- Production of red and white blood cells

Skeletal divisions

- 206 bones in body
- Divided into two main groups
  - Axial: 80 bones (skull, vertebral column, sternum, ribs)
  - Appendicular: 126 bones (upper limbs, shoulder girdle, lower limbs, pelvic girdle)

General Bone features

- Periosteum
  - Tough fibrous connective tissue (2 layers)
    - Outer layer is dense and fibrous
    - Inner layer is osteoblasts
    - Blood vessels and nerves enter and exit through periosteum
- Compact bone
  - Located under periosteum
  - Strong, dense, gives strength, close knit, resembles ivory. AKA cortical
- Spongy bone
  - Porous, forms epiphysis AKA cancellous
  - Inner layer, less dense
  - Contains a speculated network called trabeculae
    - Contains red and yellow bone marrow
- Red marrow
  - Makes RBC’s and wbc’s
- Yellow marrow
  - Fat (adipose)
- Medullary cavity
  - Central cavity of long bones
  - Contains trabeculae filled with yellow marrow
  - Red marrow found in the ends of long bones
• Endosteum
  o Lines medullary cavity
  o Sometimes it is necessary to obtain a sample of marrow; a needle is inserted through the compact bone into the spongy bone in order to obtain a sample of the tissue

• Nutrient Foramen
  o Near center of long bones; passes into medullary cavity; carries nutrients to spongy bone
  o Periosteal arteries enter at various points to supply compact bone
  o Epiphyseal artery enters at ends (epiphysis)
  o Veins exit the bones and supply blood cells to the body