MEDICAL GROSS ANATOMY

INTRODUCTION

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INTRODUCTION

Anatomy is the science of the structure and function of the body. It is the study of *internal* and *external* structures, and the physical relationships between the various body parts.
INTRODUCTION

• There are three main approaches to studying anatomy:

1. Systemic anatomy
2. Regional anatomy (topographic)
3. Clinical anatomy
INTRODUCTION

- **Surface anatomy** is the study of the living body at rest and in action and is used in all three approaches.
- The main aim of surface anatomy is the visualization of the structures that lie beneath the skin. *For example, in patients with stab or gunshot wounds, the physician must visualize the structures that might have been injured beneath the wound.*
- Surface anatomy is the basis of physical examination that forms a part of physical diagnosis.
- Regardless of what approach is used, one must visualize the three dimensional structure of the body.
INTRODUCTION

ANATOMY

- MICROSCOPIC
  - CYTOLOGY
  - HISTOLOGY
    - *CLINICAL
    - *SURFACE
    - *REGIONAL
    - *SYSTEMIC
  - DEVELOPMENTAL
- MACROSCOPIC
- OTHER
- SPECIALTIES
  - CROSS-SECTIONAL
  - COMPARATIVE
  - MEDICAL
  - RADIOGRAPHIC
  - SURGICAL
1.3. Sections of the limbs.

- Longitudinal section
- Transverse section
- Oblique section

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1.39. Technique for producing an abdominal CT scan.

CT image of the upper abdomen
I.40. Technique for producing an abdominal ultrasound scan of the upper abdomen.
ANATOMICAL AND MEDICAL TERMINOLOGY

- Anatomy has an international *vocabulary*, so accurate use of the words is important.
- Eponyms are not used in official terminology, but some clinicians still use them.
- They should be evaded to avoid ambiguity and misunderstanding.
ANATOMICAL POSITION

• All anatomical descriptions are expressed in relation to the *anatomical position* to insure that the descriptions are unambiguous.
A person in the anatomical position:

1. Is standing erect or lying supine (on one’s back) as if erect, with head, eyes, and toes directed anteriorly (forward)

2. Has upper limbs by the sides with palms facing anteriorly

3. Has lower limbs together with the feet directed anteriorly
ANATOMICAL POSITION

(a) Anterior view

(b) Posterior view
All descriptions are expressed in relation to the anatomical position illustrated here.
ANATOMICAL PLANES

- Anatomical descriptions are based on four anatomical planes that pass through the body in the anatomical position:
  1. **Median plane**: midsagittal, vertical, longitudinal
  2. **Sagittal planes**: vertical, parallel to median plane
  3. **Coronal planes**: frontal, vertical, at right angles to median plane
  4. **Horizontal planes**: transverse, at right angles to the median and coronal planes
ANATOMICAL PLANES

Transverse plane (HORIZONTAL)

Frontal plane (CORONAL)

(c) Midsagittal plane (MEDIAN)
These terms describe the position of one structure with respect to another.
TERMS OF MOVEMENT

(a) Atlanto-occipital and cervical intervertebral joints

Flexion: bending movement that decreases the angle between two parts

Extension: straightening movement that increases the angle between two parts

(c) Elbow joint
TERMS OF MOVEMENT

(d) Wrist joint

(e) Hip joint

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TERMS OF MOVEMENT

(f) Knee joint

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TERMS OF MOVEMENT

Adduction: motion that pulls a structure or body part towards the midline

Abduction: motion that pulls a structure or body part away from the midline

(a) Shoulder joint

(c) Hip joint
TERMS OF MOVEMENT

(b) Wrist joint

(d) Metacarpophalangeal joints of the fingers (not the thumb)
TERMS OF MOVEMENT

(a) Temporomandibular joint
(b) Depression
(c) Protraction
(d) Retraction
**TERMS OF MOVEMENT**

**Inversion:** the movement of the sole of the foot towards the median plane

**Dorsiflexion:** the toes are brought closer to the shin; this decreases the angle between the ankle and the leg

**Eversion:** the movement of the sole of the foot away from the median plane

**Flexion:** movement which decreases the angle between the sole of the foot and the back of the leg
**TERMS OF MOVEMENT**

**Pronation:** rotation of the forearm (or foot) so that in the anatomical position the palm or the sole is facing posteriorly.  
*Pronation of the forearm* is a rotational movement where the hand and upper arm are turned inwards.  
*Pronation of the foot* refers to turning the foot outwards.

**Supination:** of the *forearm* occurs when the forearm and palm are turned outwards.  
Supination of the *foot* occurs when the sole is turned inwards.
TERMS OF MOVEMENT

Medial (internal): rotation towards the axis of the body

Lateral (external): rotation away from the center of the body
TERMS OF MOVEMENT

(a) Shoulder joint
(b) Hip joint
IMAGINARY LINES

(a) Anterior view showing nine abdominopelvic regions

(b) Anterior view showing abdominopelvic quadrants

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THE SKIN

FUNCTIONS
1. Body temperature regulation.
2. Reservoir for blood.
3. Protection from external
5. Excretion and absorption.
6. Vitamin D synthesis.
THE SKIN – *Surface Lines*

- The skin is not smooth. It has a geometric pattern of lines and creases, which follow bundles of collagen fibers in the dermis of the skin.
  1. Tension lines, or *Langer’s lines*, or lines of cleavage
  2. Friction lines: in palms and soles (finger/foot prints)
  3. Flexure lines: over joints
LANGER’S LINES
DERMATOMES

• A dermatome is an area of skin supplied by the sensory fibers of a single dorsal root through the dorsal and ventral rami of its spinal nerve.

• Dermatomes are arranged in a segmental fashion because the thoracoabdominal nerves arise from segments of the spinal cord.

• Adjacent dermatomes overlap.

• Physicians need to have a working knowledge of the segmental, or dermatomal innervation of the skin so they can determine (e.g. pain) whether a particular segment of the spinal cord is functioning normally.

• Three contiguous spinal nerves need to be blocked in order to achieve proper anesthesia of the skin segment.
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Posterolateral views

- Segmental innervation of skin by three separate spinal nerves

- Innervation of skin by three spinal nerves combined into one peripheral nerve through plexus formation
1.20. Dermatomes and myotomes.

- Dorsal root
- Spinal ganglion
- Ventral root
- Skin (dermatome)
- Nerve
- Skeletal muscle (myotome)

(A) Diagram showing the relationship between the spinal cord, dermatomes, and myotomes.

(B) Front view of the body with dermatomes and myotomes labeled.

(C) Back view of the body with dermatomes and myotomes labeled.
**Key Dermatomes:**
1. T4 = nipple
2. T10 = navel (umbilicus)
3. T12 = above the pubis
4. L5 = hallux
5. C7 = middle finger
6. C8 = little finger
Herpes zoster; Acute Posterior Ganglionitis

An acute CNS infection involving primarily the dorsal root ganglia and characterized by vesicular eruption and neuralgic pain in the cutaneous areas supplied by peripheral sensory nerves arising in the afferent root ganglia.

Etiology: varicella-zoster virus.
FASCIA AND FASCIAL PLANES

- The **superficial fascia** is composed of loose connective tissue and fat.
- It is located between the dermis and the overlying (investing) deep fascia.
- It contains sweat glands, blood and lymphatic vessels, and cutaneous nerves.
FASCIA AND FASCIAL PLANES

- The *deep fascia* is a dense, more organized connective tissue layer that invests deep structures (e.g. muscles).
- The deep fascia sends radial projections to deeper structures and bones forming compartments.
THANK YOU...