

MEDICAL GROSS ANATOMY

INTRODUCTION

Dr. Nicholas Lutfi



Nicholas Lutfi
photography ●●●●

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.

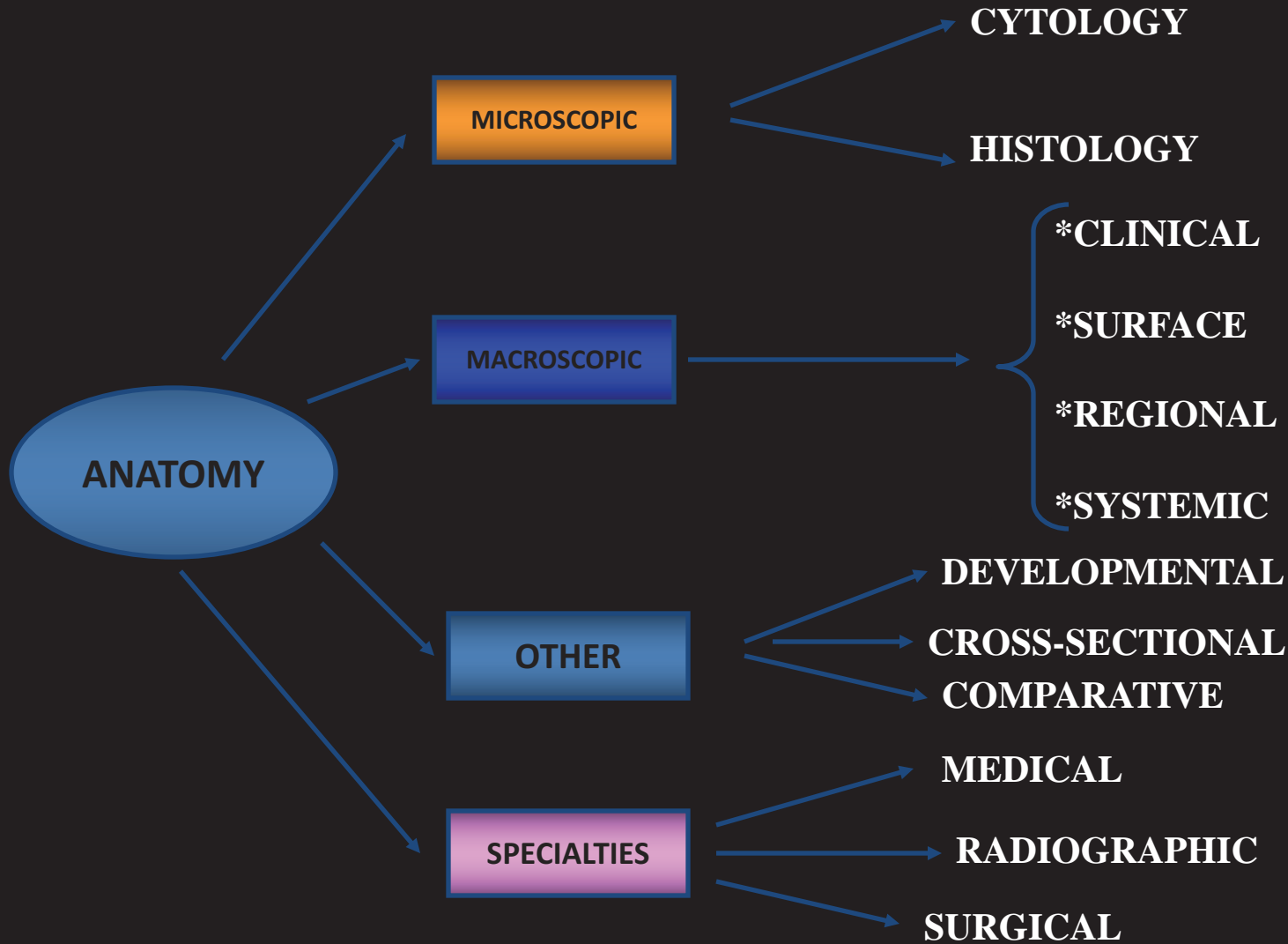
INTRODUCTION

- There are three main approaches to studying anatomy:
 1. Systemic anatomy
 2. Regional anatomy (*topographic*)
 3. Clinical anatomy

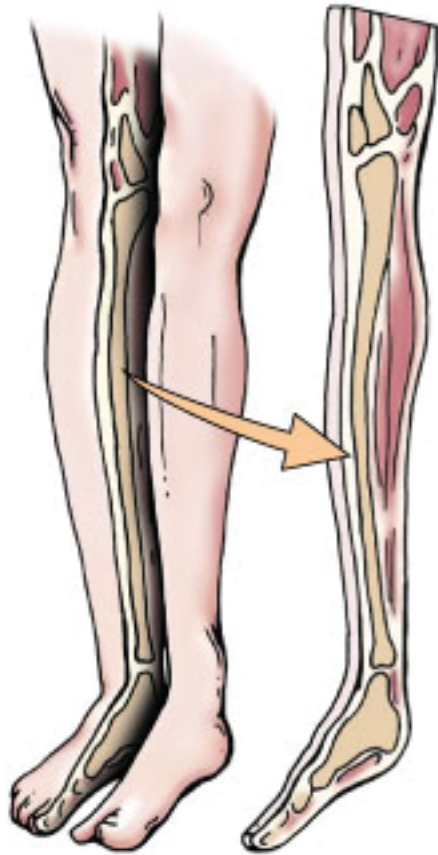
INTRODUCTION

- *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.

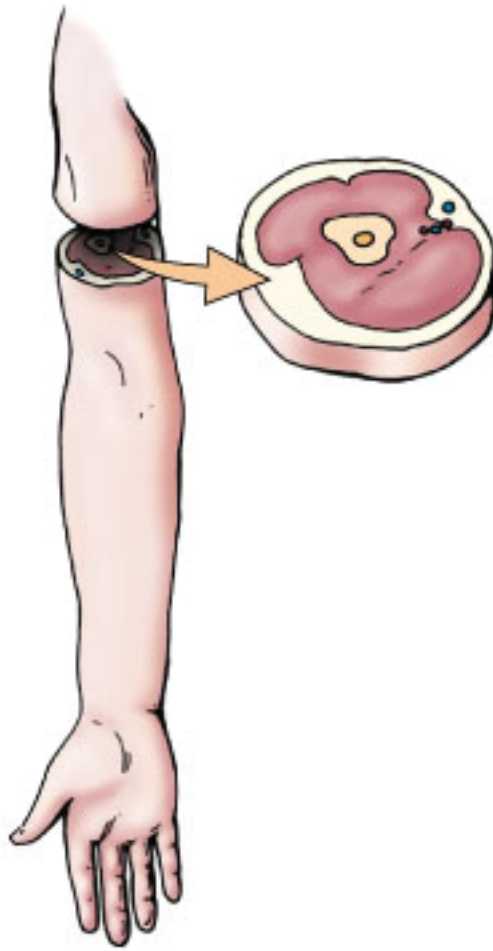
INTRODUCTION



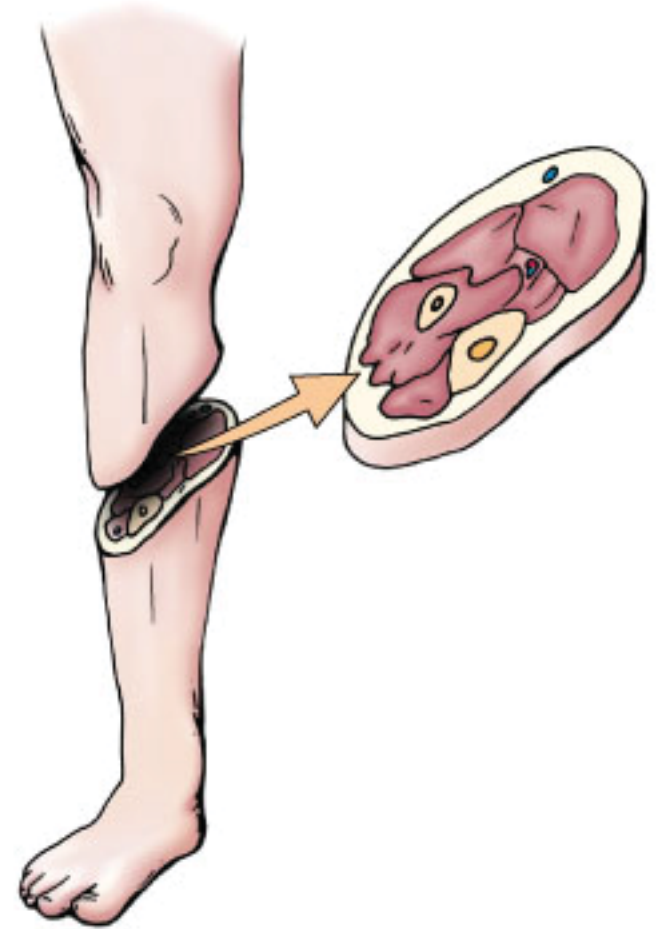
1.3. Sections of the limbs.



Longitudinal section

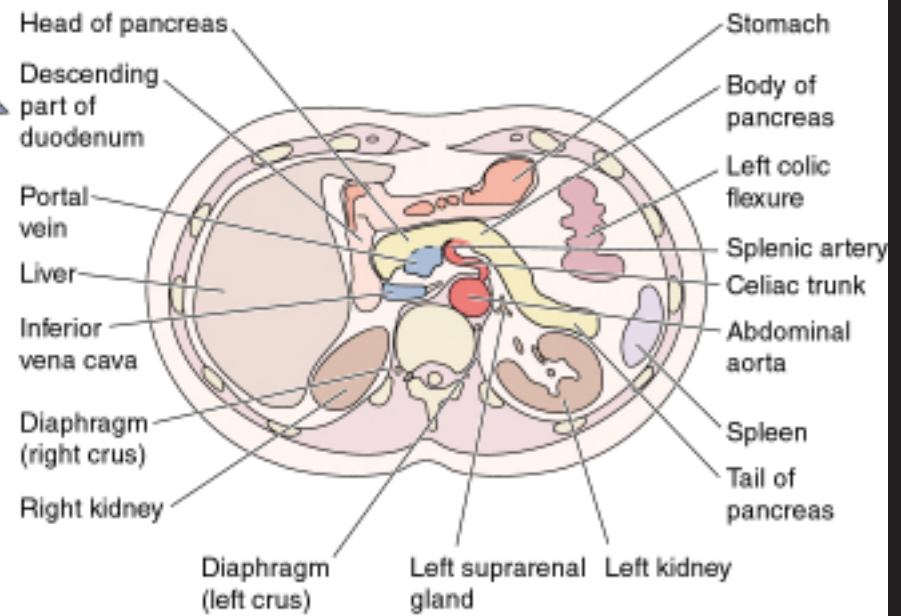
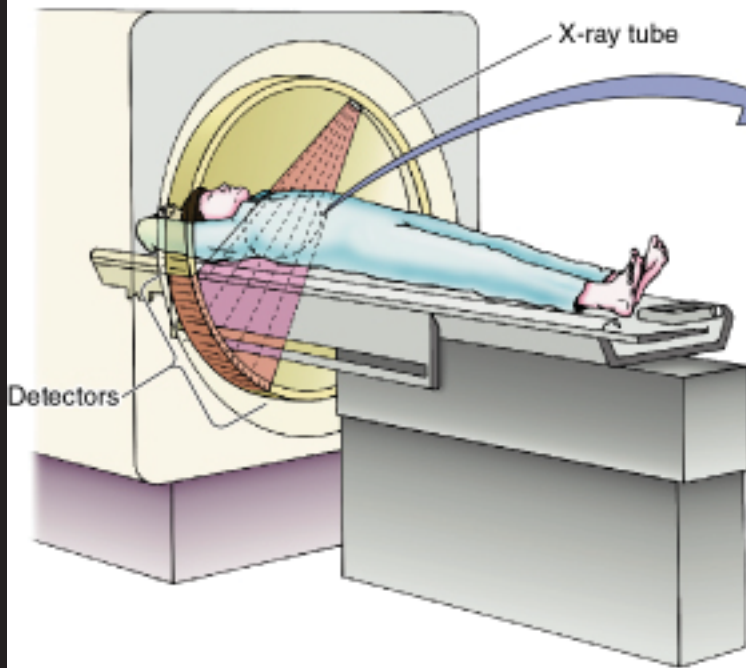


Transverse section

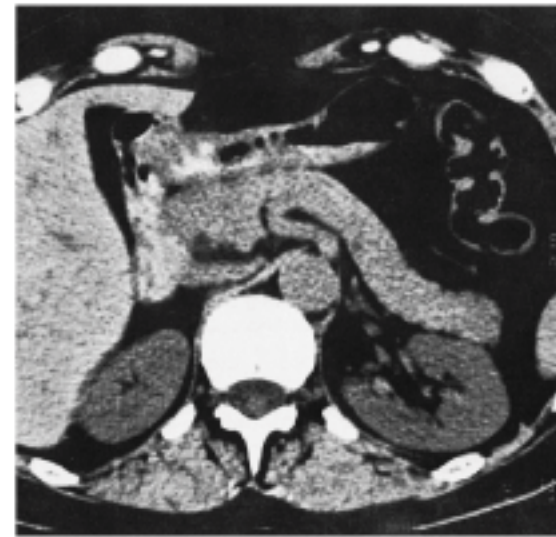


Oblique section

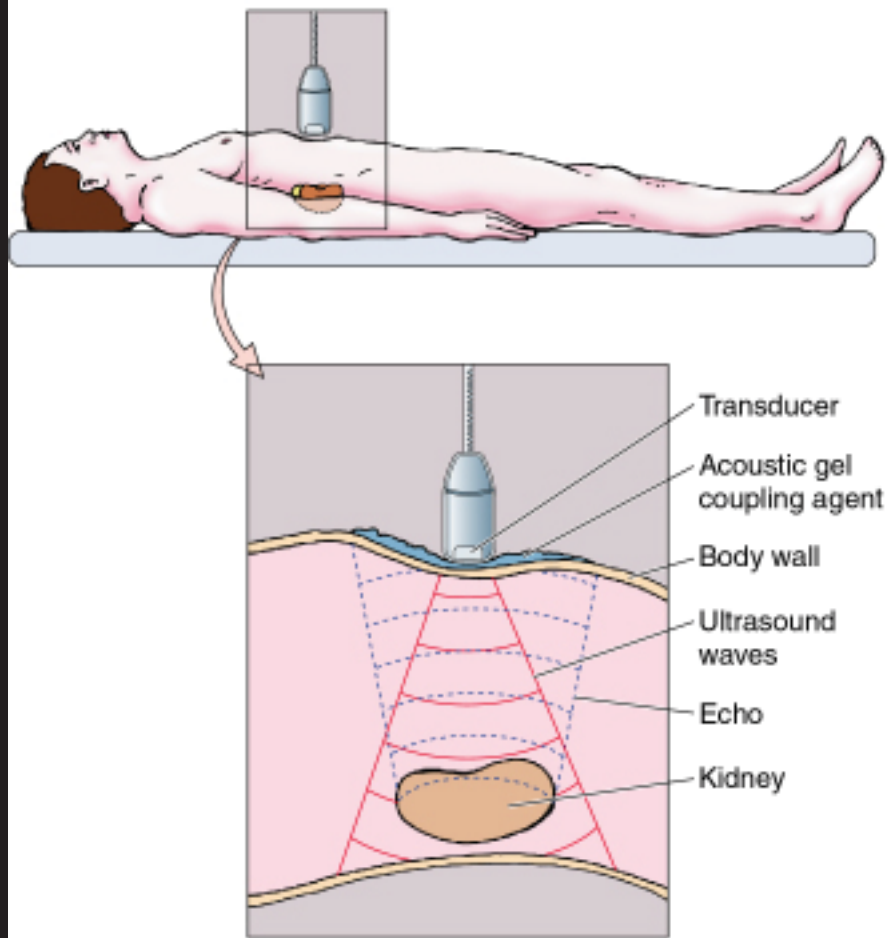
I.39. Technique for producing an abdominal CT scan.

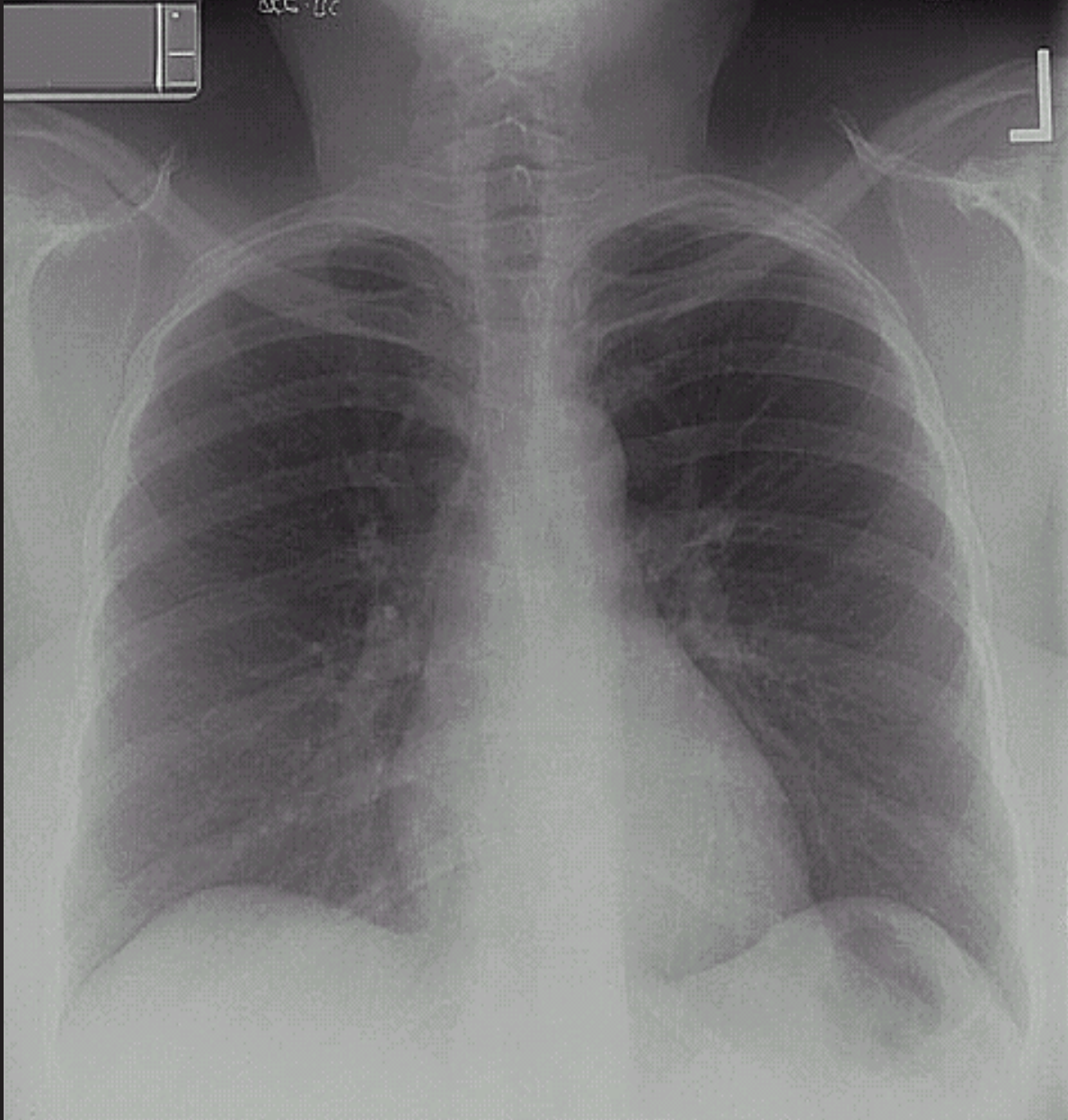


CT image of the upper abdomen



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.

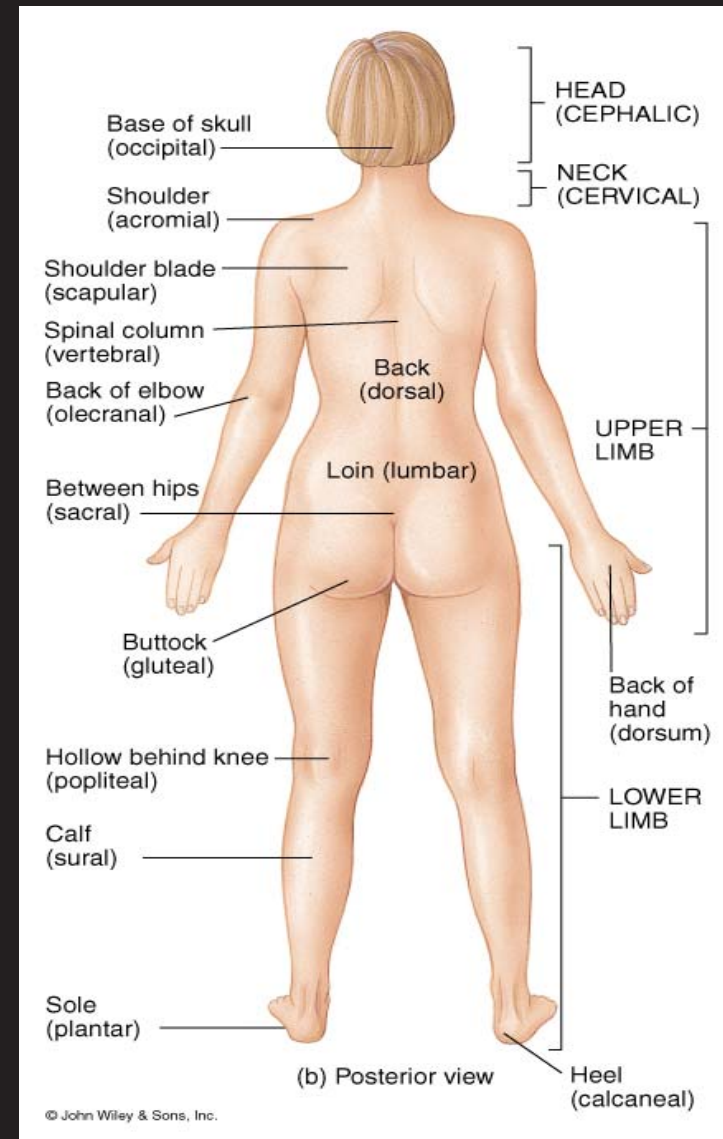
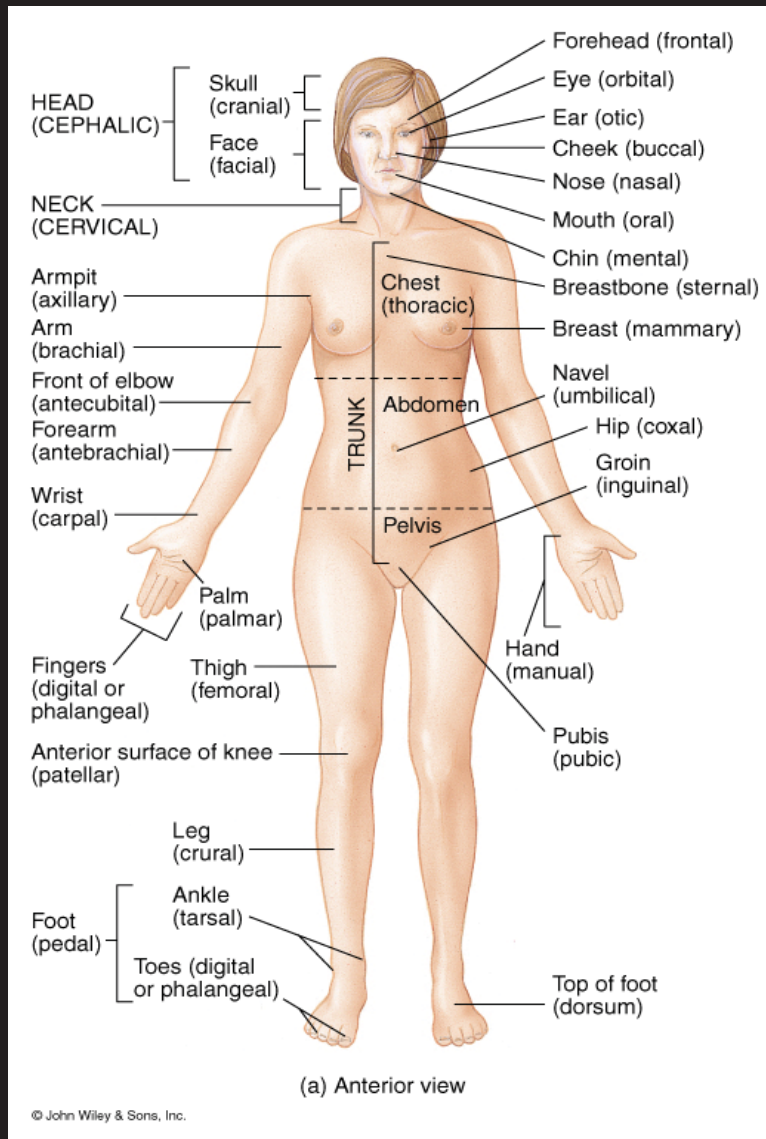
ANATOMICAL POSITION

- All anatomical descriptions are expressed in relation to the *anatomical position* to insure that the descriptions are unambiguous.

ANATOMICAL POSITION

- 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

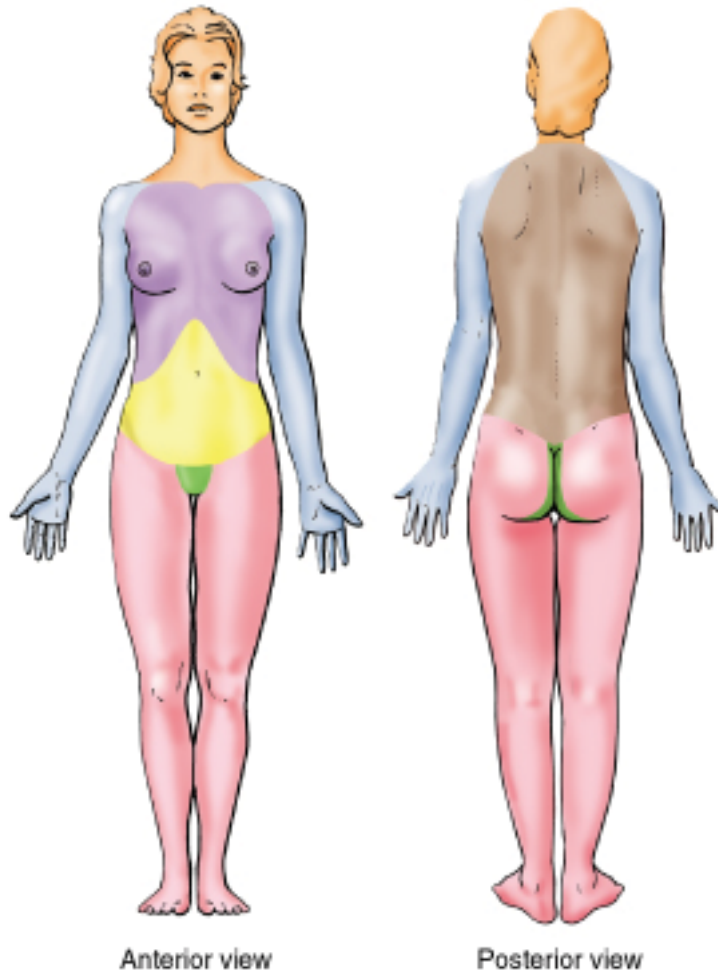
ANATOMICAL POSITION



I.1. Regions of the body.

Key

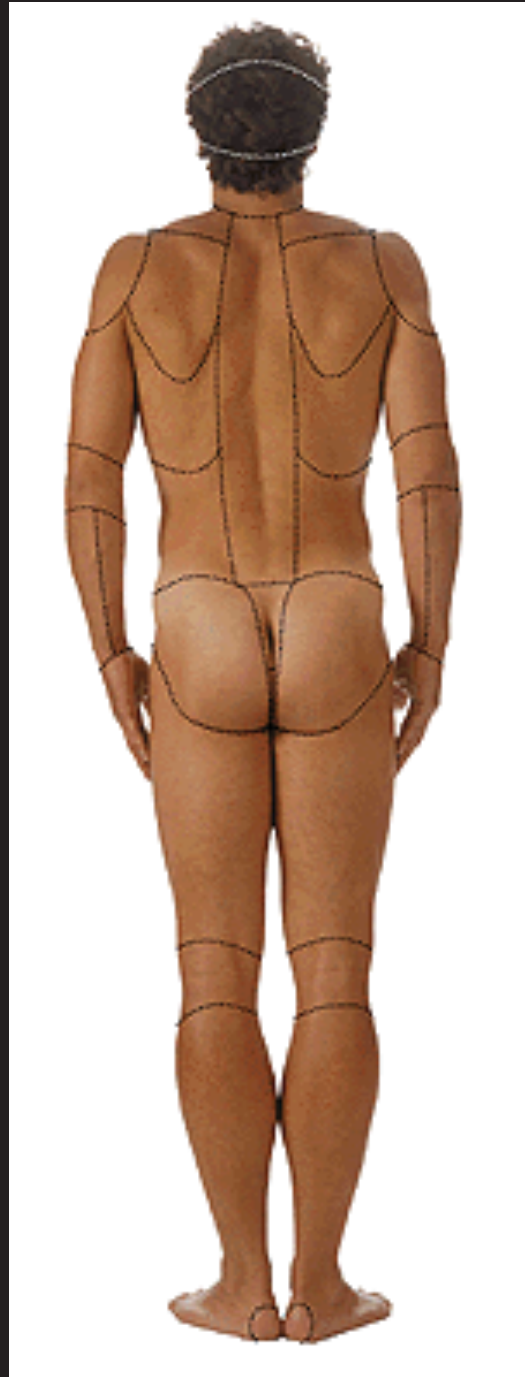
Head/neck	Thorax	Abdomen	Lower limb
Upper limb	Back	Pelvis/perineum	



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REGIONS OF THE BODY

All descriptions are expressed in relation to the anatomical position illustrated here

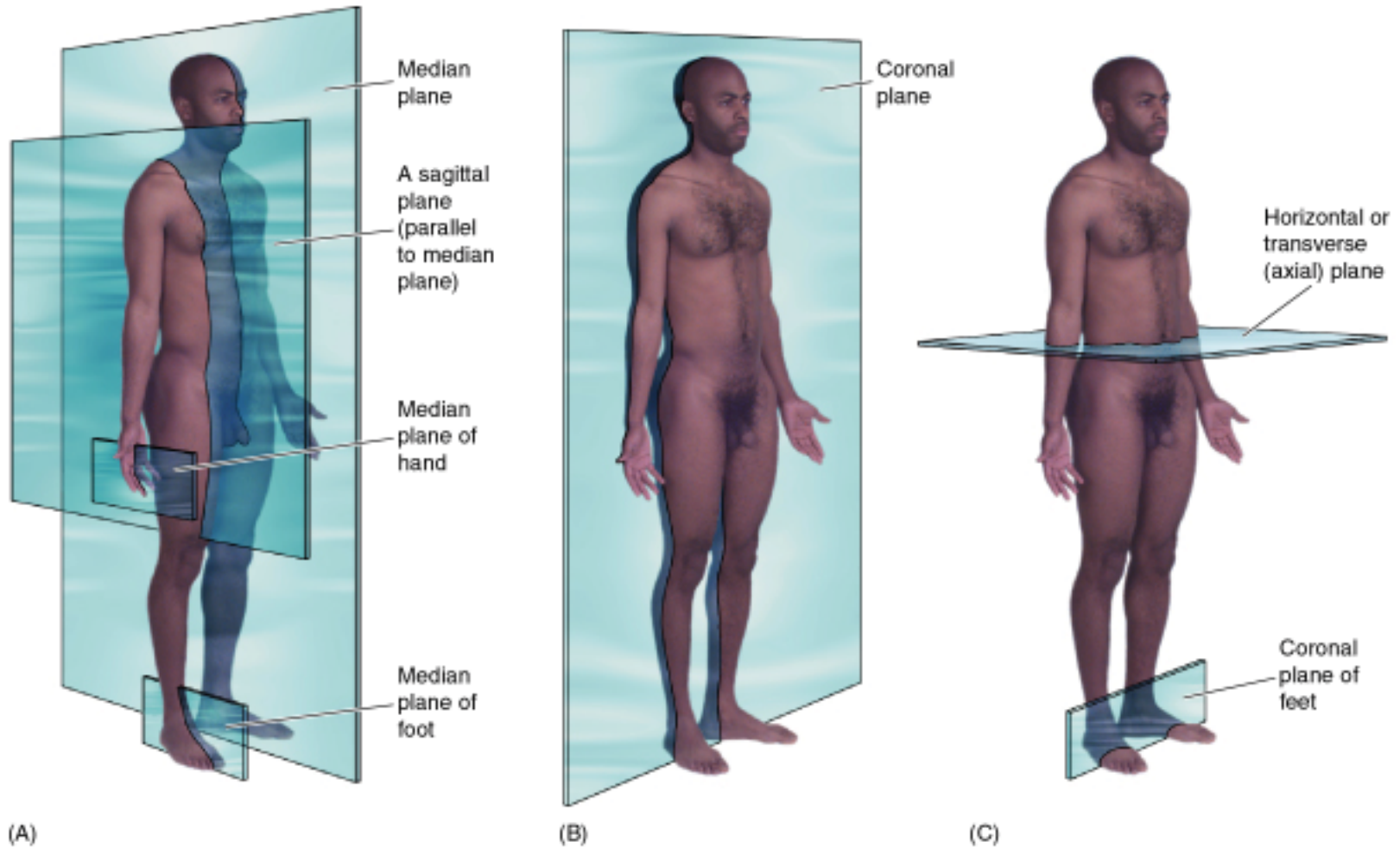


ANATOMICAL PLANES

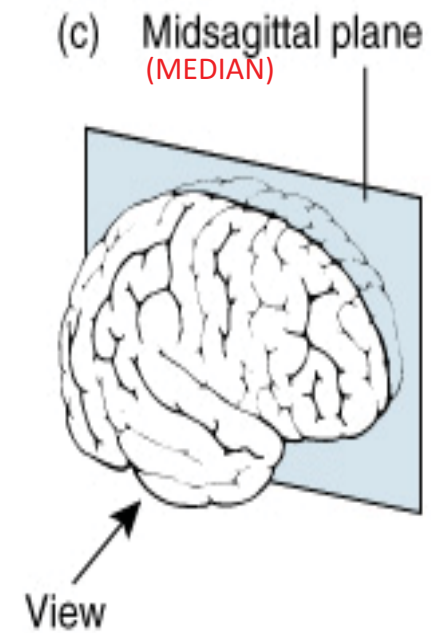
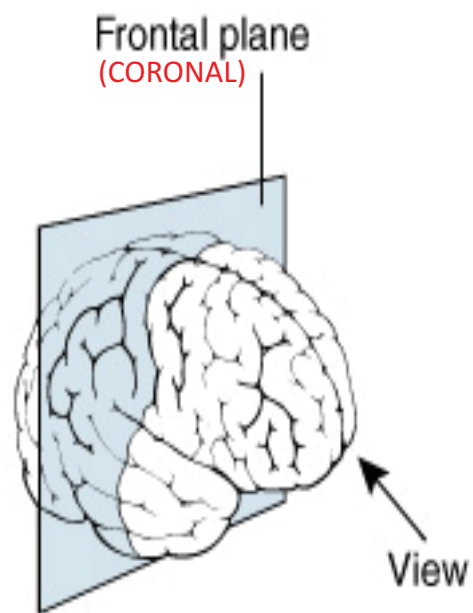
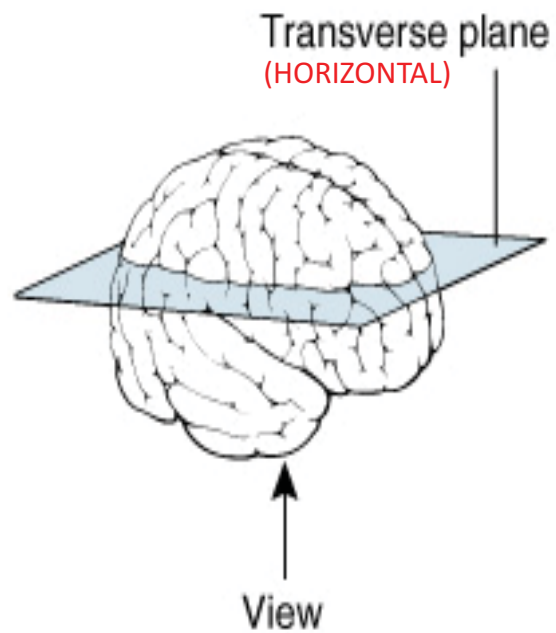
- Anatomical descriptions are based on four anatomical **planes** that pass through the body in the anatomical position:
 1. Median plane: midsagittal, vertical, longitudinal
 2. Sagittal planes: vertical, parallel to median plane
 3. Coronal planes: frontal, vertical, at right angles to median plane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

ANATOMICAL PLANES

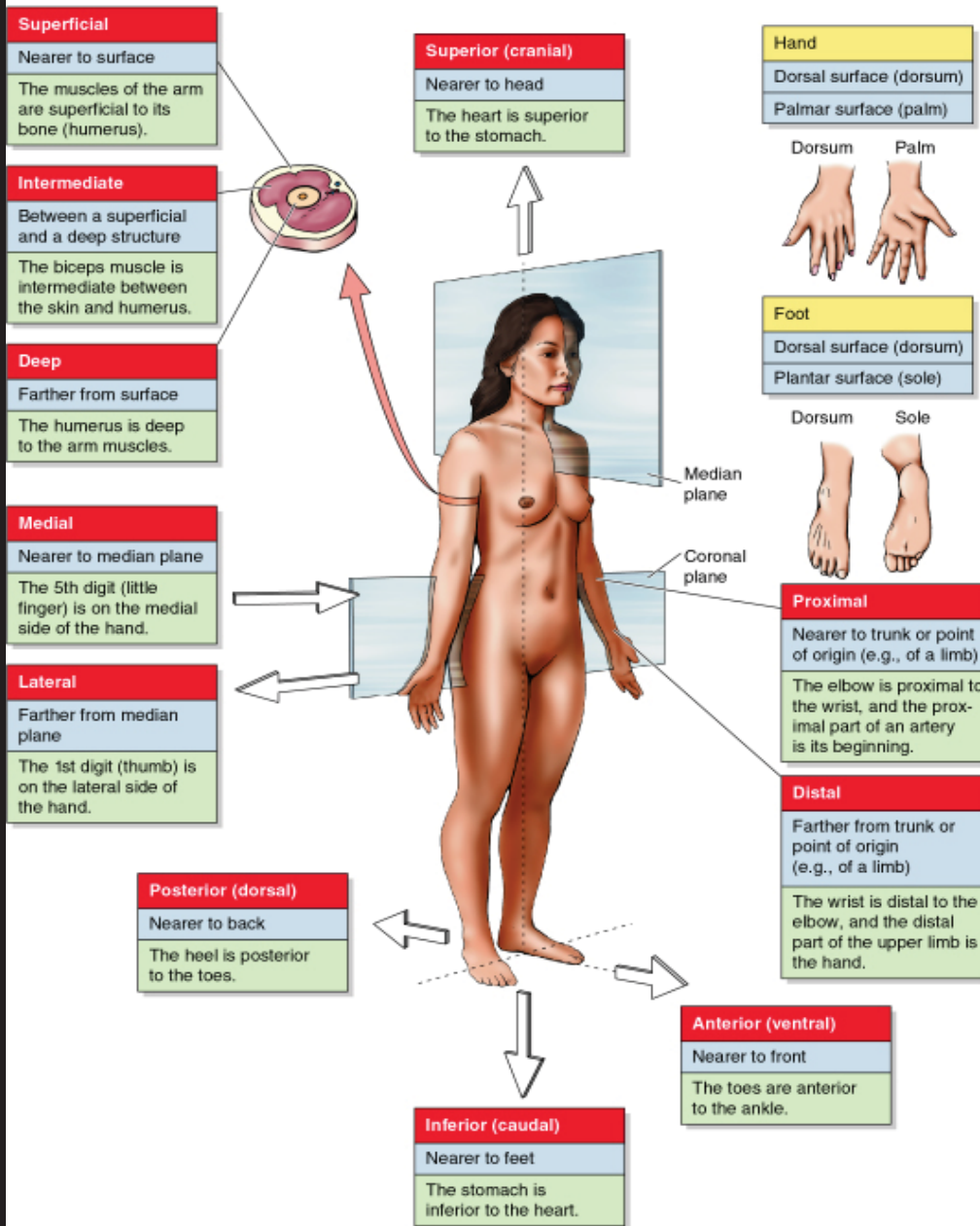
I.2. Anatomical planes.



ANATOMICAL PLANES



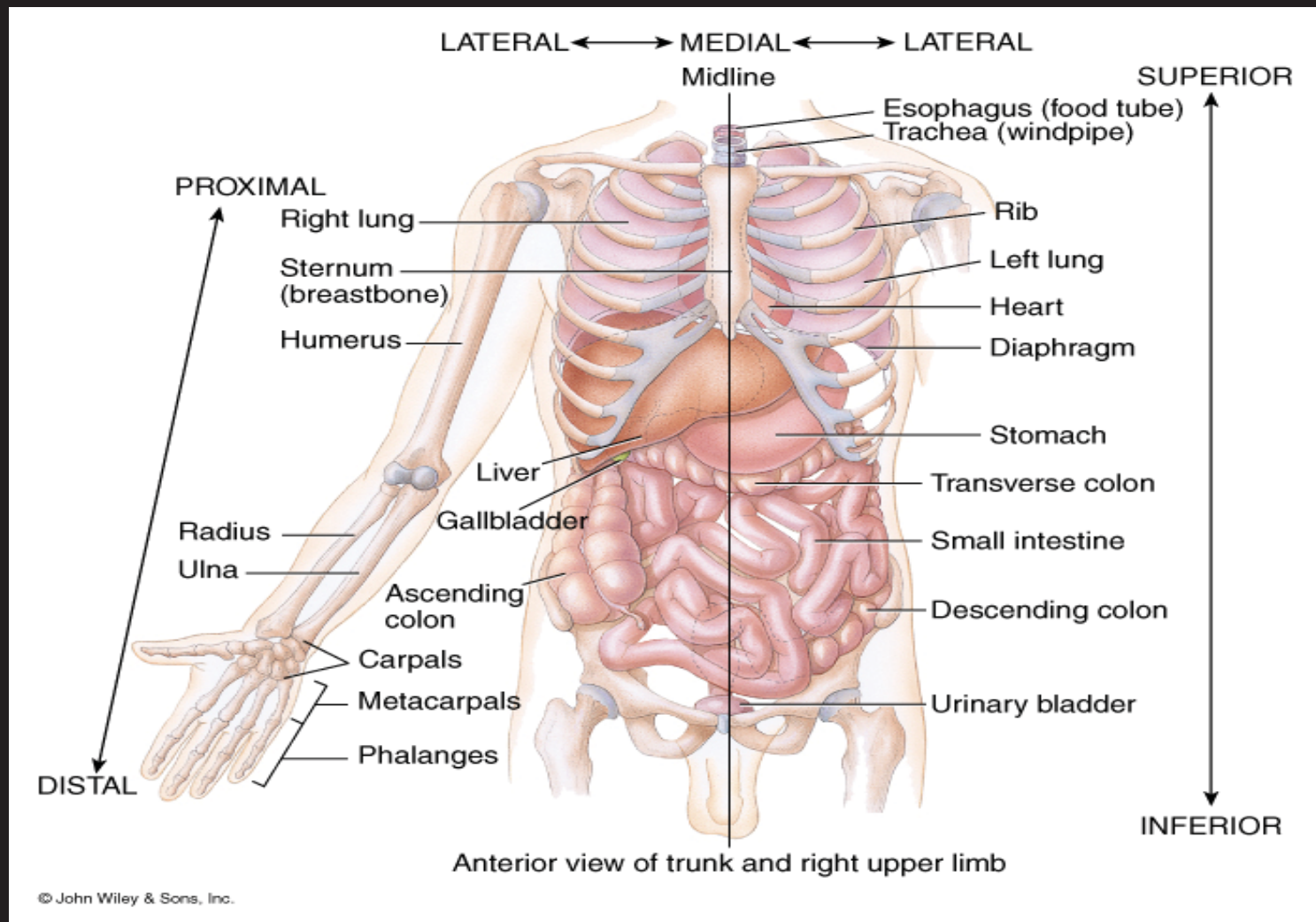
I.4. Terms of relationship and comparison.



TERMS OF RELATIONSHIP AND COMPARISON

These terms describe the position of one structure with respect to another

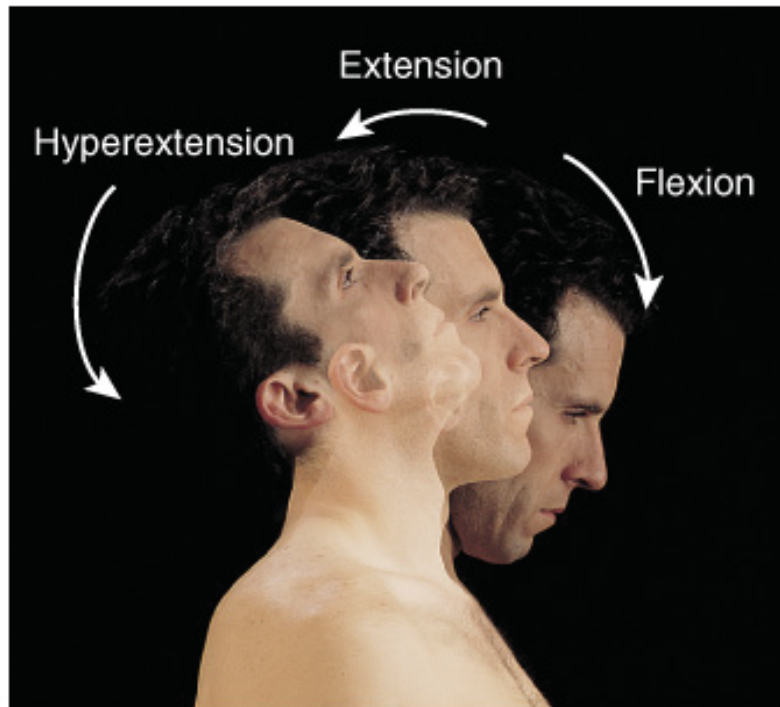
TERMS OF RELATIONSHIP AND COMPARISON - *Direction*





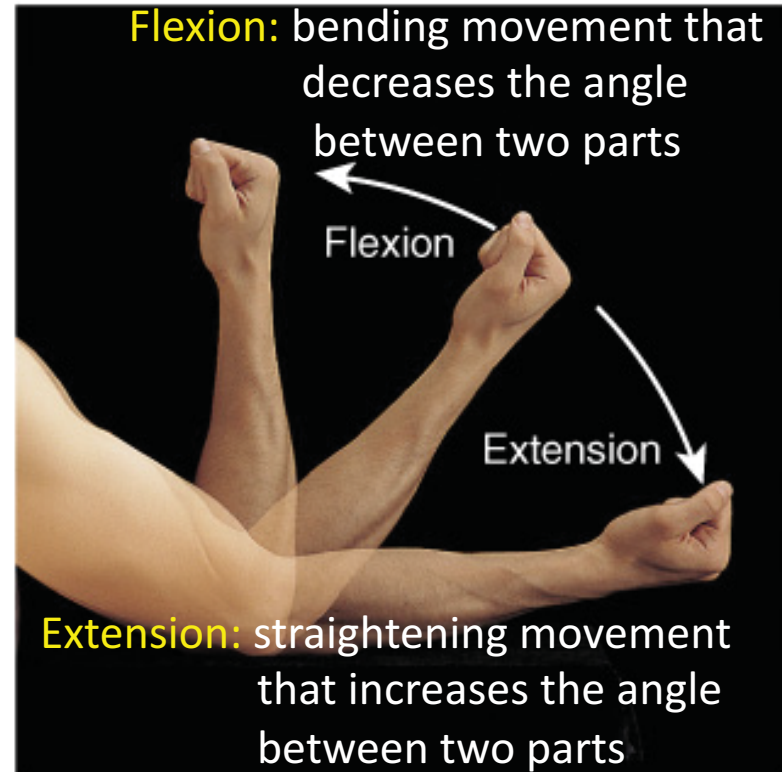
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TERMS OF MOVEMENT



(a) Atlanto-occipital and cervical intervertebral joints

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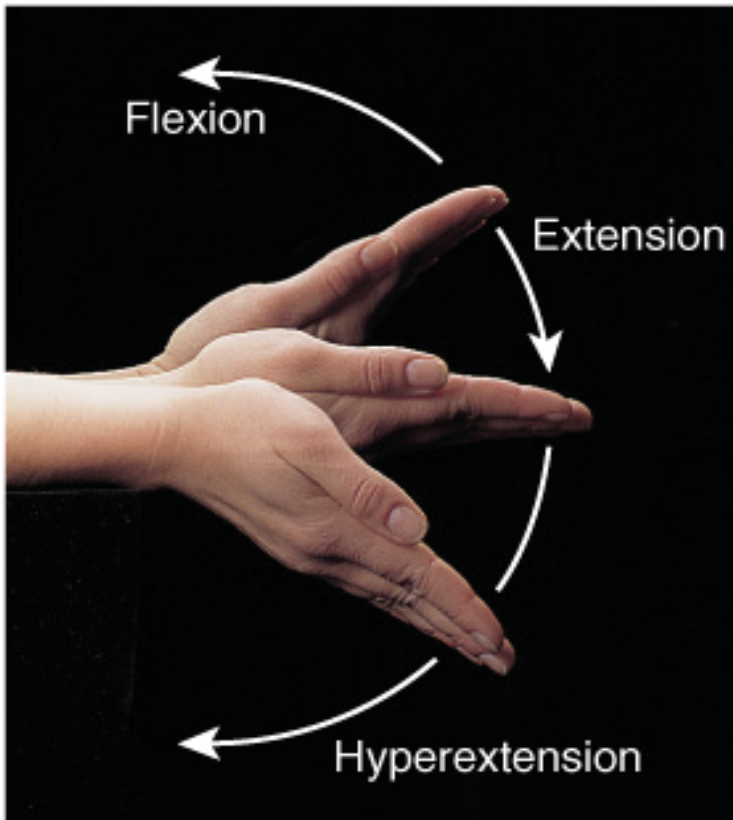
Flexion: bending movement that decreases the angle between two parts

Extension: straightening movement that increases the angle between two parts

(c) Elbow joint

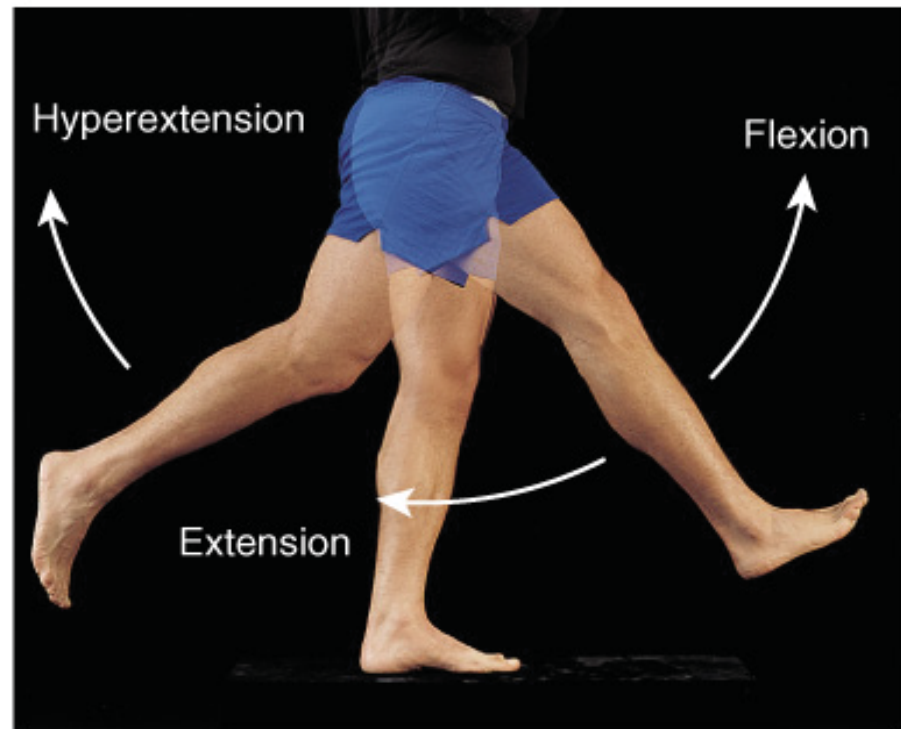
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TERMS OF MOVEMENT



(d) Wrist joint

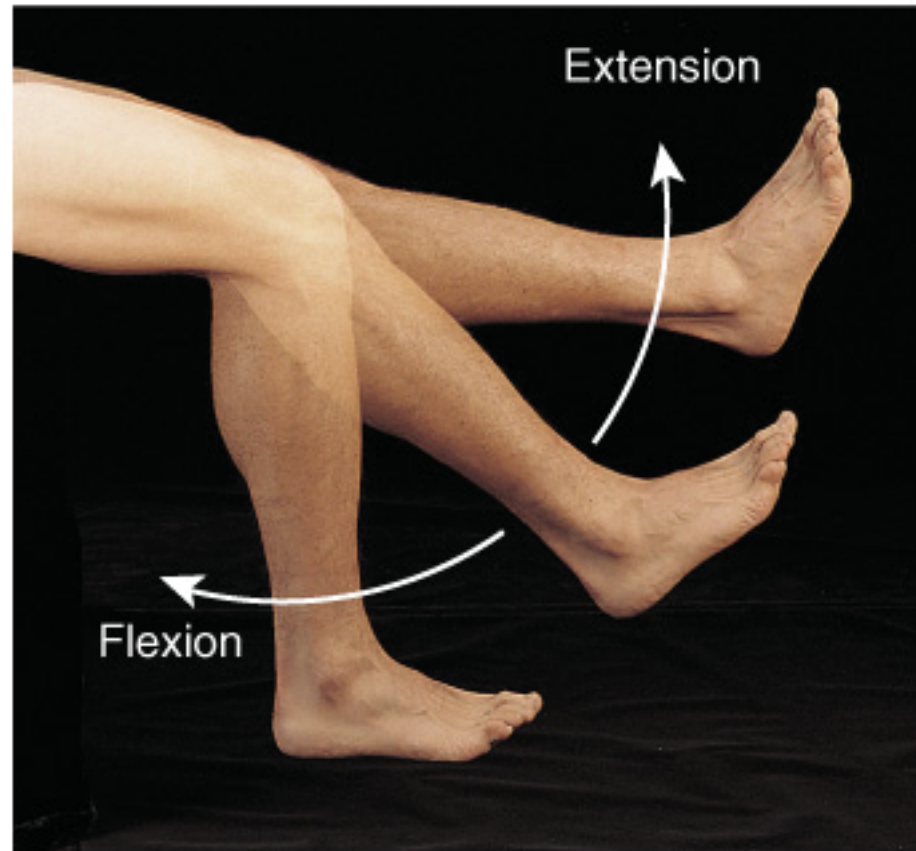
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(e) Hip joint

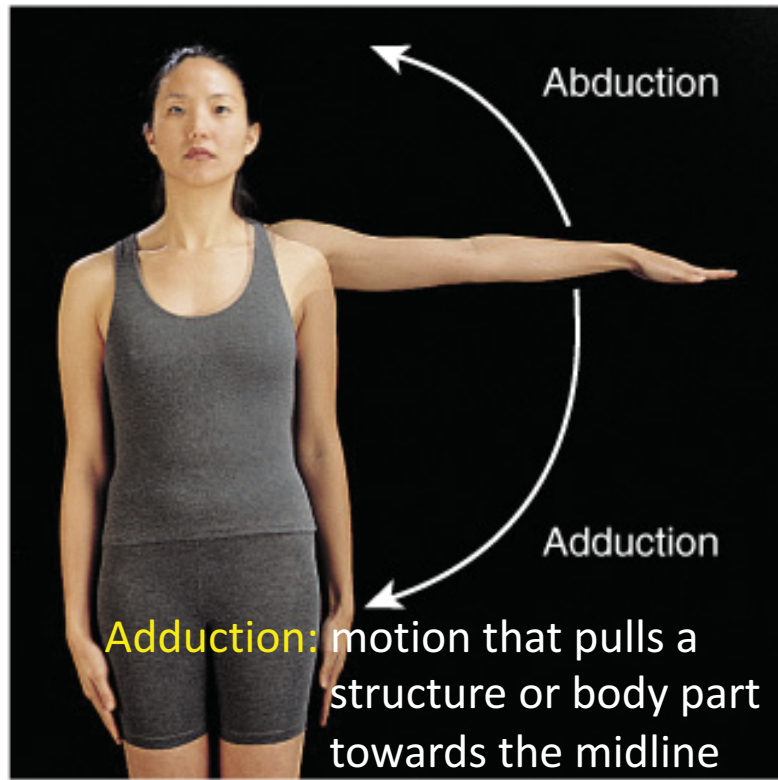
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TERMS OF MOVEMENT



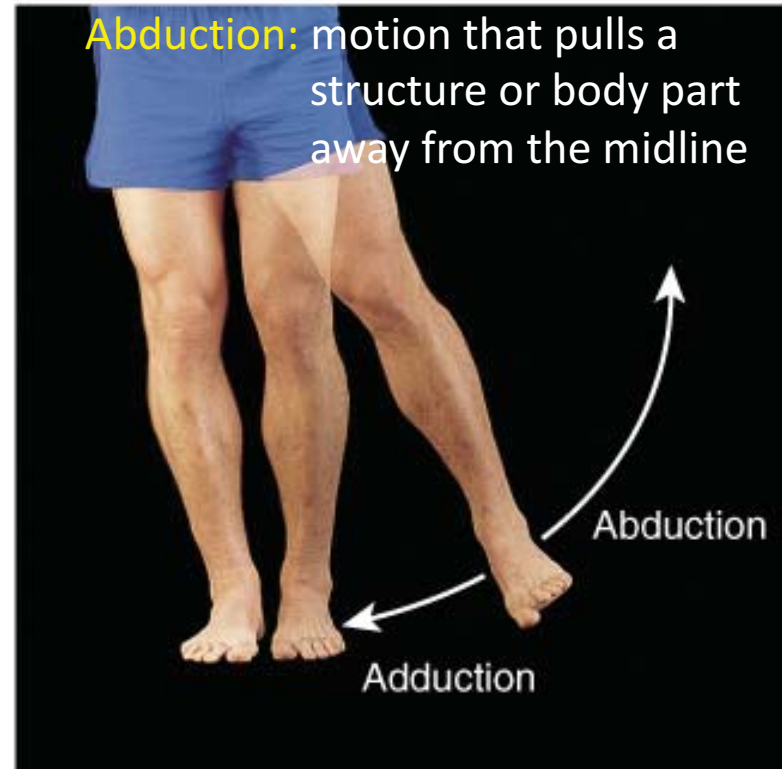
(f) Knee joint

TERMS OF MOVEMENT



(a) Shoulder joint

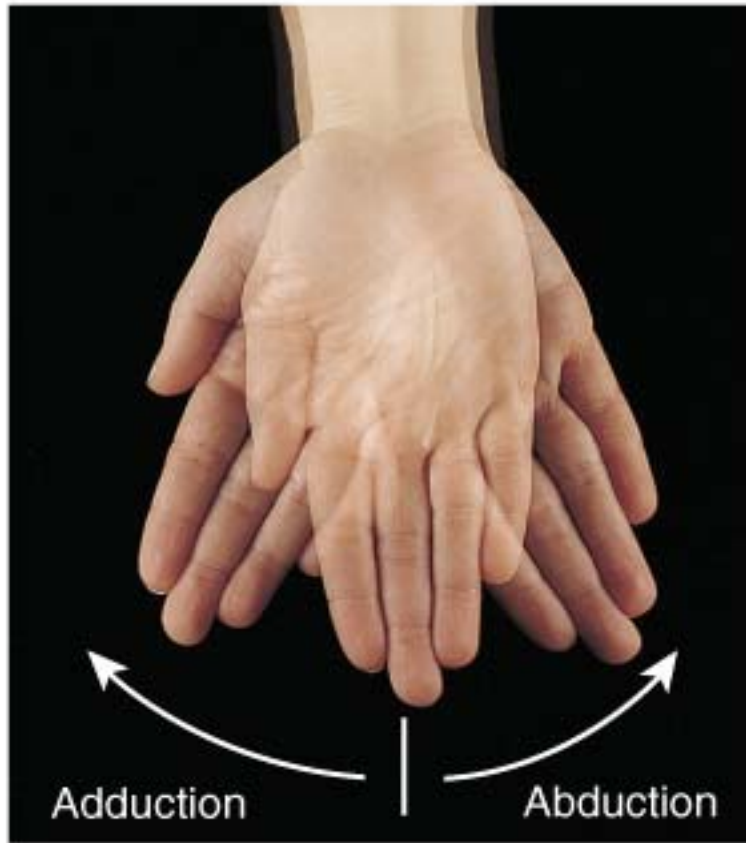
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(c) Hip joint

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TERMS OF MOVEMENT



(b) Wrist joint

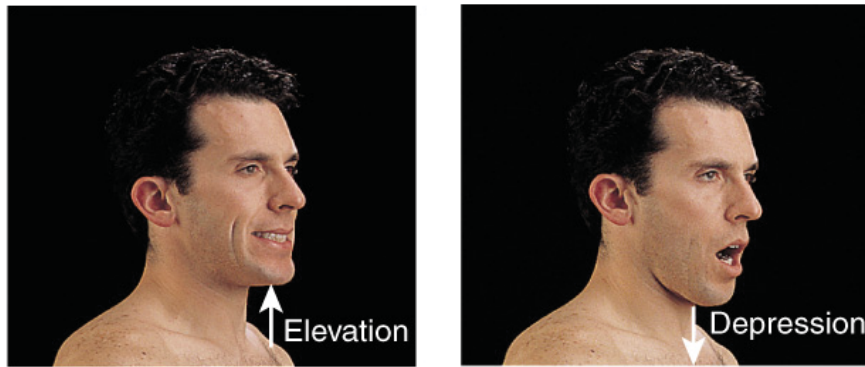
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(d) Metacarpophalangeal joints of the fingers (not the thumb)

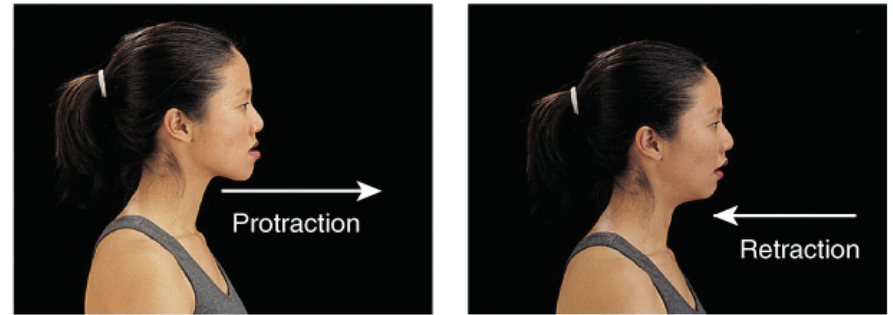
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TERMS OF MOVEMENT



(a) Temporomandibular joint (b)

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(c) Temporomandibular joint (d)

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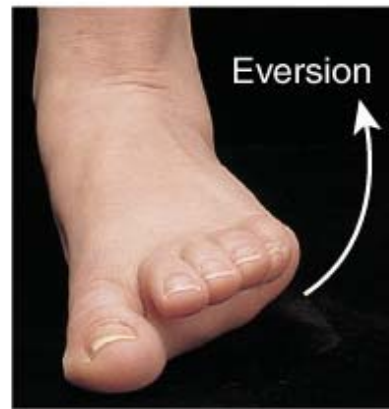
TERMS OF MOVEMENT

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



(e)

Intertarsal joint



(f)

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

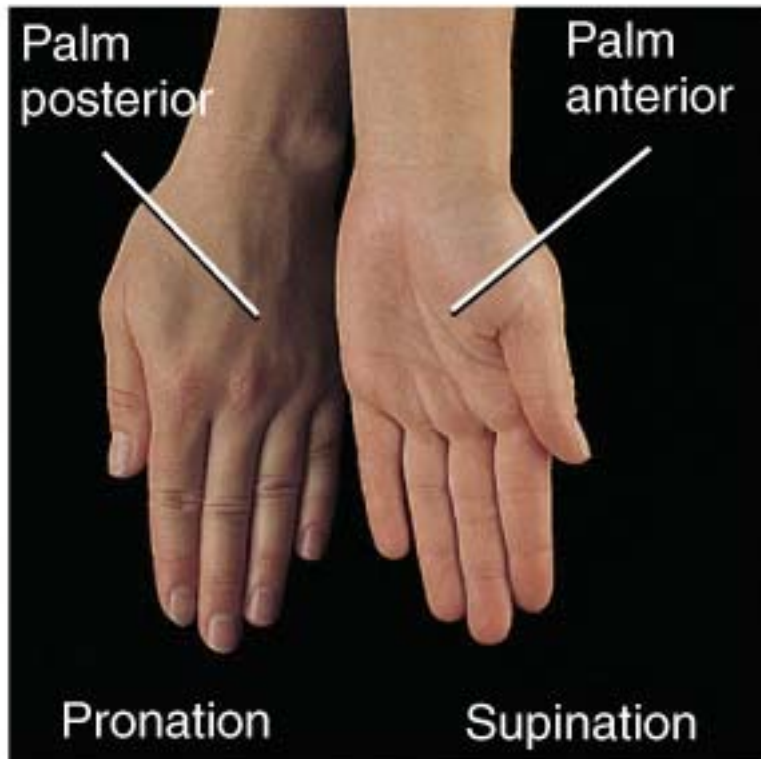
Dorsiflexion: the toes are brought closer to the shin; this decreases the angle between the ankle and the leg



(g) Ankle joint

Flexion: movement which decreases the angle between the sole of the foot and the back of the leg

TERMS OF MOVEMENT



(h) Radioulnar joint

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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.

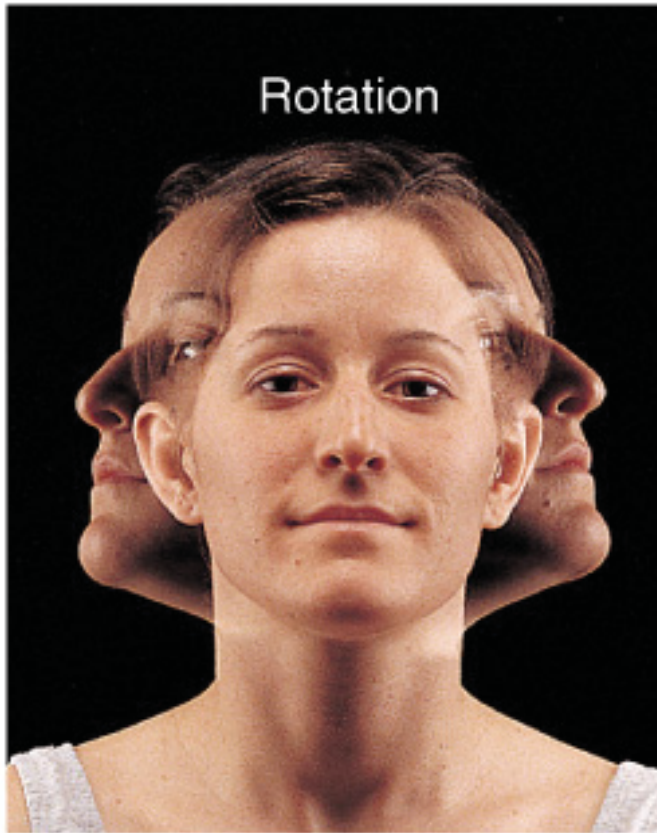
Pronation of the foot refers to turning the foot outwards

Supination: of the forearm occurs when the forearm and palm are turned outwards.

Supination of the foot occurs when the sole is turned inwards

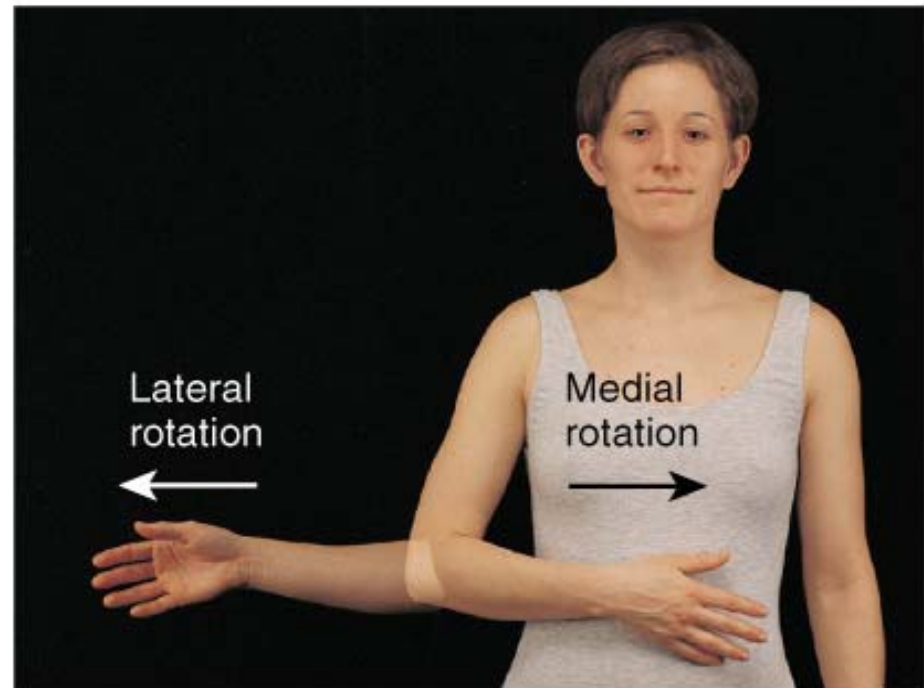
TERMS OF MOVEMENT

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



(a) Atlanto-axial joint

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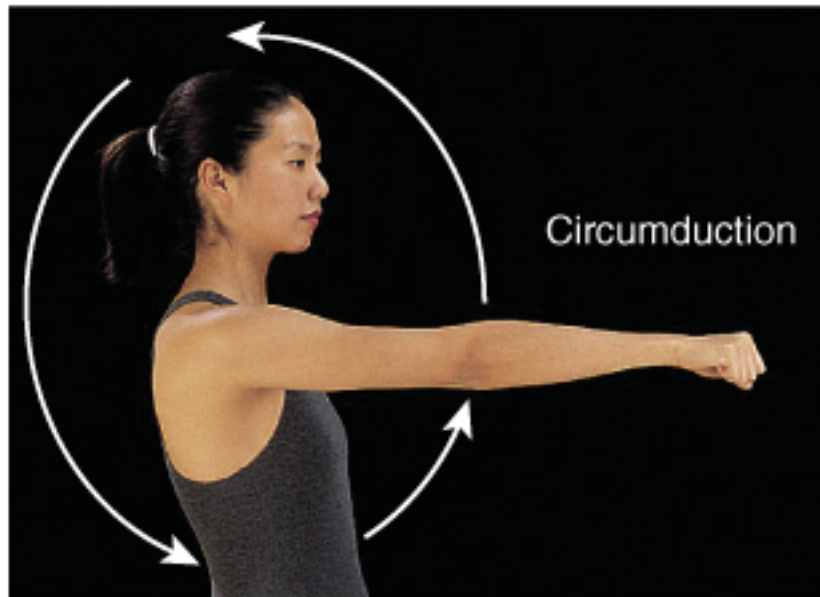


(b) Shoulder joint

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

TERMS OF MOVEMENT

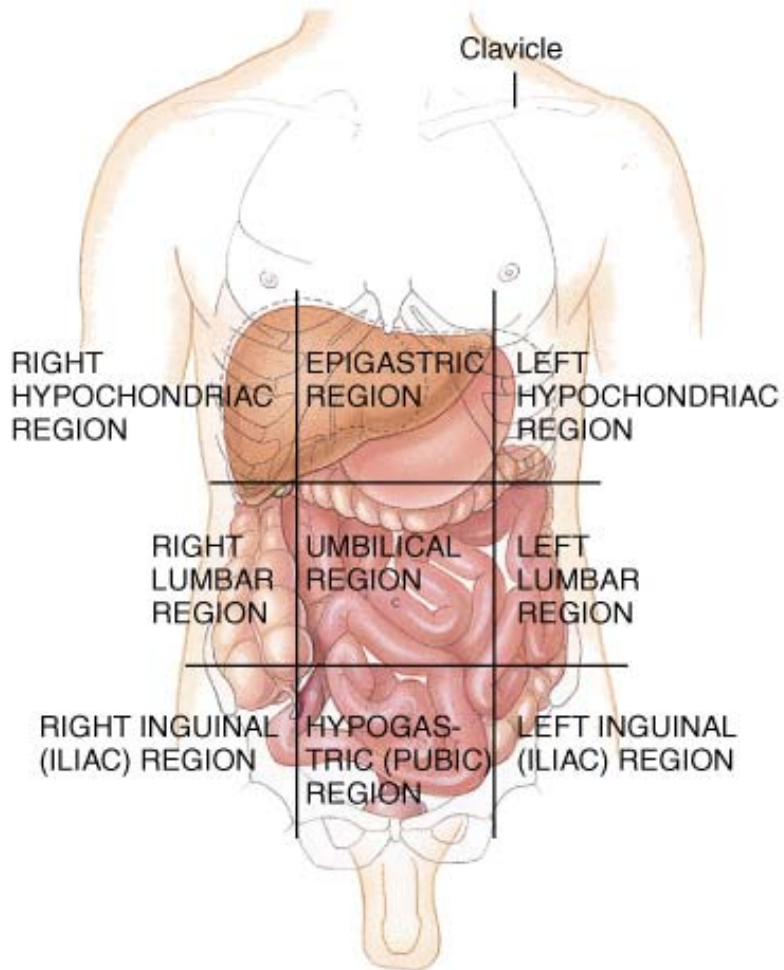


(a) Shoulder joint



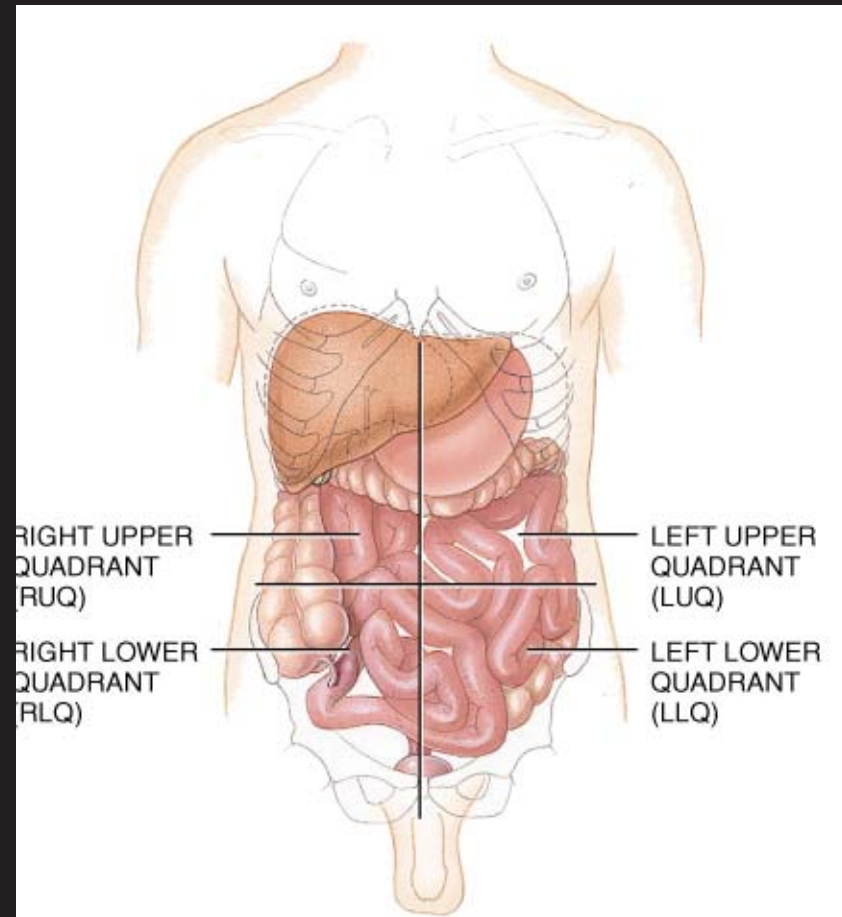
(b) Hip joint

IMAGINARY LINES



(a) Anterior view showing nine abdominopelvic regions

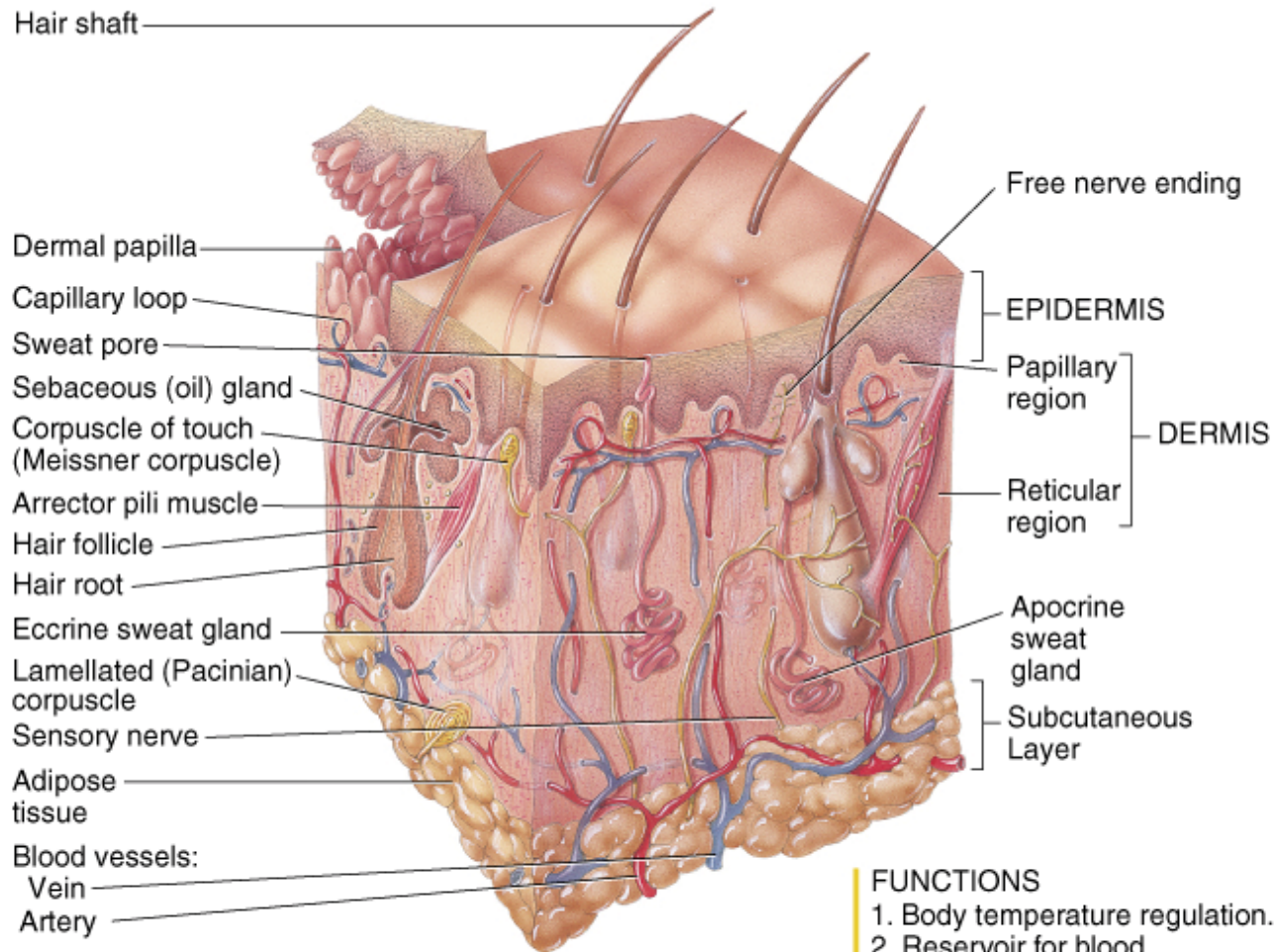
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(b) Anterior view showing abdominopelvic quadrants

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THE SKIN

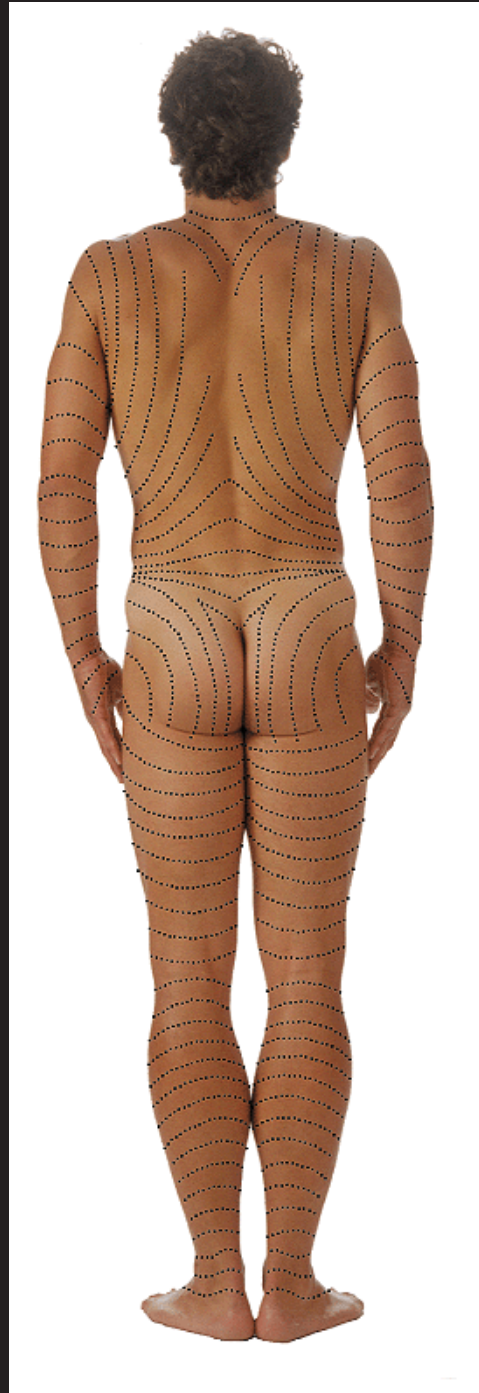


FUNCTIONS

1. Body temperature regulation.
2. Reservoir for blood.
3. Protection from external
4. Cutaneous sensations.
5. Excretion and absorption.
6. Vitamin D synthesis.

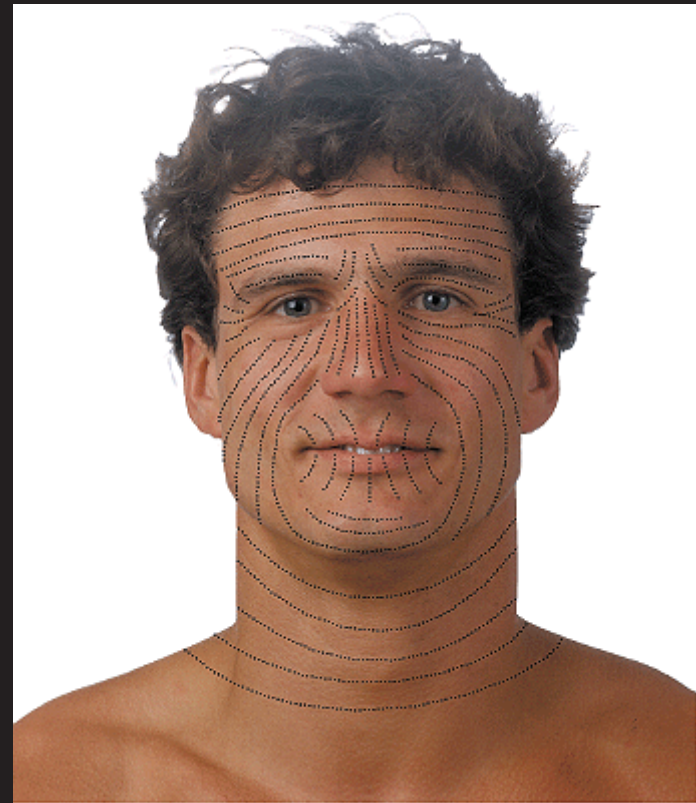
THE SKIN – *Surface Lines*

- 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



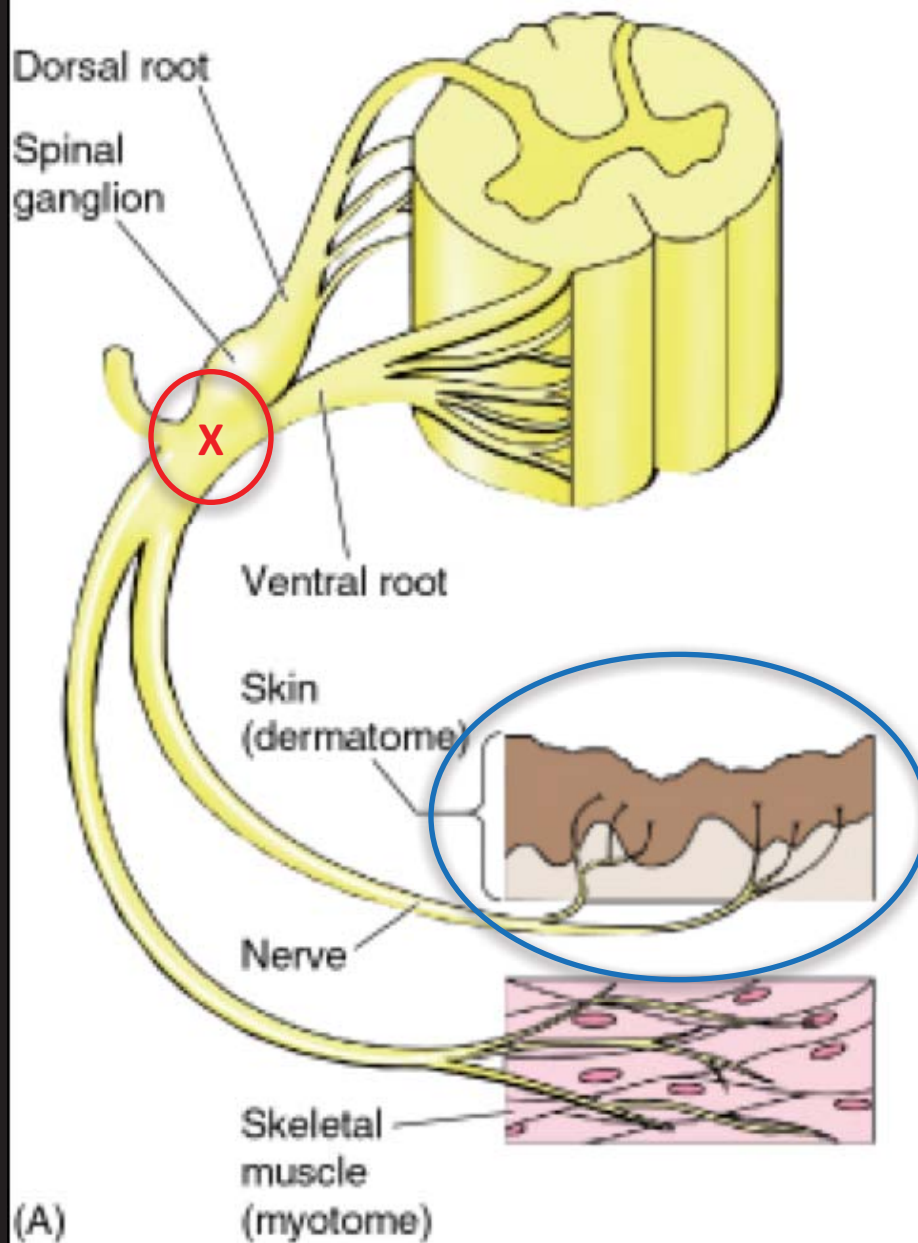
LANGER'S LINES

LANGER'S LINES



DERMATOMES

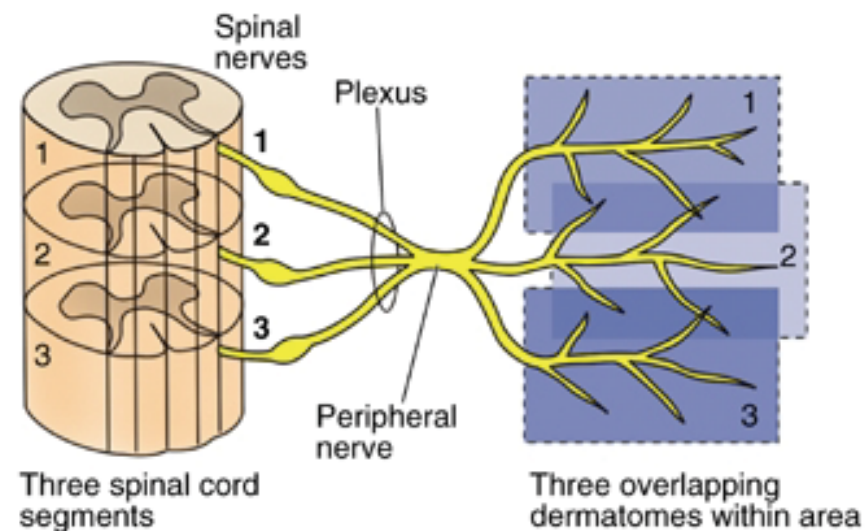
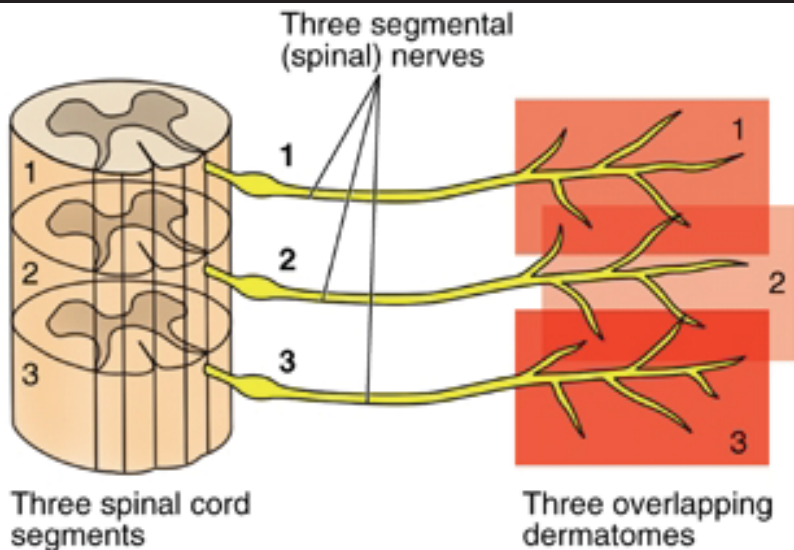
- A **dermatome** is an area of skin supplied by the sensory fibers of a single dorsal root through the dorsal and ventral rami of its spinal nerve.
- Dermatomes are arranged in a *segmental* fashion because the thoracoabdominal nerves arise from segments of the spinal cord.
- *Adjacent dermatomes overlap.*
- 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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DERMATOMES

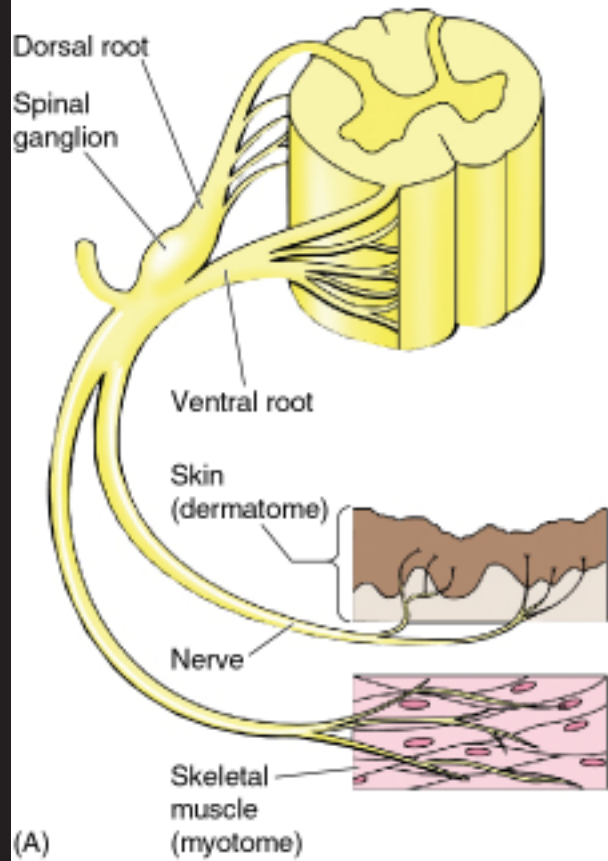
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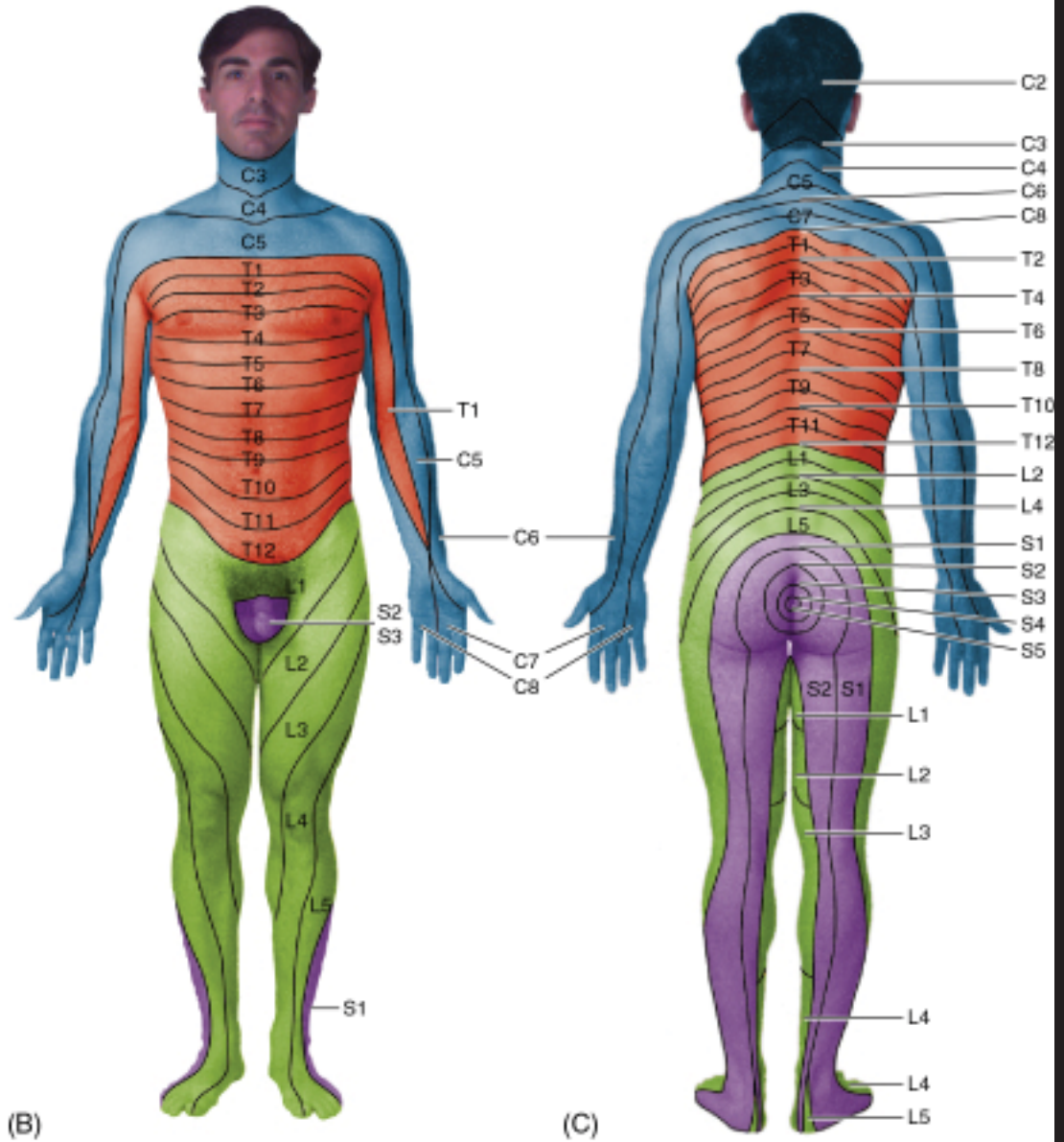
Posterolateral views • Segmental innervation of skin by three separate spinal nerves

• Innervation of skin by three spinal nerves combined into one peripheral nerve through plexus formation (*dotted line*)

1.20. Dermatomes and myotomes.



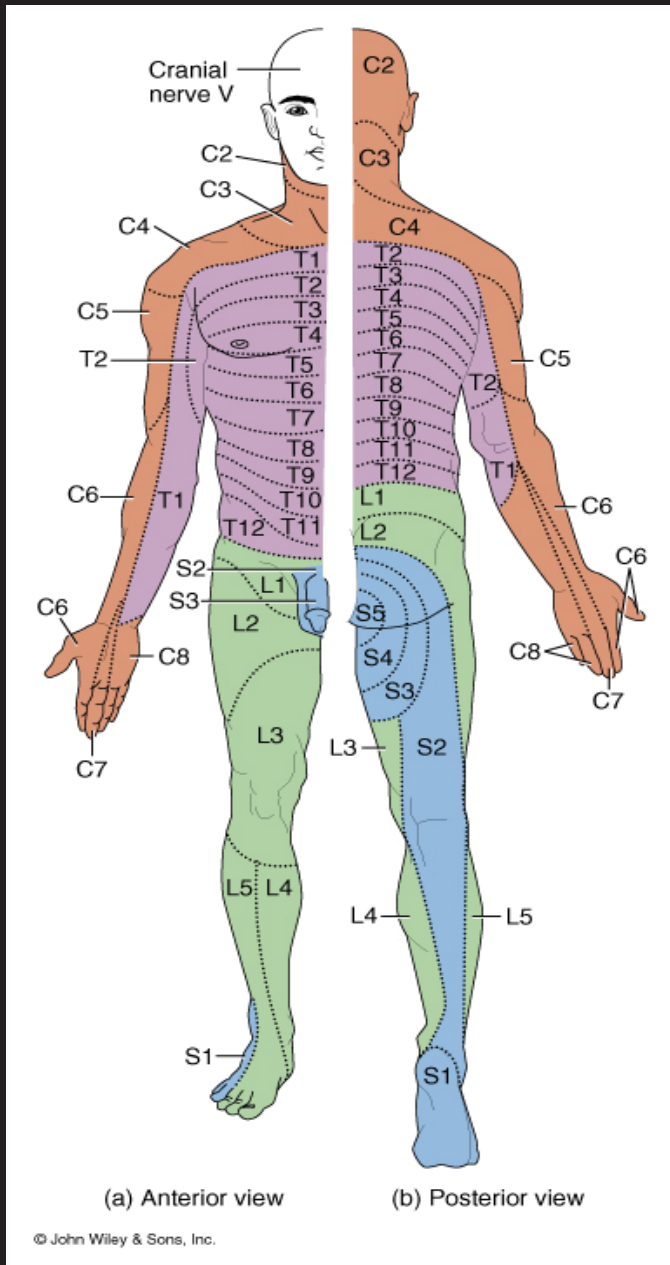
(A)



(B)

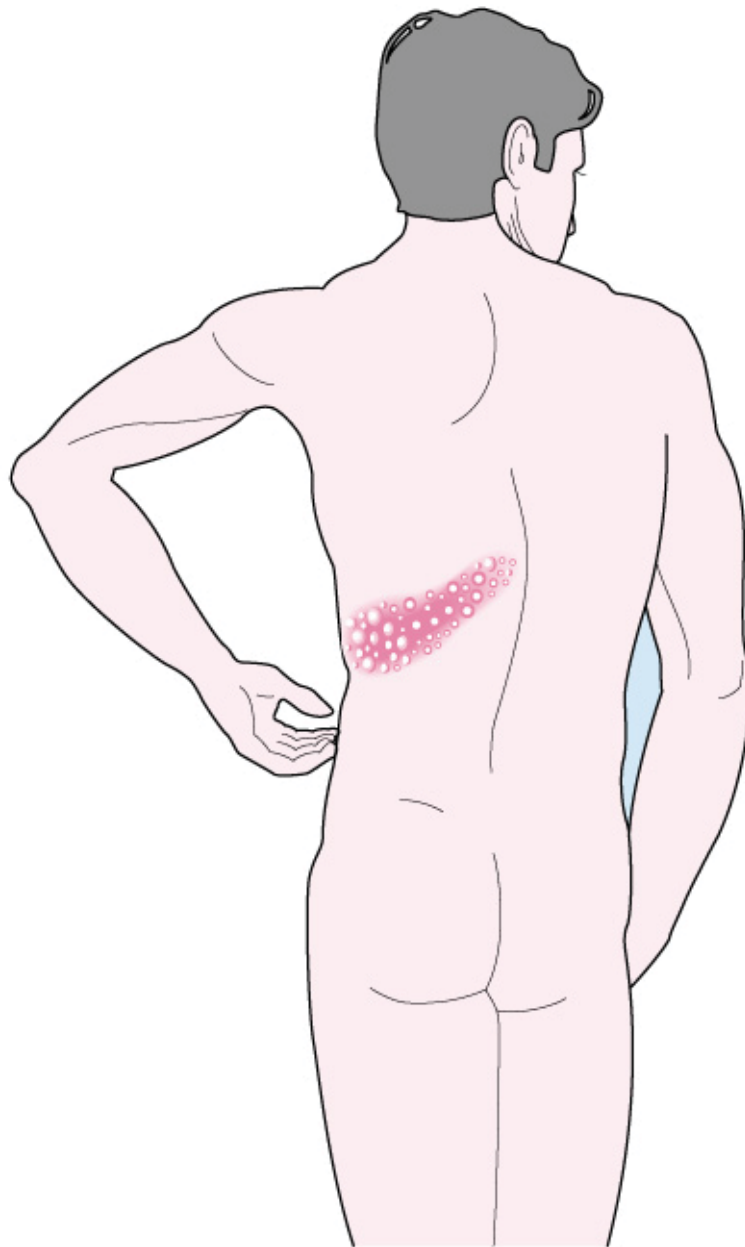
(C)

DERMATOMES



TQ

- 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.

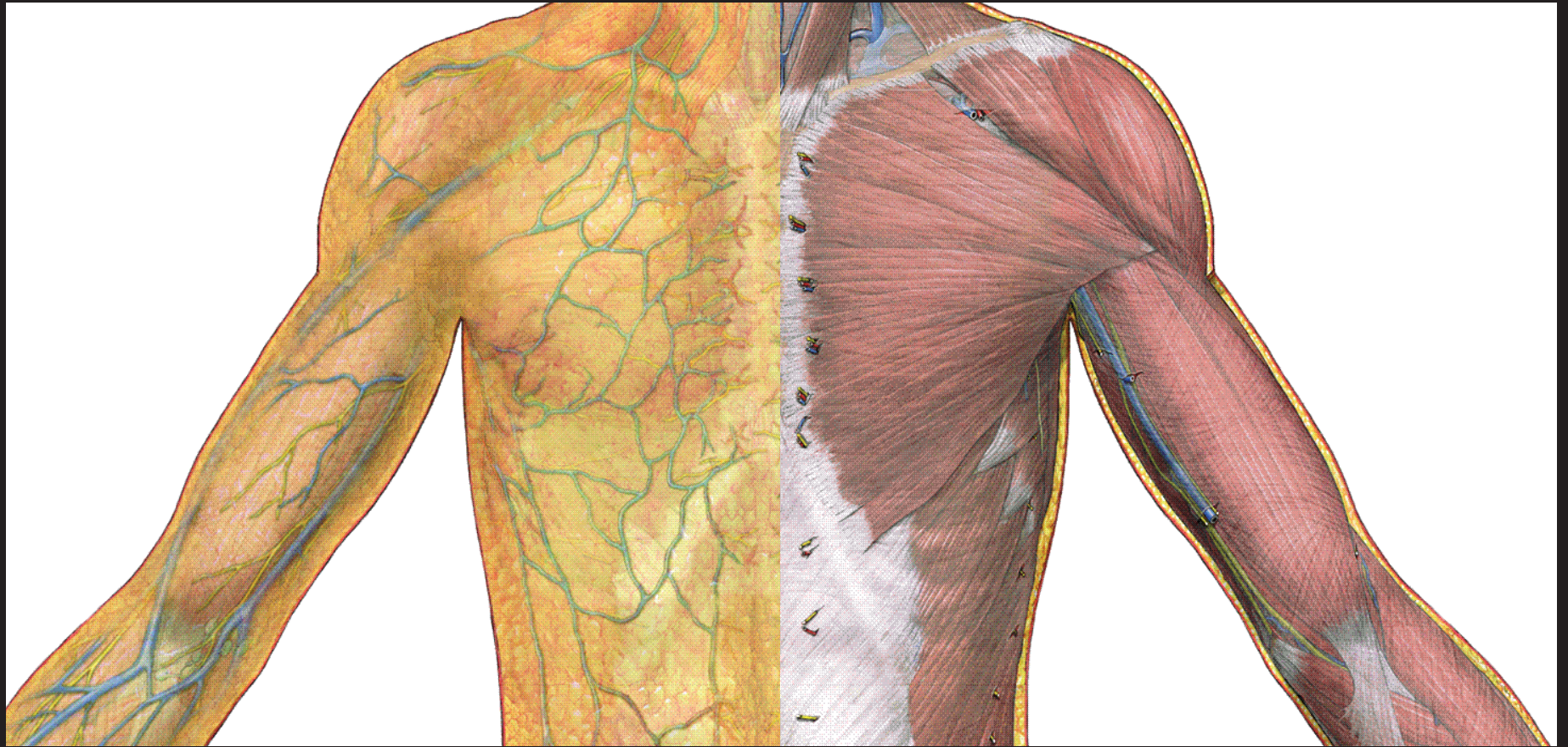
FASCIA AND FASCIAL PLANES

- 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

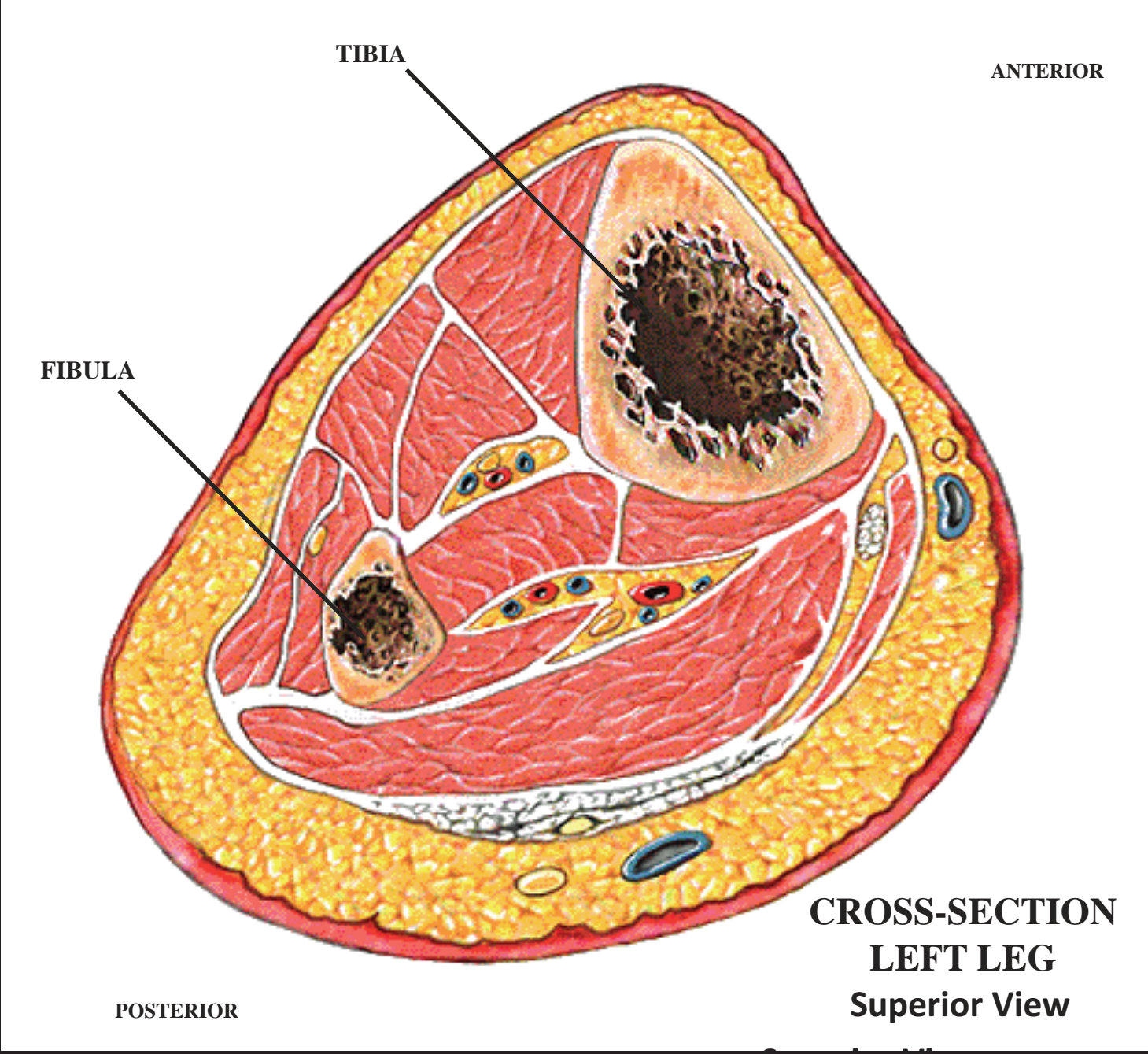
- The *deep fascia* is a dense, more organized connective tissue layer that invests deep structures (e.g. muscles).
- The deep fascia sends radial projections to deeper structures and bones forming compartments.

FASCIA



SUPERFICIAL

DEEP



TIBIA

ANTERIOR

FIBULA

POSTERIOR

CROSS-SECTION
LEFT LEG
Superior View

THANK YOU...

