

ANATOMY

Introduction

Definition :

- It's a part of biological science that deals with structures (man or animals).
- It derived from the Greek ward which means *cutting-up, dissection* :
- Ana : dissect
- tomy : abdomen
- Dissection is used to cut a body or remove organs in the body.

Study of anatomy :

■ Approached by different methods :

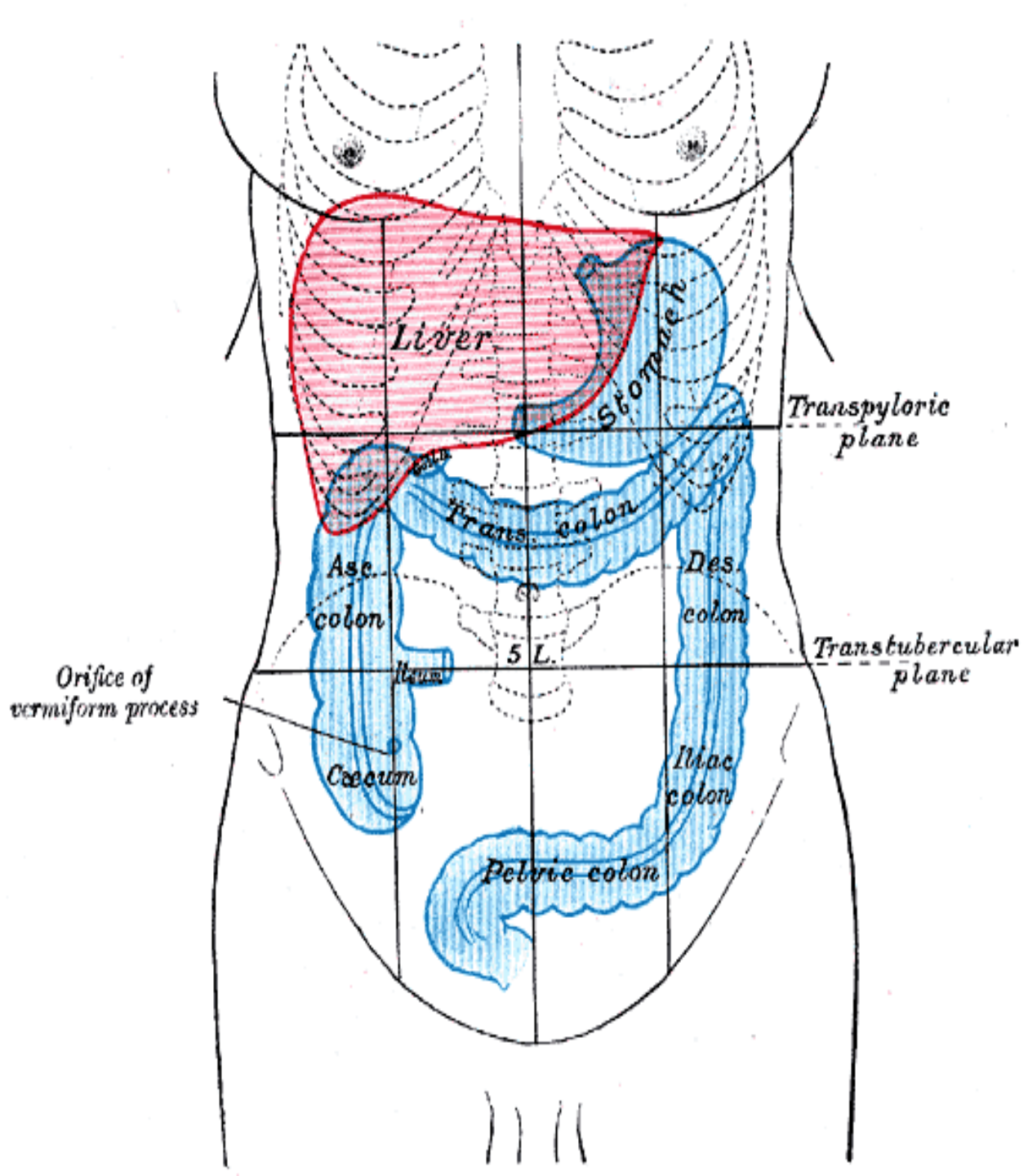
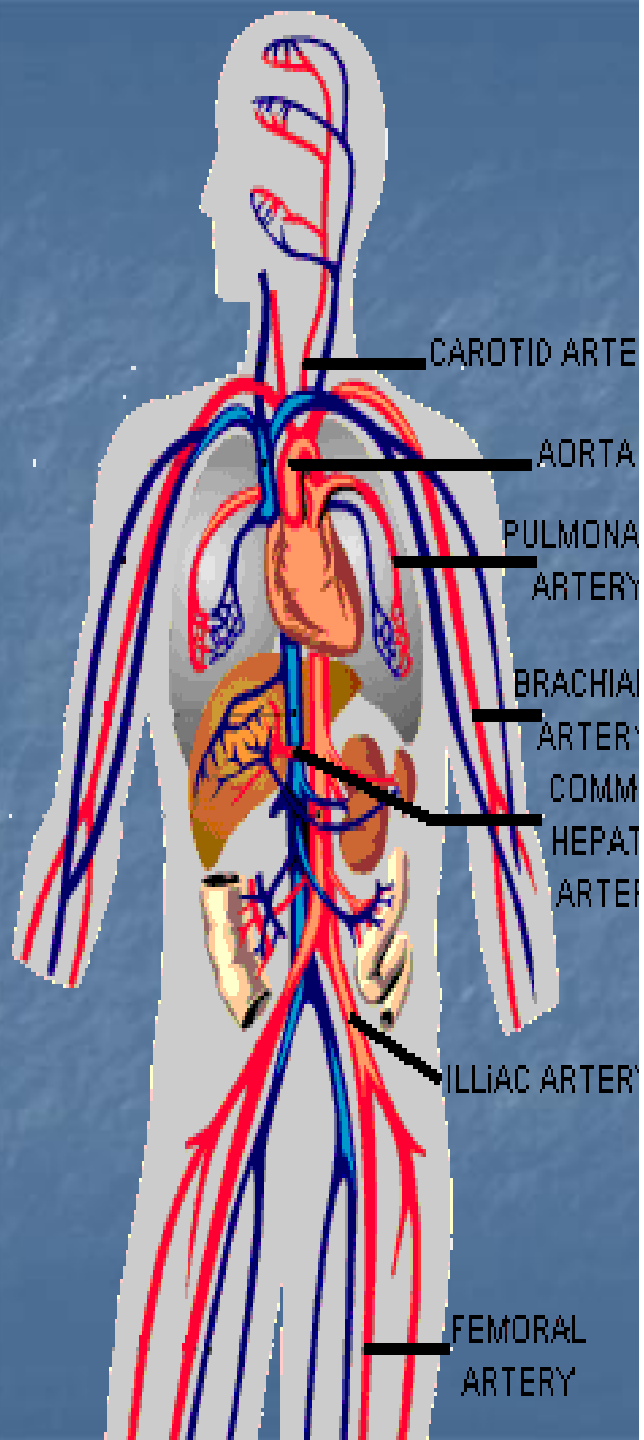
1. **Systems:** systematic anatomy

2. **Regions:** regional anatomy

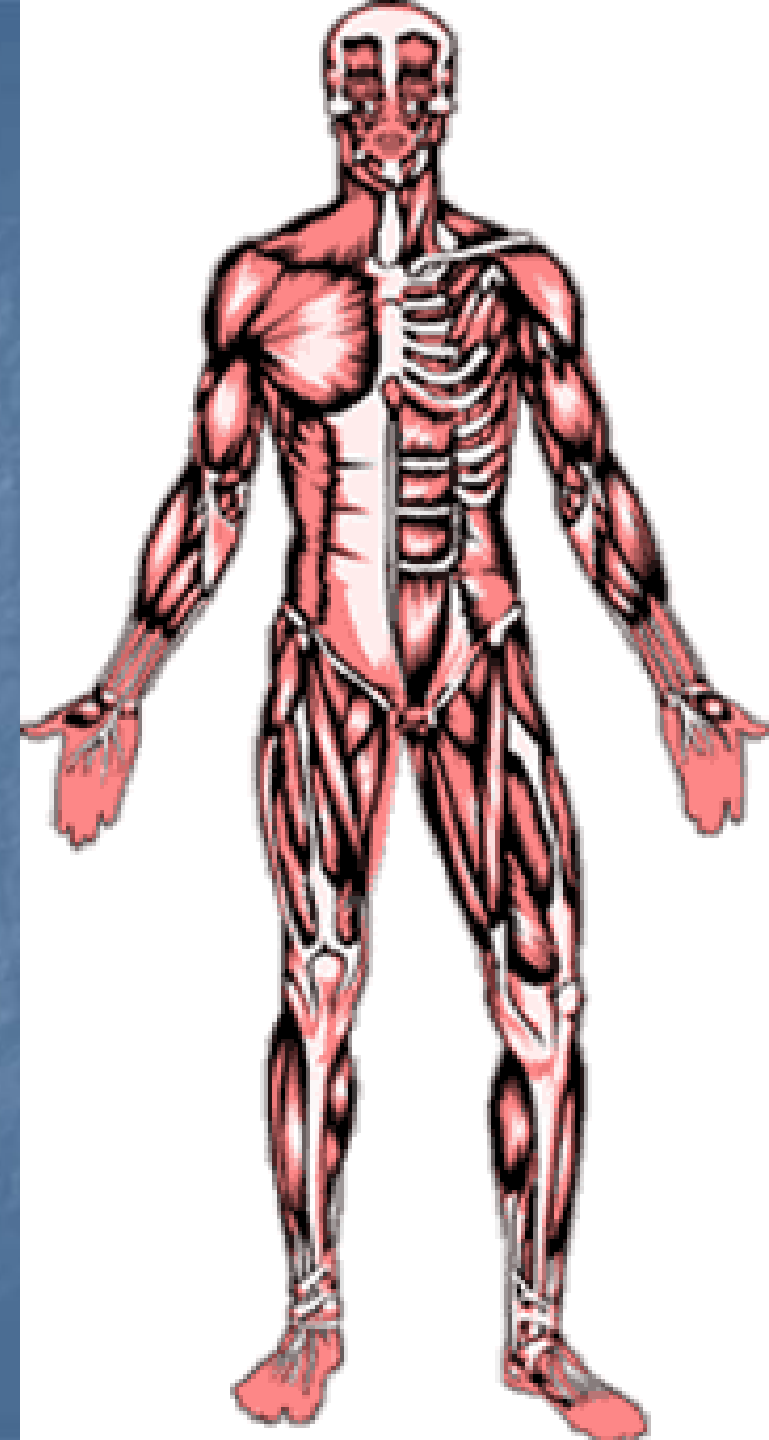
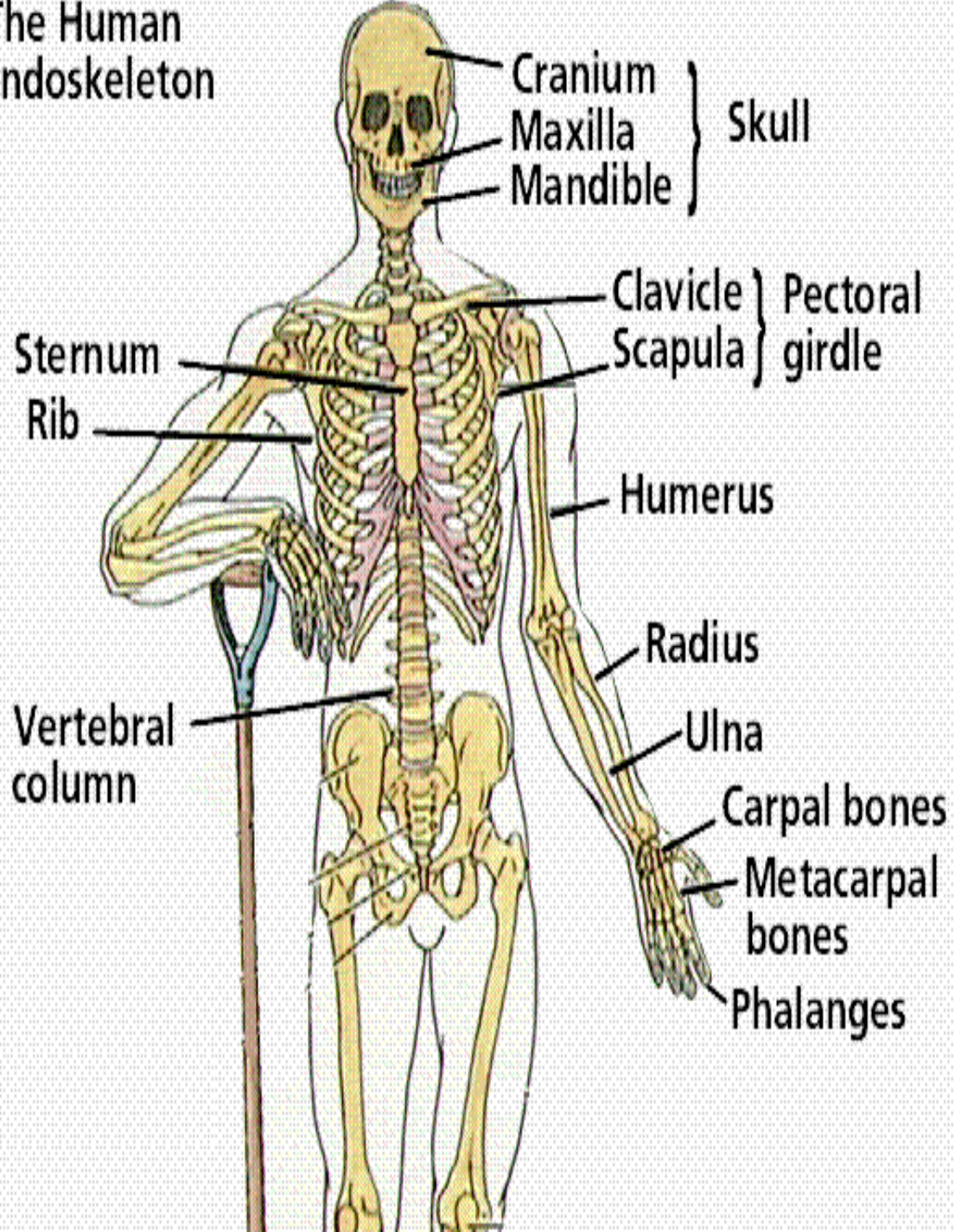
3. **Composition method:** it compose the two other methods, considered with special reference to it's medical & surgical bearing which is called **practical** or **applied** anatomy.

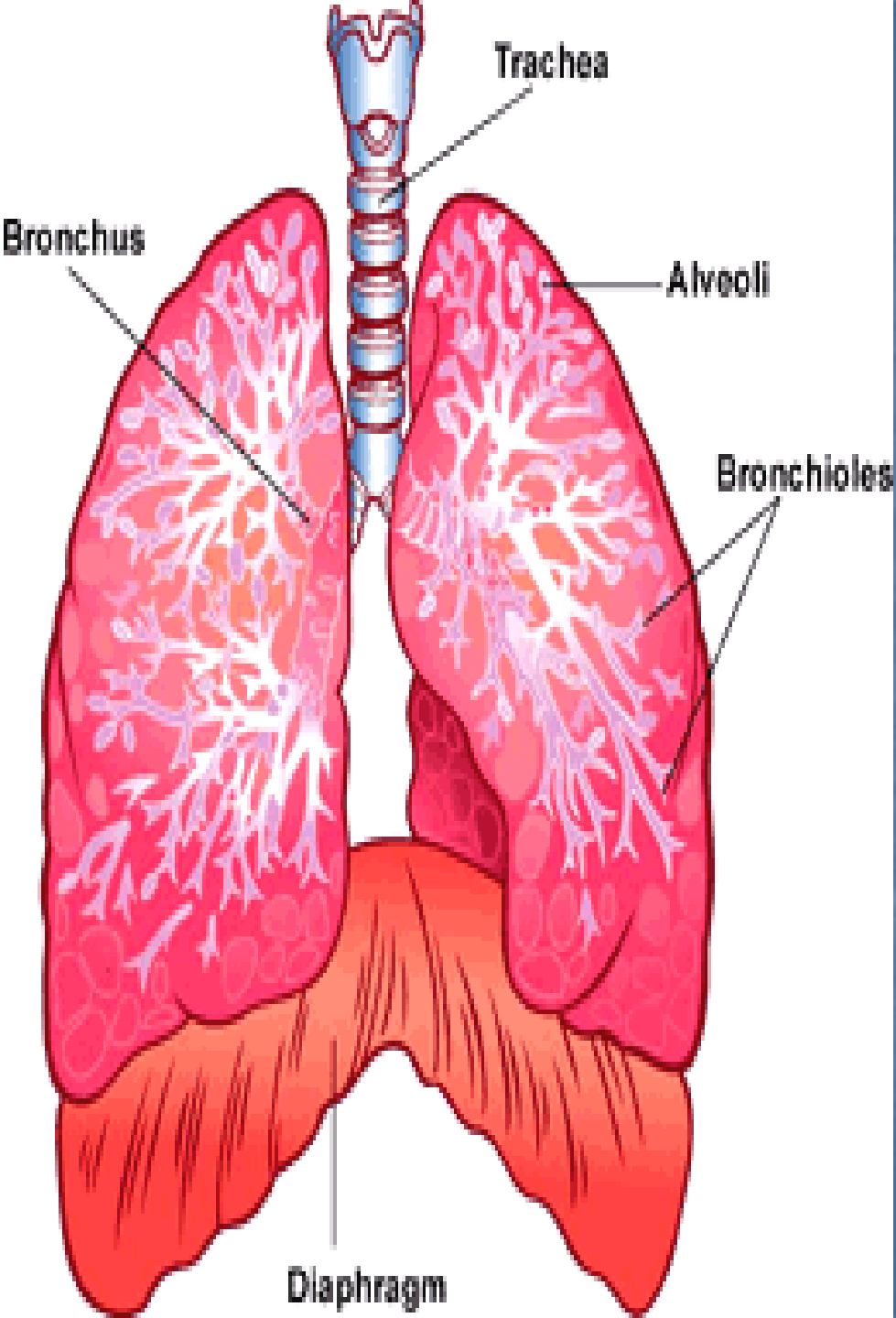
[A] Systems :

- our body is made up by one or more organs, joined to carry out a group of actions or activities which maintains the life of our body.
- Many systems found like :
 - * **Skeleton** { osteology }
 - * **Joints** { arthrology }
 - * **Muscles** { myology }
 - * **Nervous s.** { neurology } : brain, spinal cord, organs of special sense.
 - * **Cardiovascular s.** : heart, blood, vessels.
 - * **Viscera** : Digestive s.
Respiratory s.
Urinary s.
Genital s.



The Human Endoskeleton





Anatomy of the Brachial Plexus - Copy

Major terminal branches	Cords	Divisions	Trunks	Roots (ventral ram)
Musculo-cutaneous	Lateral	Anterior	Upper	C5
		Posterior		C6
Median	Medial	Anterior	Middle	C7
		Posterior		
Ulnar	Medial	Anterior	Lower	C8
		Posterior		T1

Schematic Overview of the Brachial Plexus

This diagram shows the human torso and right arm, highlighting the **Brachial plexus** of nerves. The plexus is formed by the ventral rami of the **Cervical vertebrae (7)** and the **First rib**. It passes over the **Clavicle** and under the **Sternum**. The plexus branches into several major nerves: the **Musculo-cutaneous nerve**, **Median nerve**, and **Ulnar nerve**. The **Radial nerve** is also shown, passing along the **Humerus**, **Radius**, and **Ulna** bones of the arm.

ANTERIOR VIEW

Enlarged View of the Brachial Plexus

[B] Regions :

➤ from anatomical point of view the body is divided into a number of regions each of them contains variety of tissues, organs

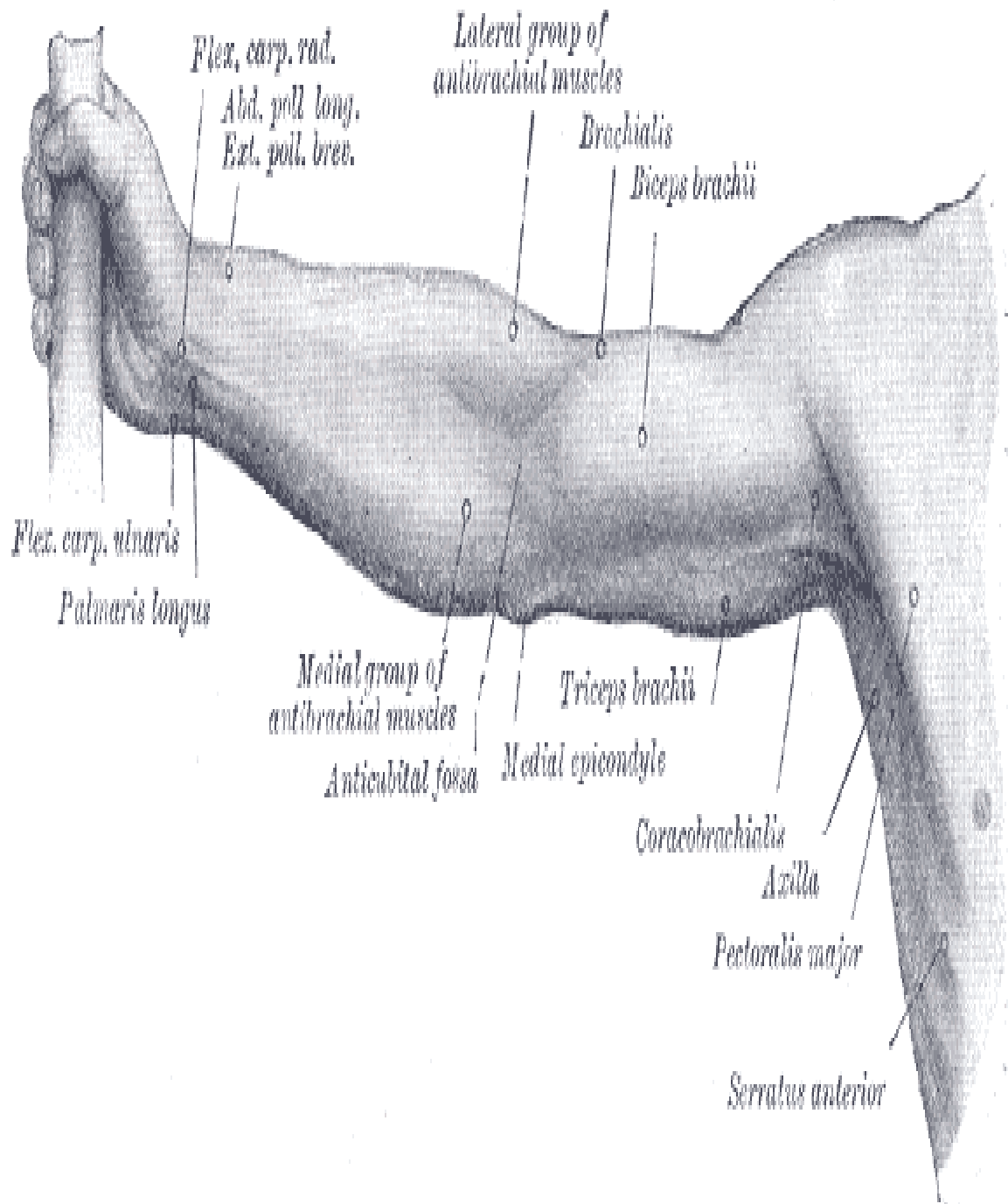
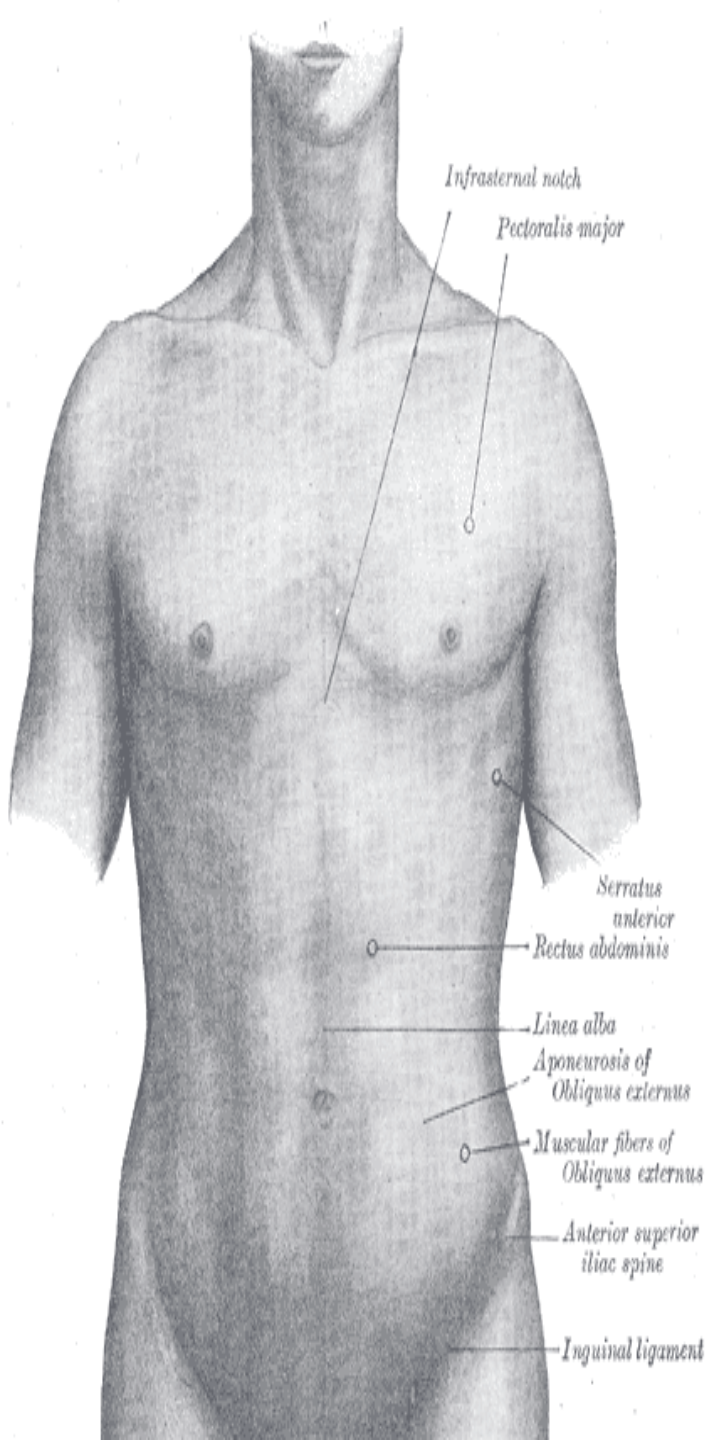
➤ **Examples :**

1- **Head & Neck** : brain, skull, eyes, ears.

2- **Trunk** → **Thorax** : heart, lungs, ribs
→ **Abdomen** : pancreas, stomach, intestine

→ **Pelvis & Perineum** : bladder.

3- **Limbs** : upper & lower limbs.

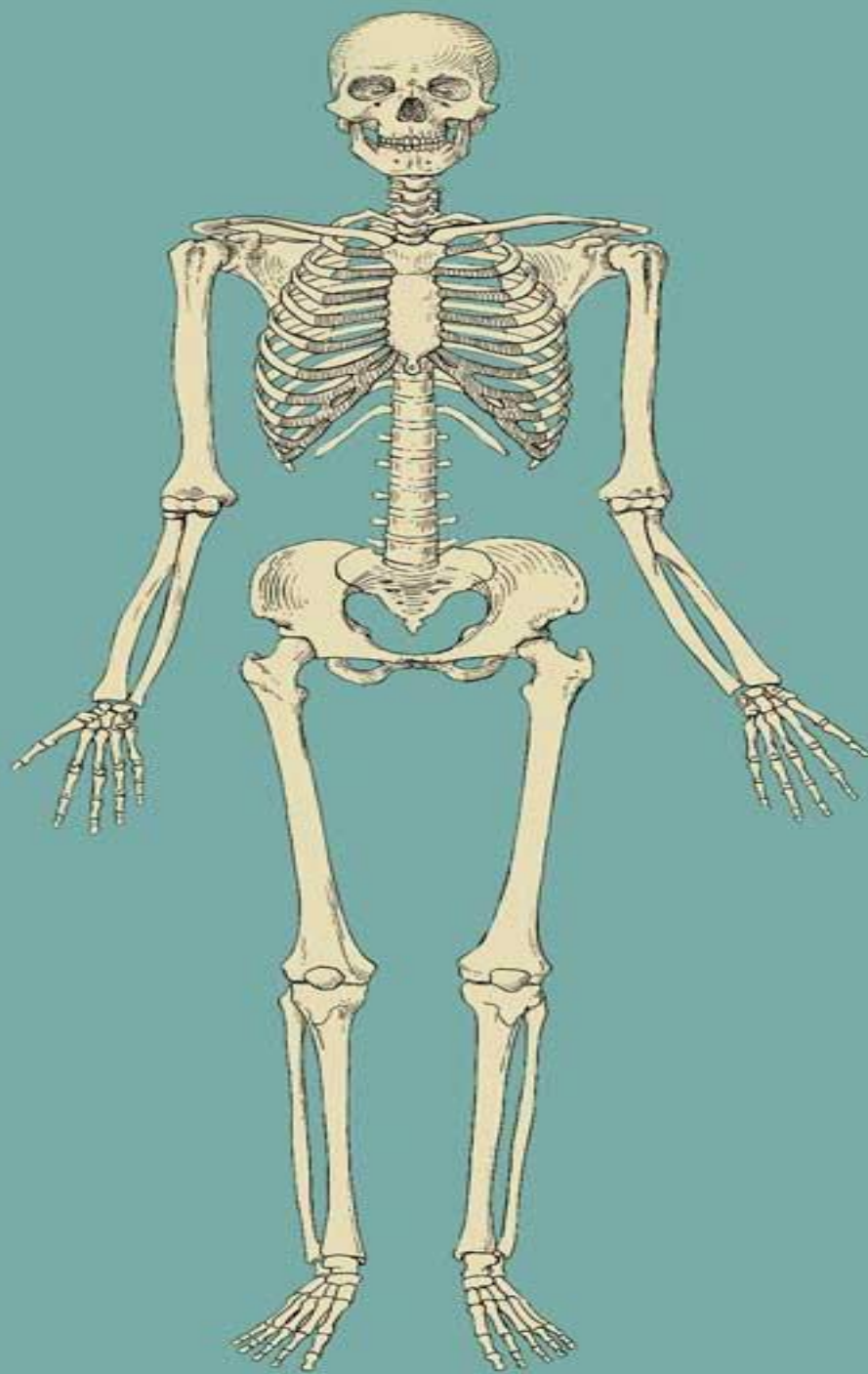


Descriptive Terms

➤ For descriptive purposes, the human body is regarded as standing erect.

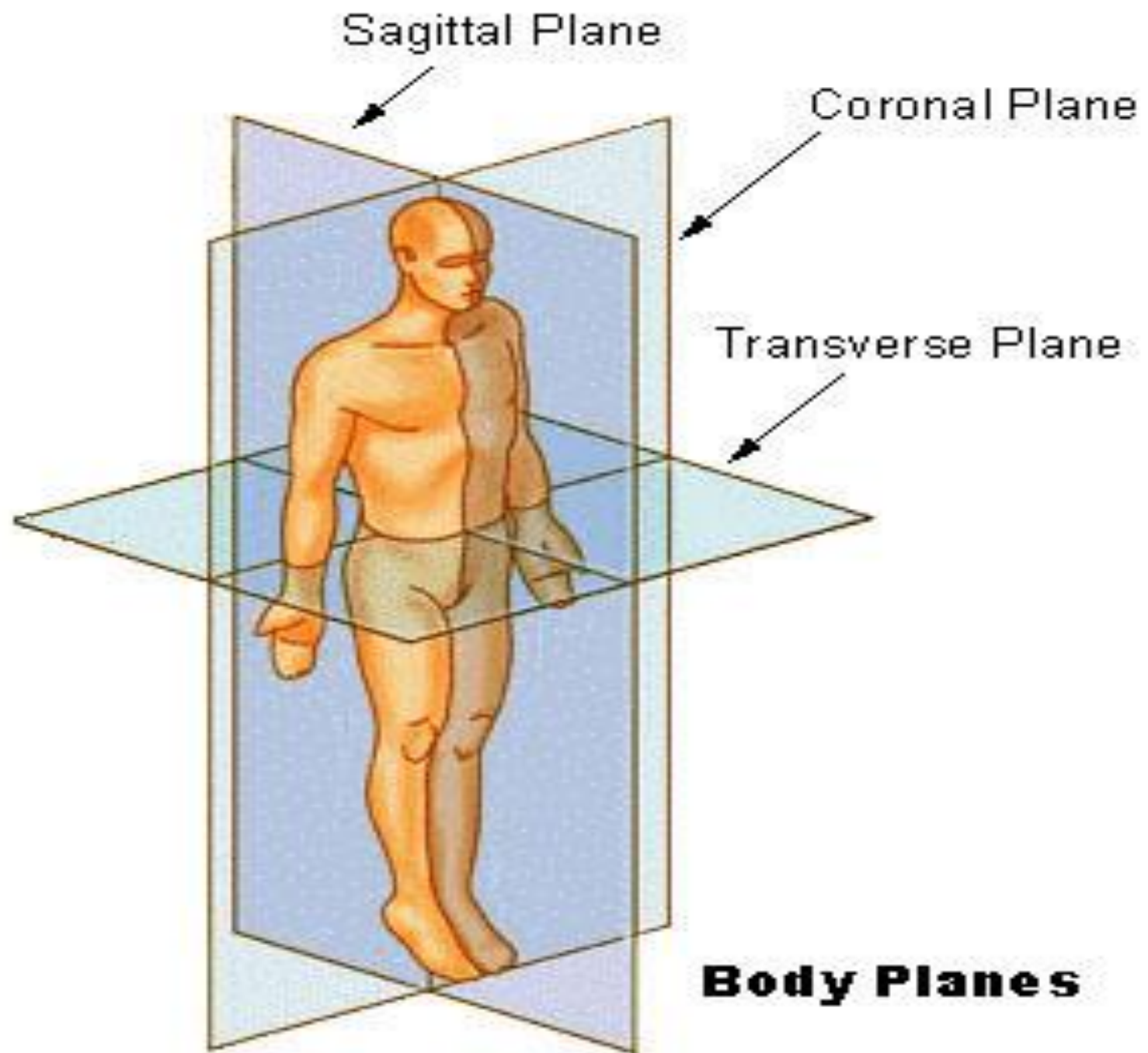
➤ the anatomists agreed of a standard terms :

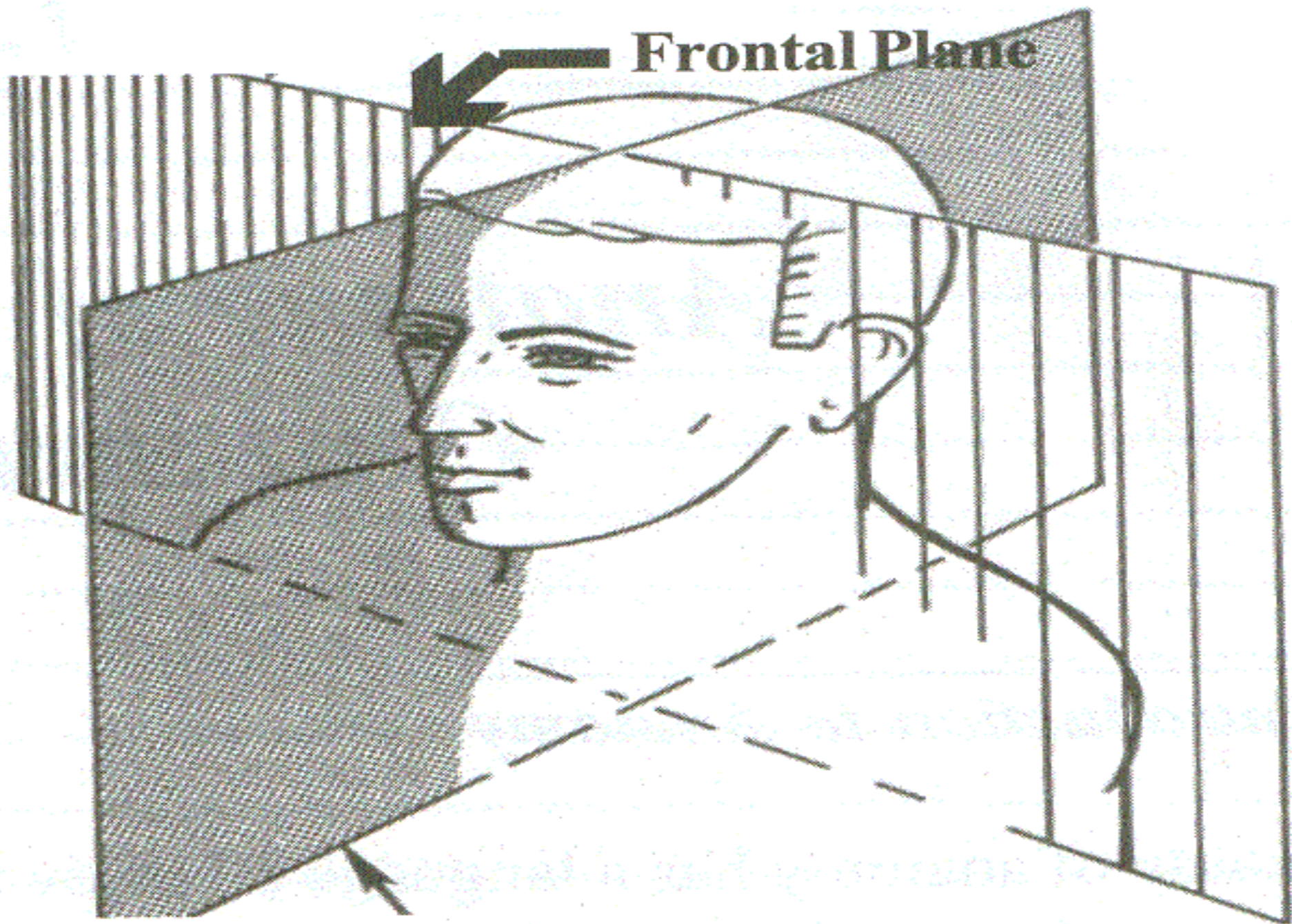
[1] **Anatomical position** : in this position the body standing upright, the eyes looking forward to the horizon, the arms by the sides, & the palms of the hands & the toes directed forward.



[2] Planes :

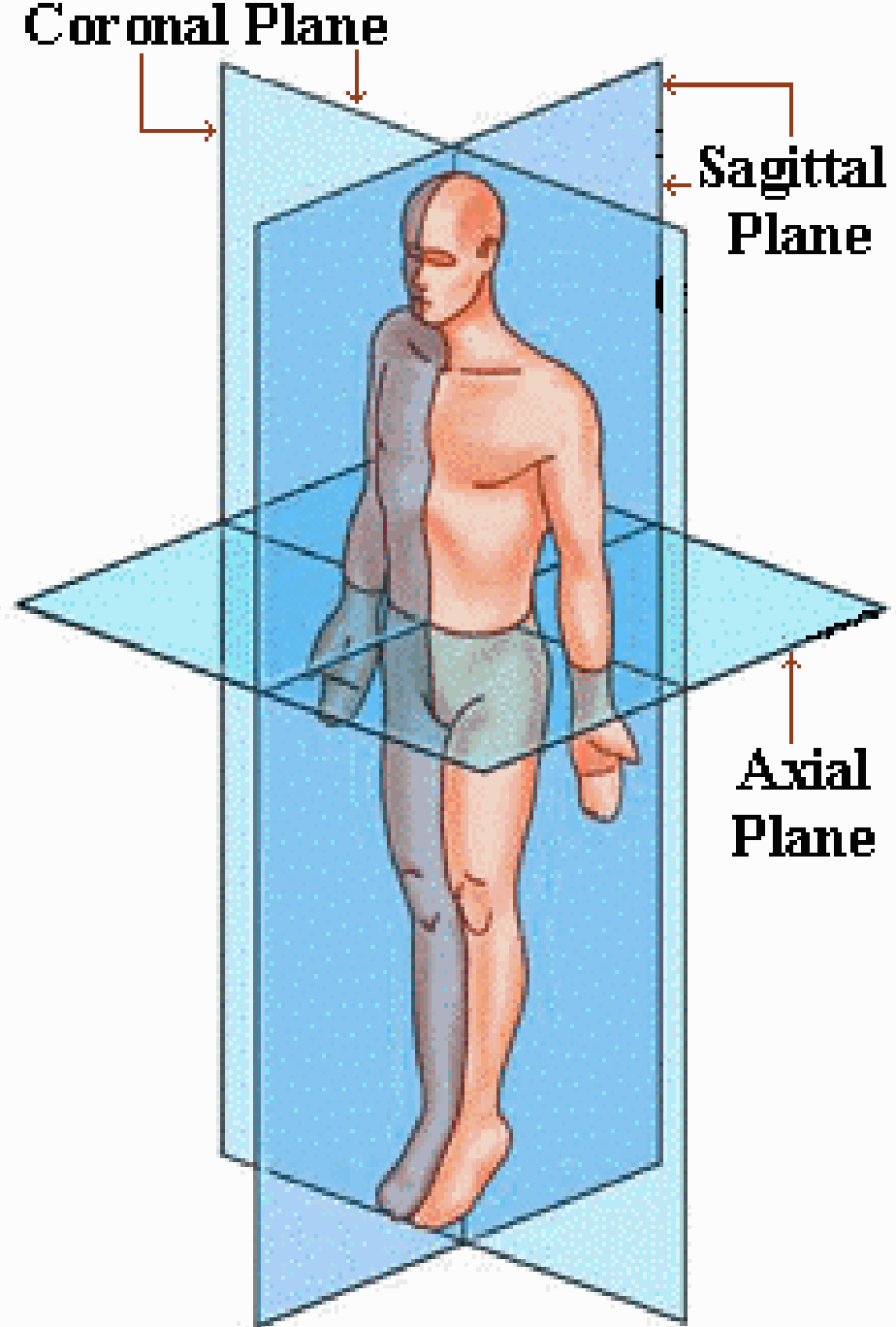
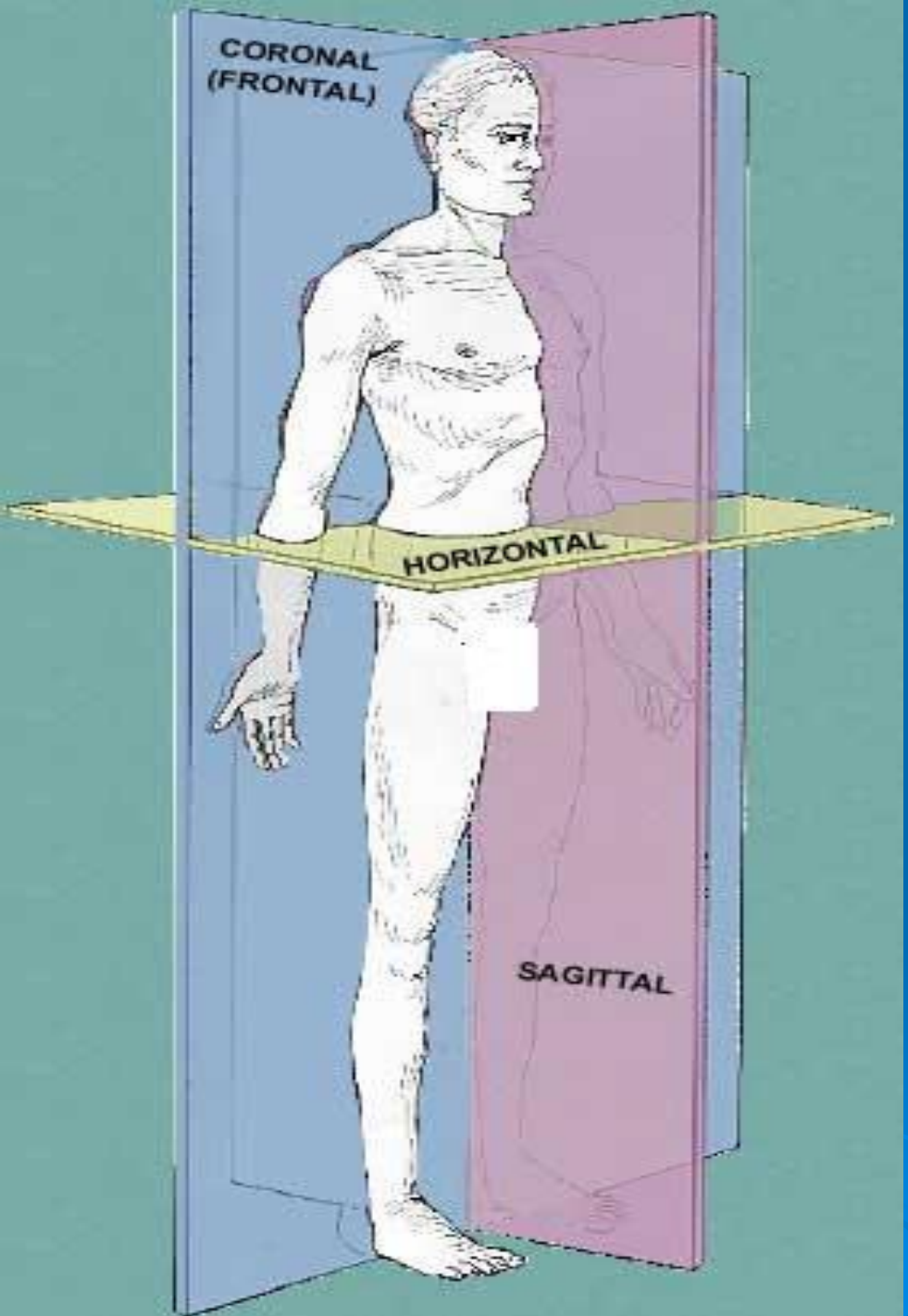
- 1. Sagittal plane** : is any vertical antero-posterior plane parallel to and including the median plane. It's also parallel to the sagittal suture of the skull.
 - The body is divided into two **equal halves** or parts, **right** & **left** by the median or **mid sagittal plane**.
- 2. Coronal or frontal plane** : is any vertical side-to-side plane at right angles to the sagittal plane.
 - It divides the body into two parts (not necessarily equal parts) **front** and **back**.
- 3. Horizontal or transverse plane** : is any plane at right angles to the sagittal & coronal planes i.e. at right angles to the long axis of the body or limb.
 - It divides the body into two parts, **upper** & **lower**.



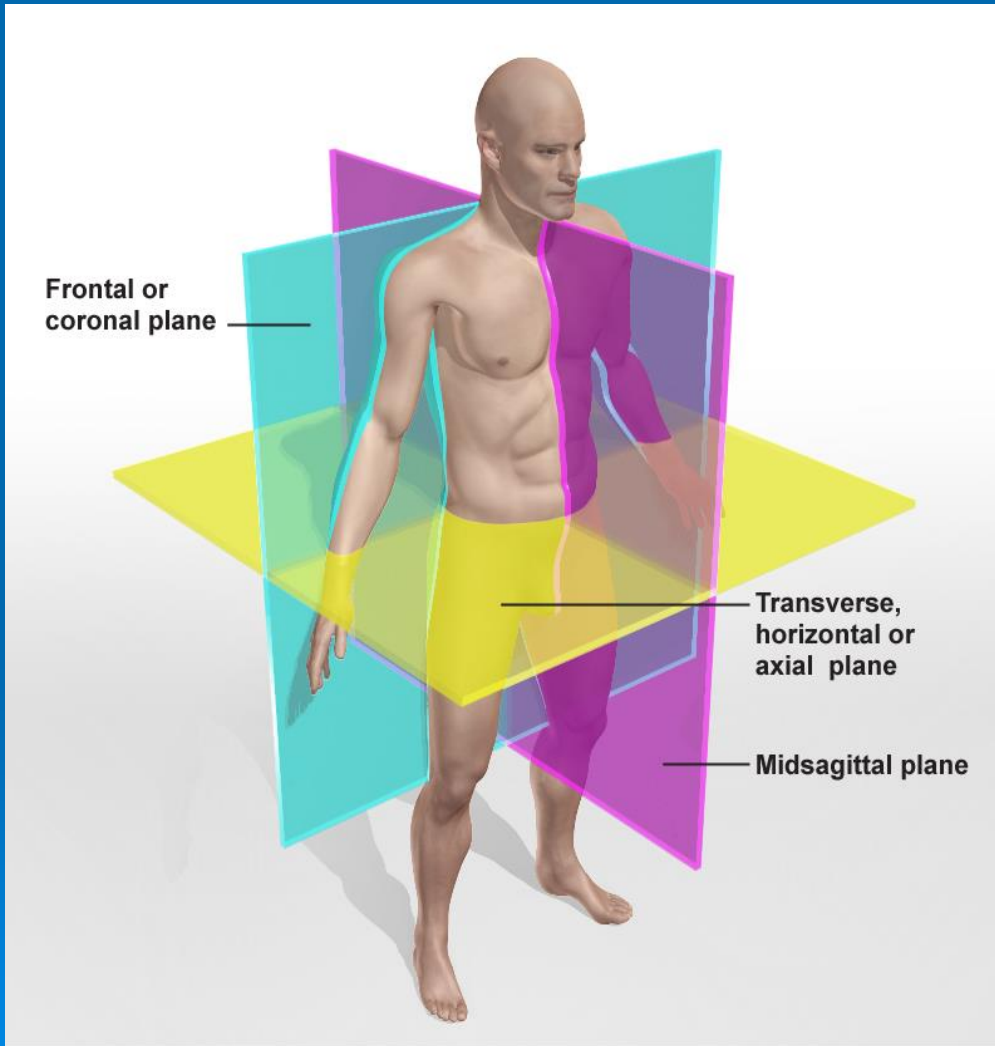


Frontal Plane

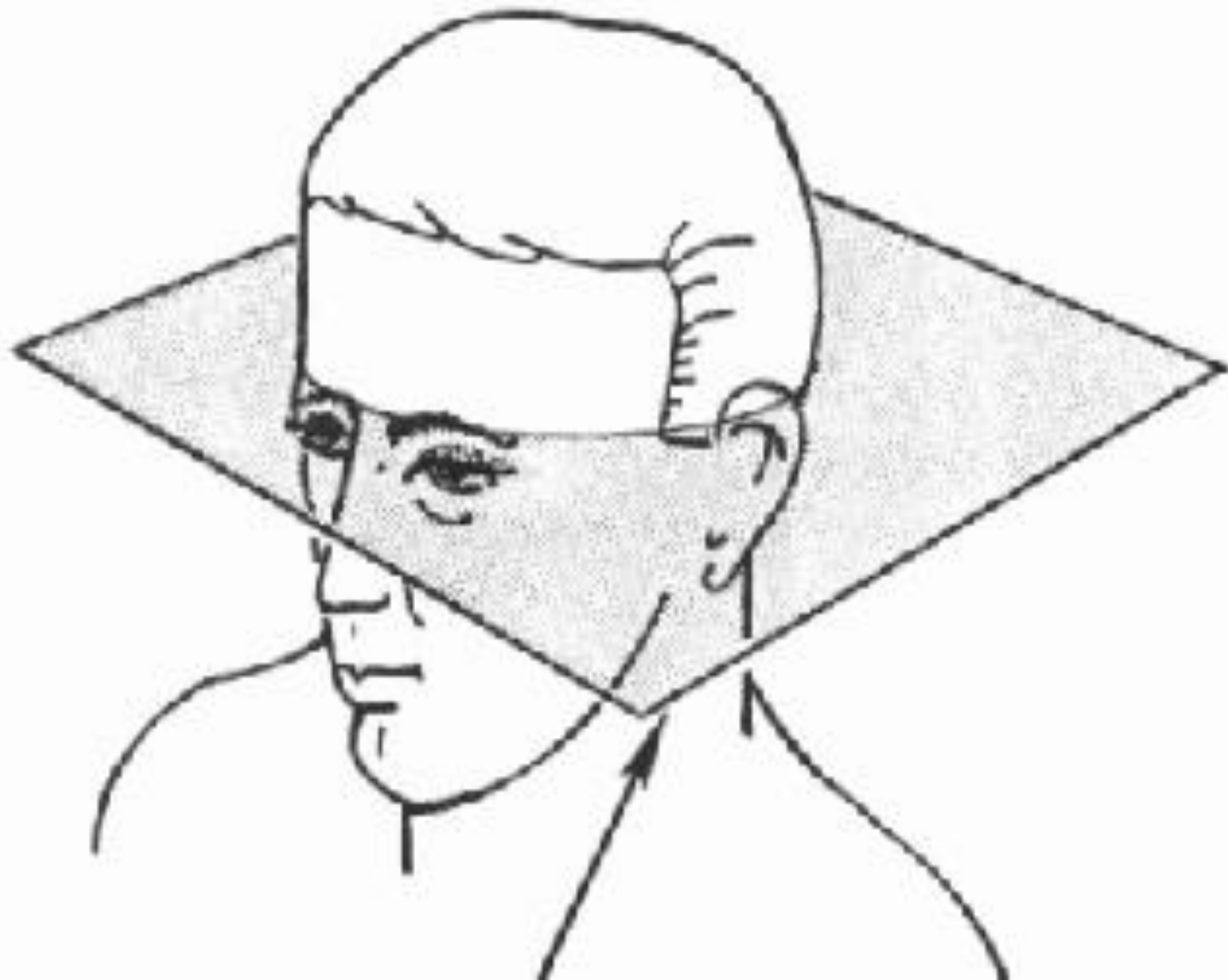
Midsagittal Frontal Plane



Planes



- **Coronal (Frontal)**
 - Divides the body into anterior/posterior parts
- **Transverse (Horizontal or Axial)**
 - Separates into both superior(upper)/inferior parts(lower)
- **Sagittal**
 - Divides the body into right and left portions.
- **MidSagittal (Median)**
 - Extends vertically. Divides the body into right and left halves



Body Planes

- Sagittal and medial – divides the body into right and left parts
- Midsagittal – sagittal plane that lies on the midline
- Frontal or coronal – divides the body into anterior and posterior parts
- Transverse or horizontal (cross section) – divides the body into superior and inferior parts
- Oblique section – cuts made diagonally

Body Planes

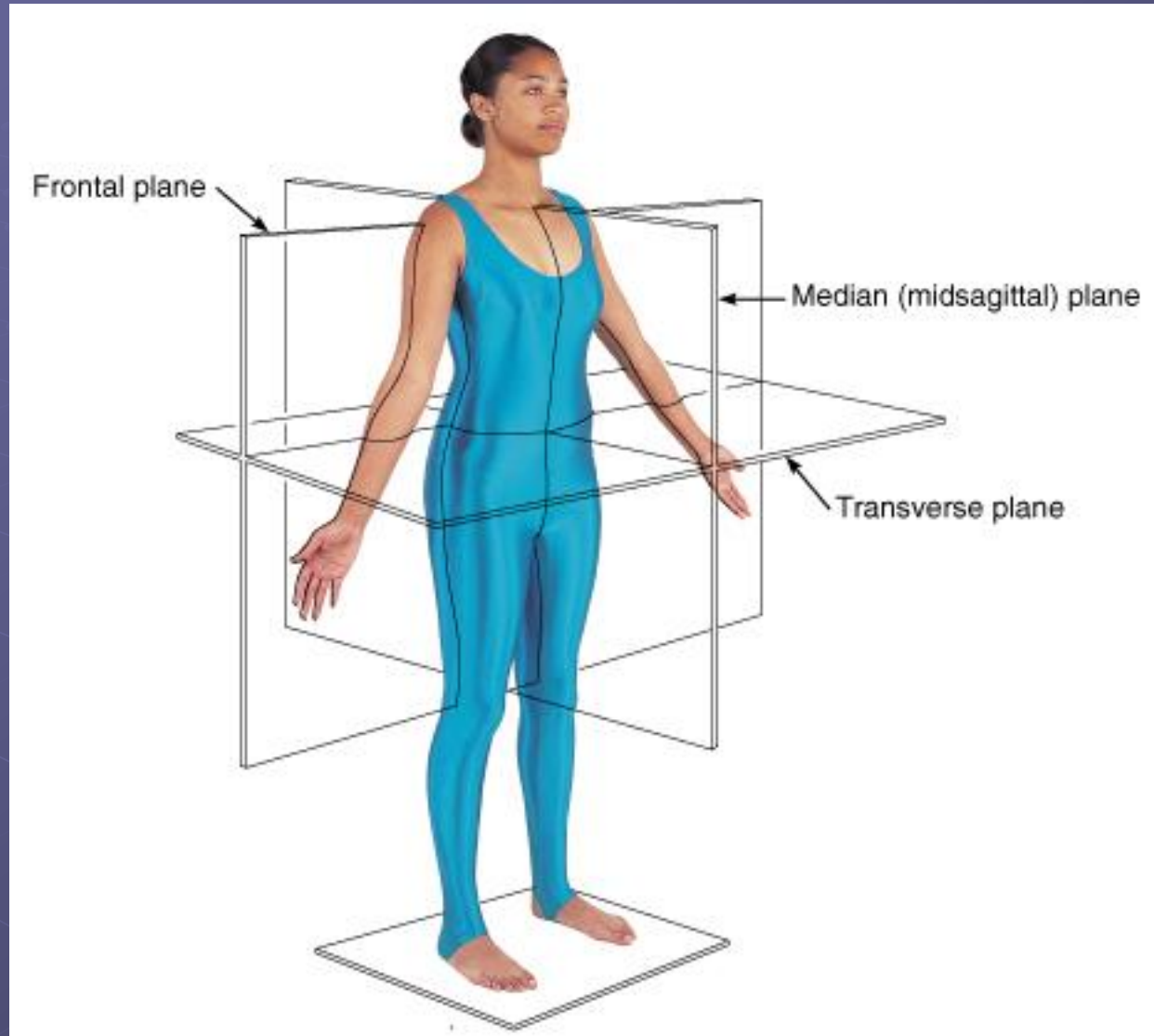


Figure 1.8

[3] Terms express positions in relation to the standard anatomical position :

1. **Anterior (ventral)**: in front of a structure

Posterior (dorsal): behind the body or a structure

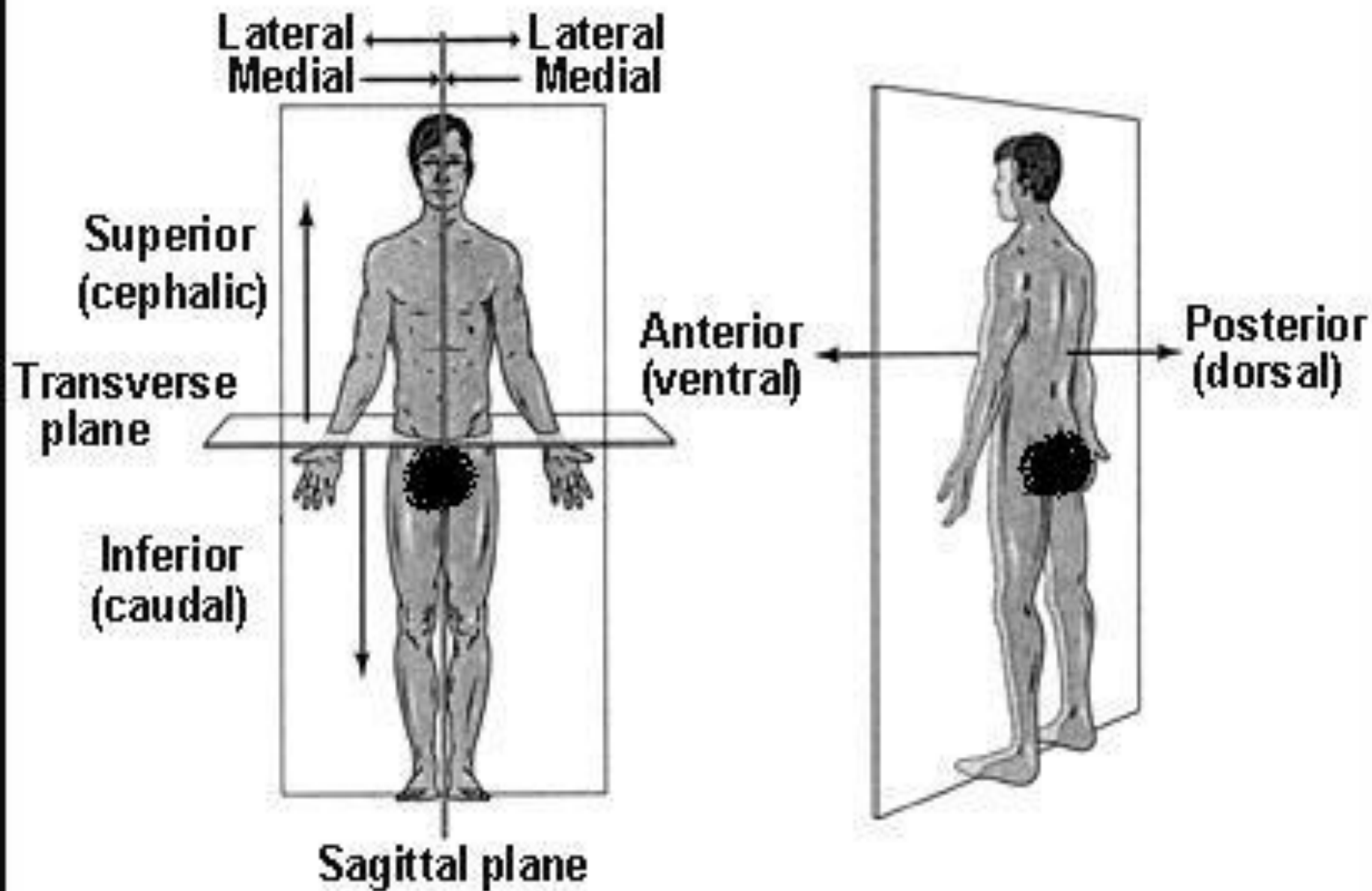
2. **Lateral**: referred to the side of the body (away from the sagittal plane)

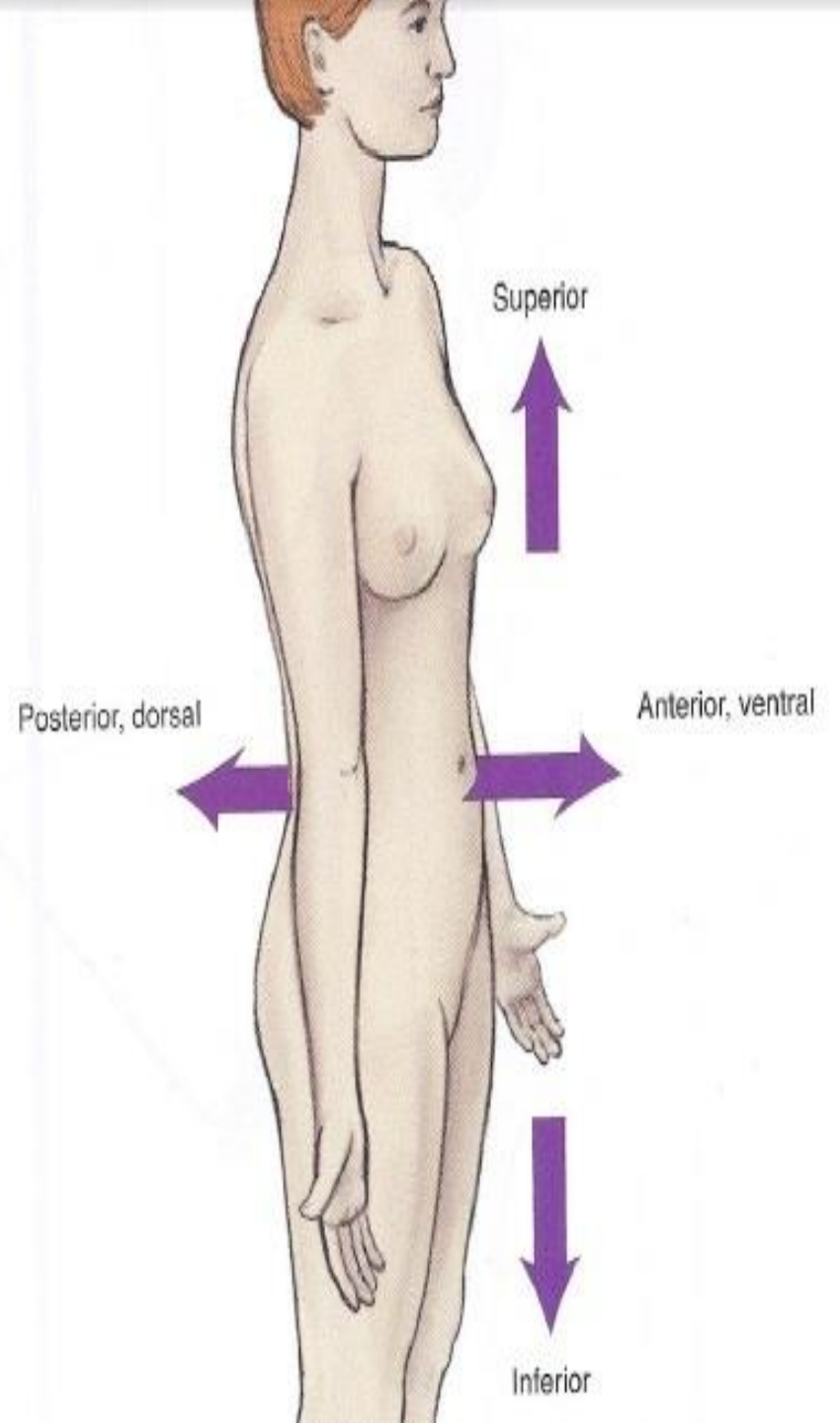
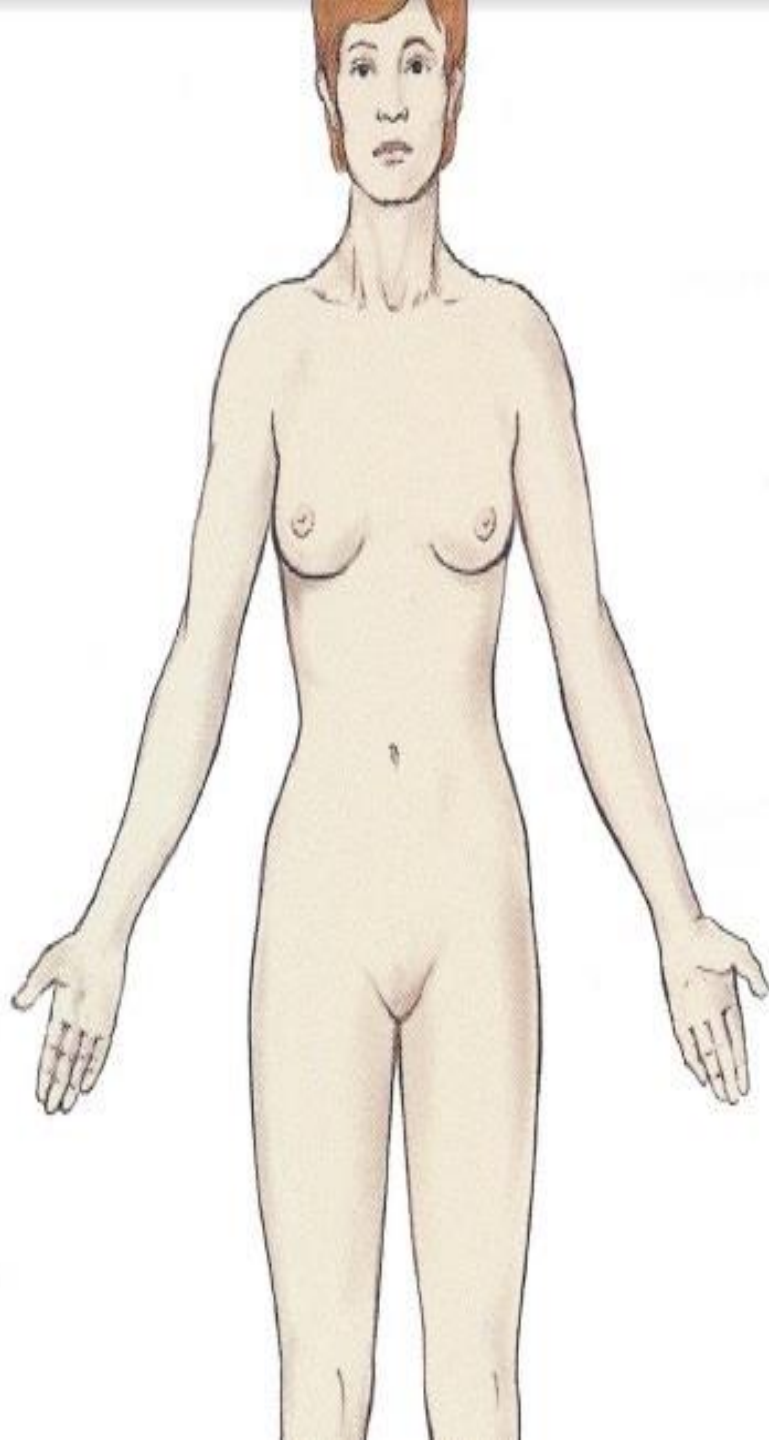
Medial: referred to the position of a structure very close to the sagittal plane

- **Contralateral**: opposite side

- **Ipsilateral**: at the same side

3. **Median**: means in the middle





4. External & Internal: they have their meaning related to specific target e.g. skin is external to muscles & bone.

5. Superficial & Deep: **superficial** when structure is relatively near the surface of the body or the skin, while **deep** one is entirely located inside the body away from the skin.

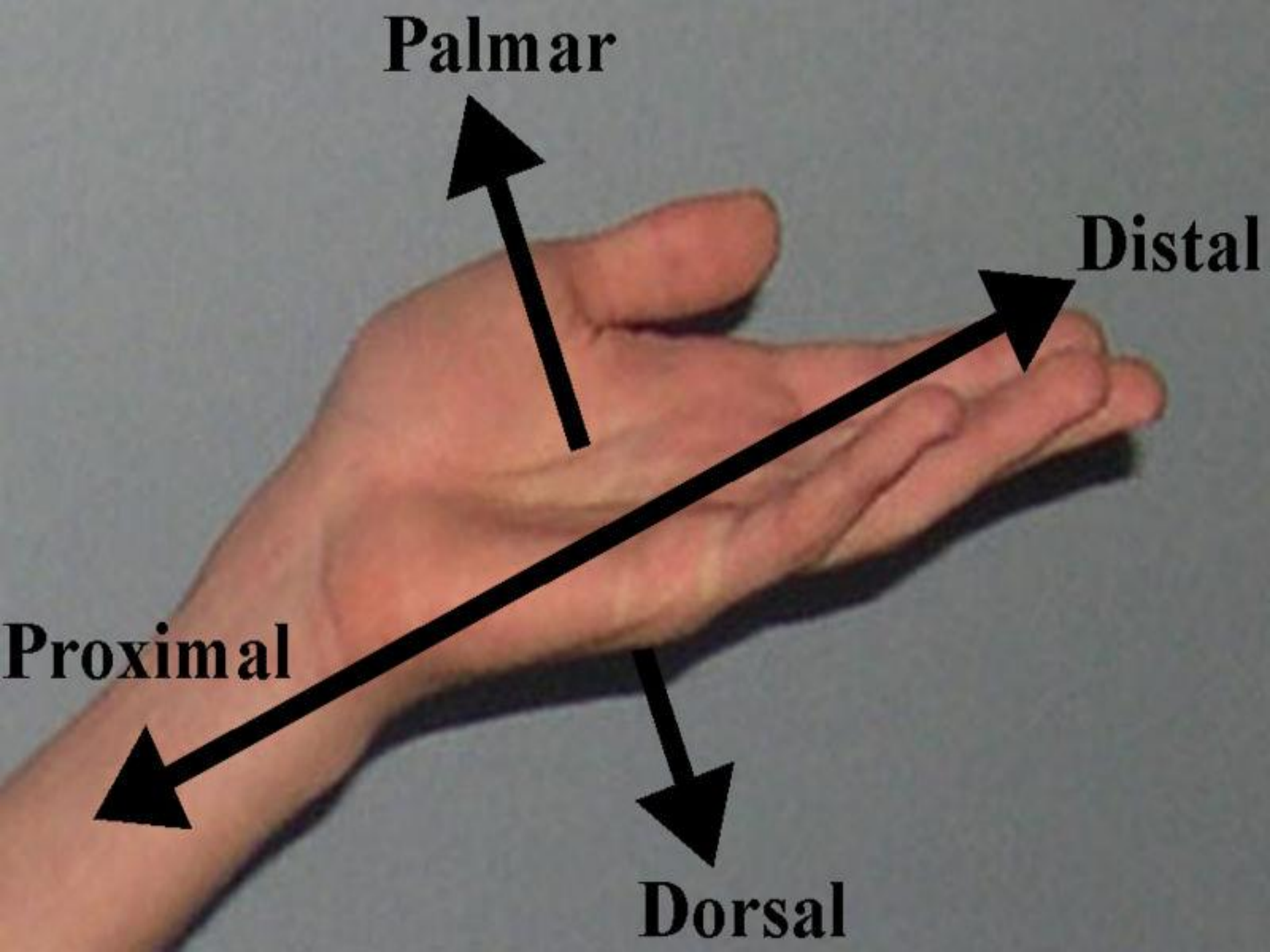
6. Superior (cranial): the structure in the direction or near the head

Inferior (caudal): the structure in the direction or near the feet

7. Proximal & Distal: applied to the distance of a structure from a fixed target

8. Supine: lying on the back

Prone: lying on the face

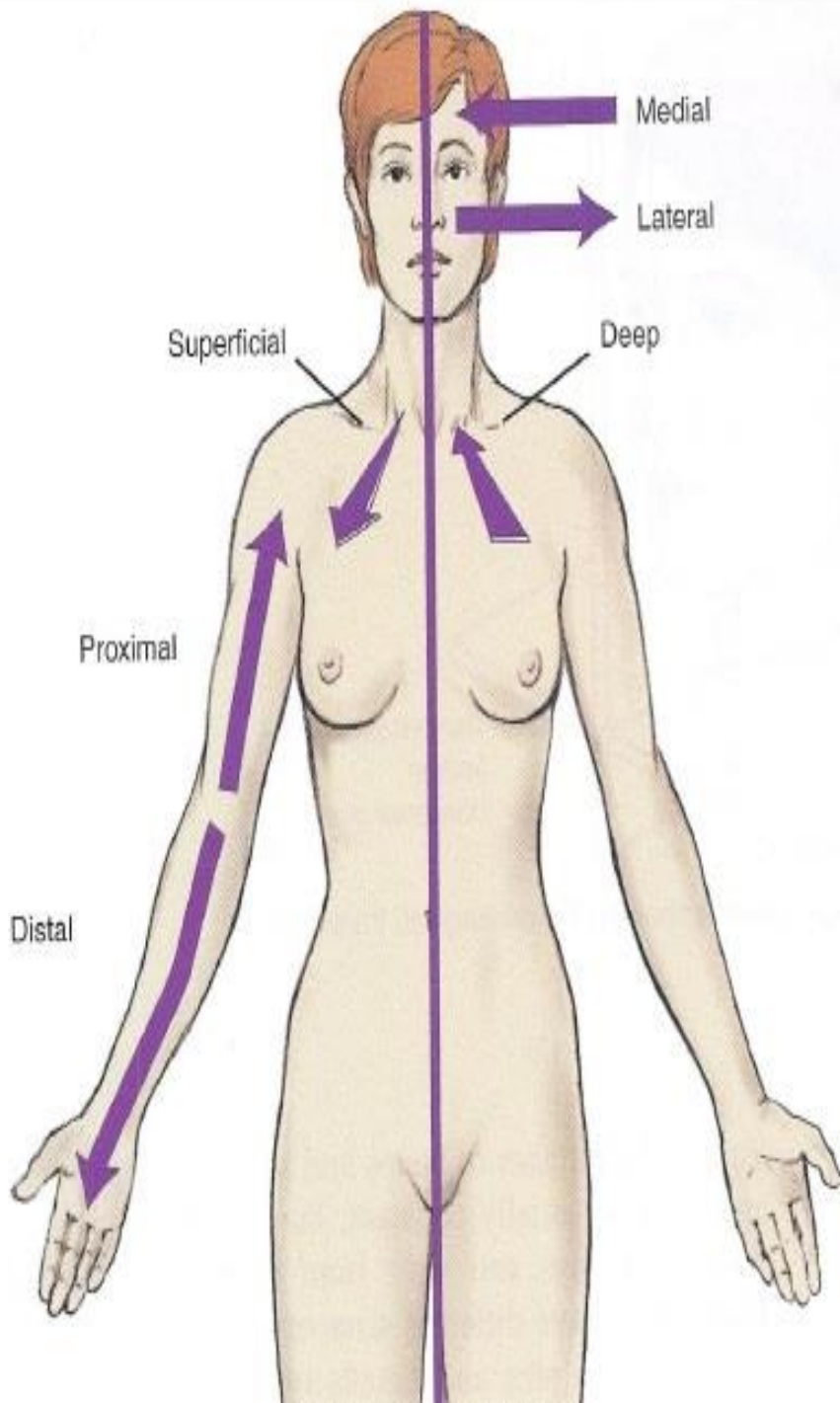


Palmar

Distal

Proximal

Dorsal



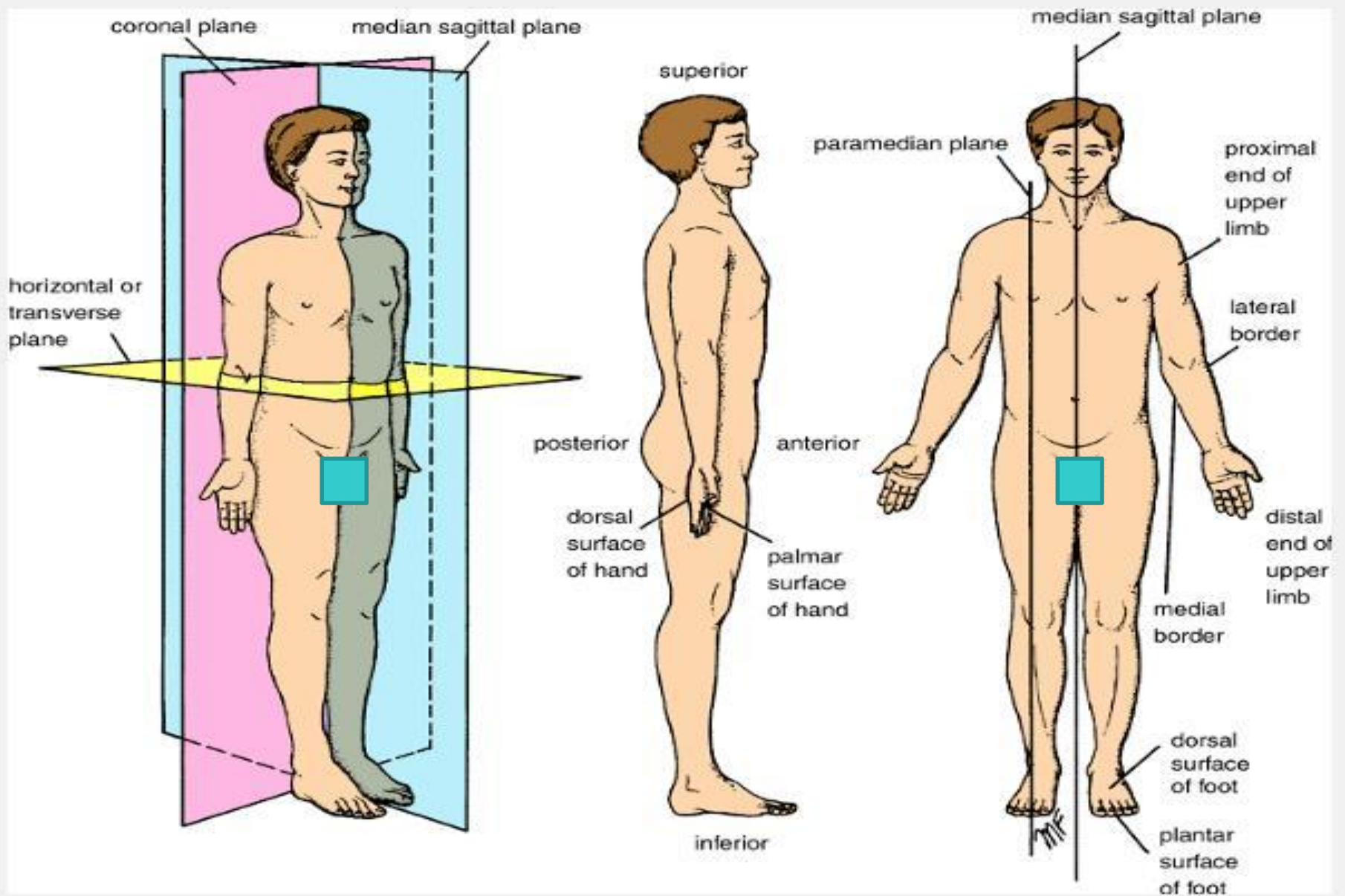


Figure 1-1 Anatomic terms used in relation to position. Note that the subjects are standing in the anatomic position.

Table 1.2

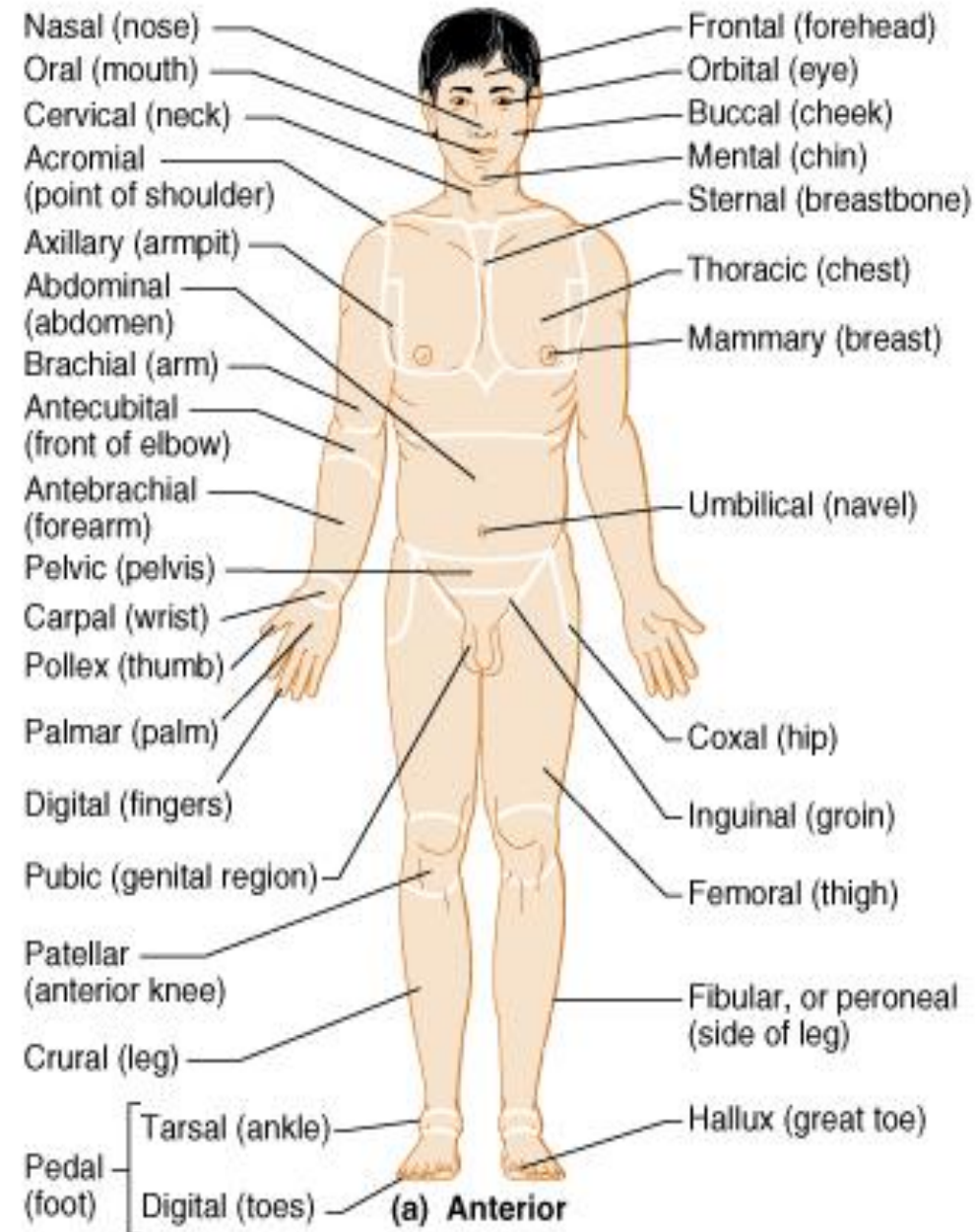
Anatomic Directional Terms



Direction	Term	Meaning	Example
Relative to front (belly side) or back (back side) of the body	Anterior	In front of; toward the front surface	The stomach is <i>anterior</i> to the spinal cord.
	Posterior	In back of; toward the back surface	The heart is <i>posterior</i> to the sternum.
	Dorsal	At the back side of the human body	The spinal cord is on the <i>dorsal</i> side of the body.
	Ventral	At the belly side of the human body	The umbilicus (navel, belly button) is on the <i>ventral</i> side of the body.
Relative to the head or tail of the body	Superior	Closer to the head	The chest is <i>superior</i> to the pelvis.
	Inferior	Closer to the feet	The stomach is <i>inferior</i> to the heart.
	Caudal	At the rear or tail end	The abdomen is <i>caudal</i> to the head.
	Cranial	At the head end	The head is <i>cranial</i> to the trunk.
Relative to the midline or center of the body	Medial	Toward the midline of the body	The lungs are <i>medial</i> to the shoulders.
	Lateral	Away from the midline of the body	The arms are <i>lateral</i> to the heart.
	Deep	On the inside, underneath another structure	Muscles are <i>deep</i> to the skin.
	Superficial	On the outside	The external edge of the kidney is <i>superficial</i> to internal structure.
Relative to point of attachment of the appendage	Proximal	Closest to point of attachment to trunk	The elbow is <i>proximal</i> to the hand.
	Distal	Furthest from point of attachment to trunk	The wrist is <i>distal</i> to the elbow.

Regional Terms

- Axial – head, neck, and trunk
- Appendicular – appendages or limbs
- Specific regional terminology



Regional Terms

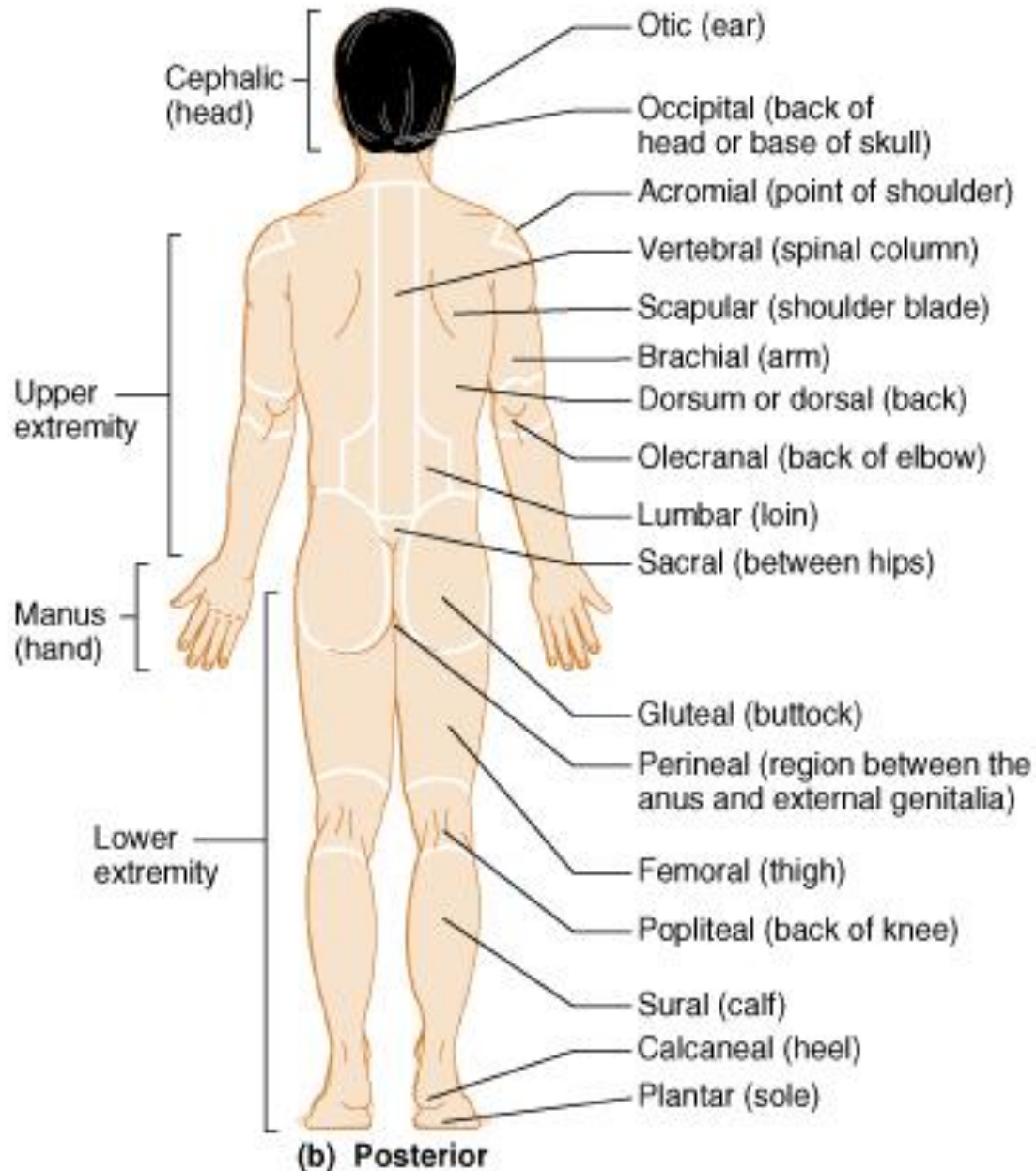
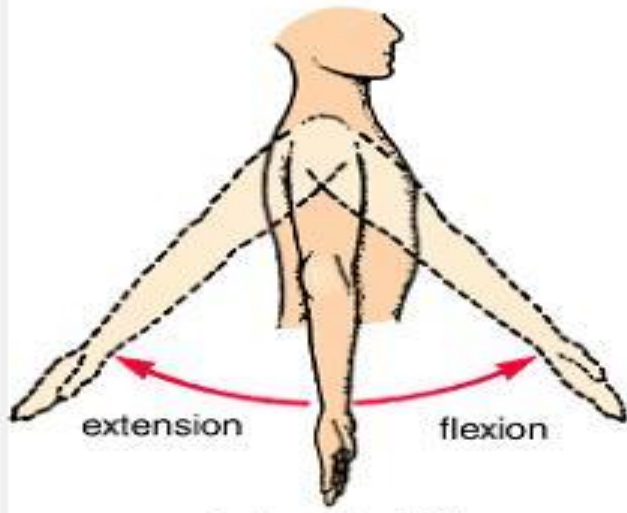


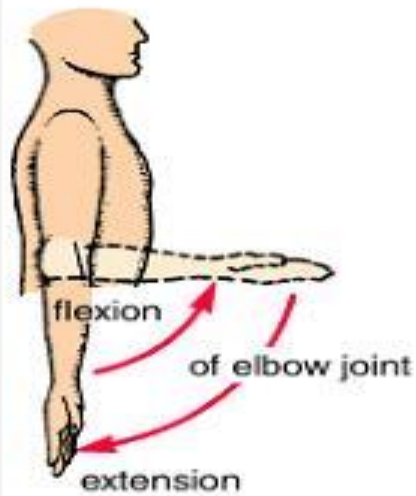
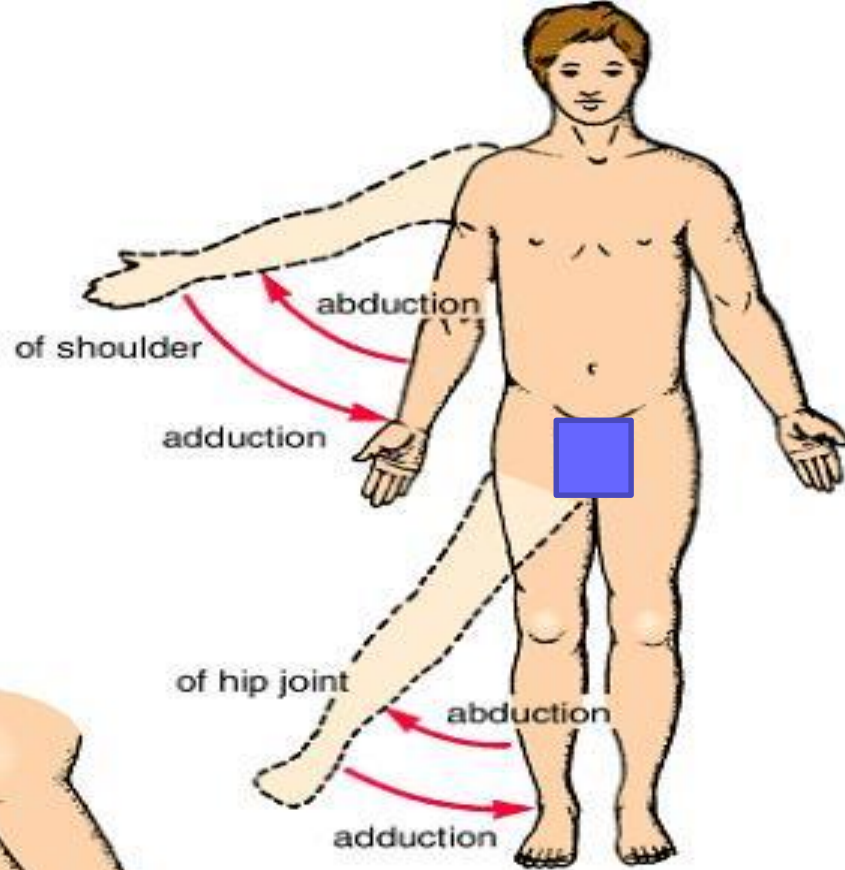
Figure 1.7b

[4] Terms related to the movements :-

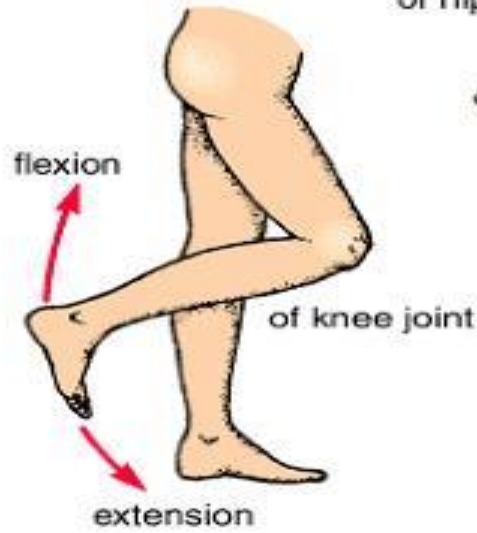
- 1. Abduction** : pulling the structure away from the axis of the body
Adduction : moving the structure to the axis of the body **e.g.** the limbs
- 2. Flexion** : aproxing the anterior surface { bending of a structure }
Extension : aproxing the posterior surface { making the structure straight, maximum length }
- * Lateral flexion** : movement to the side of the trunk { away from the middle }
- 3. Circumduction** : it's a sequence of different movements produce circular movement **i.e.** flexion, extension, adduction, & abduction of the organ **e.g.** the thumb.
- 4. Pronation** : applied to the palms when it face backward { movement of the part on it's axis medially }
Supination : movement followed pronation **i.e.** bringing the moved part to it's normal position.
- 5. Inversion** : { related to the feet }, bringing the sole medially
Eversion : moving the feet so that the sole face laterally.



of shoulder joint



of elbow joint



of knee joint



circumduction



medial rotation of shoulder joint



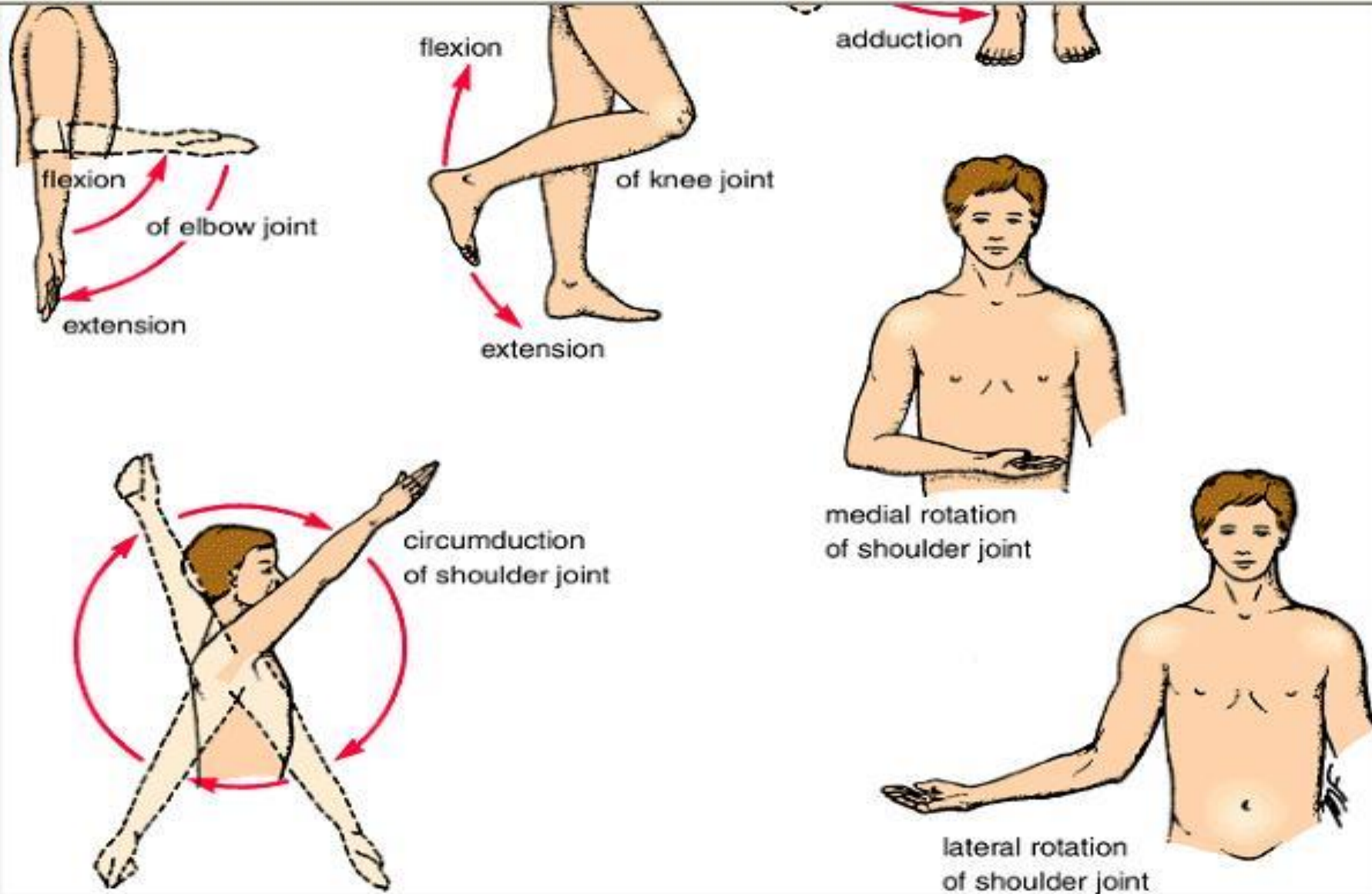
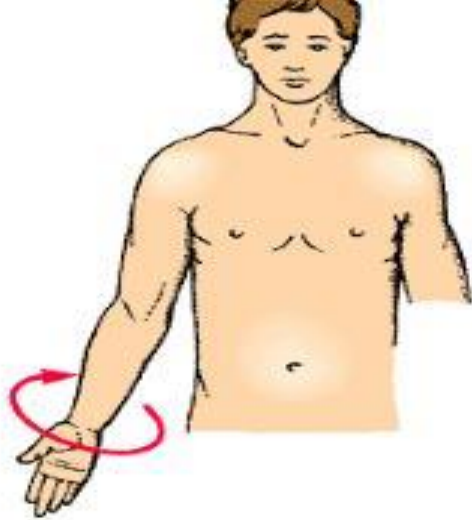
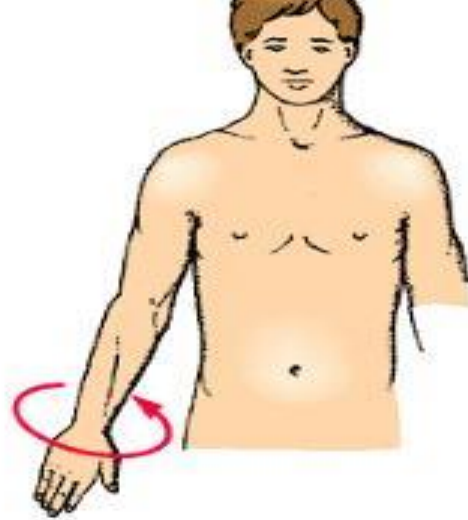


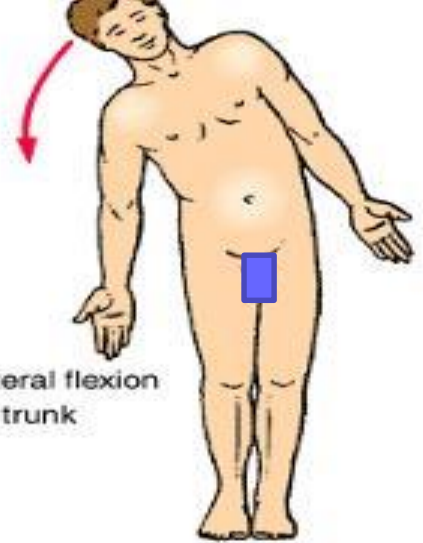
Figure 1-2 Some anatomic terms used in relation to movement. Note the difference between flexion of the elbow and that of the knee.



supination of forearm



pronation of forearm



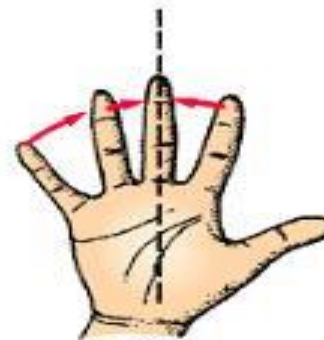
lateral flexion of trunk



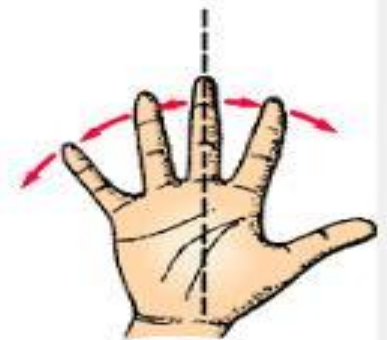
inversion of foot



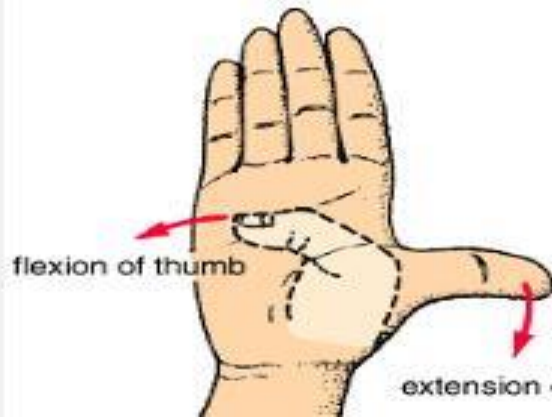
eversion of foot



adduction of fingers

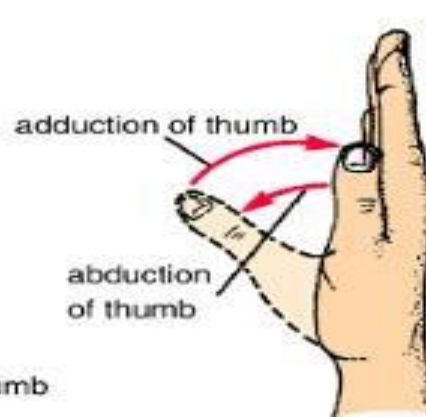


abduction of fingers



flexion of thumb

extension of thumb



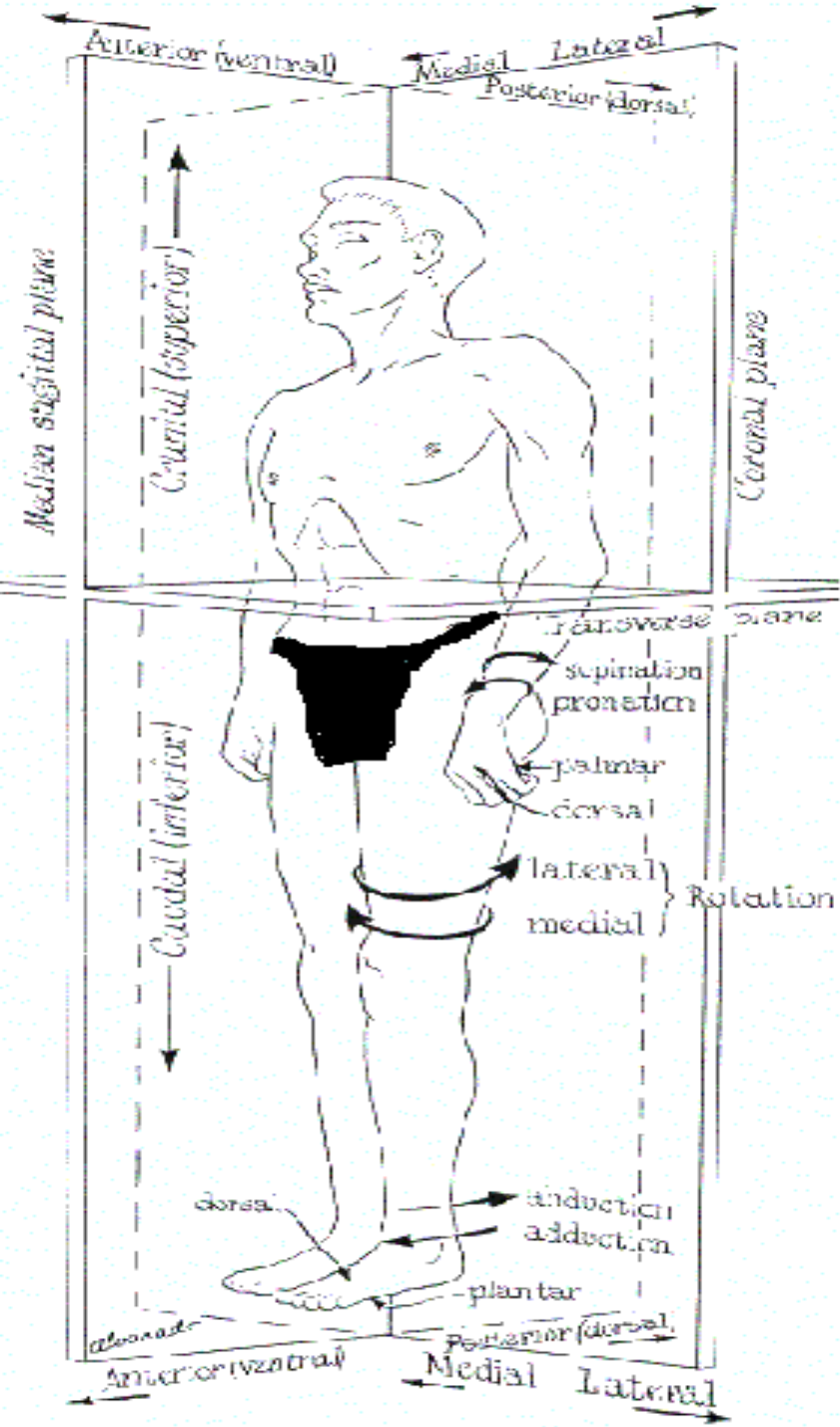
adduction of thumb

abduction of thumb

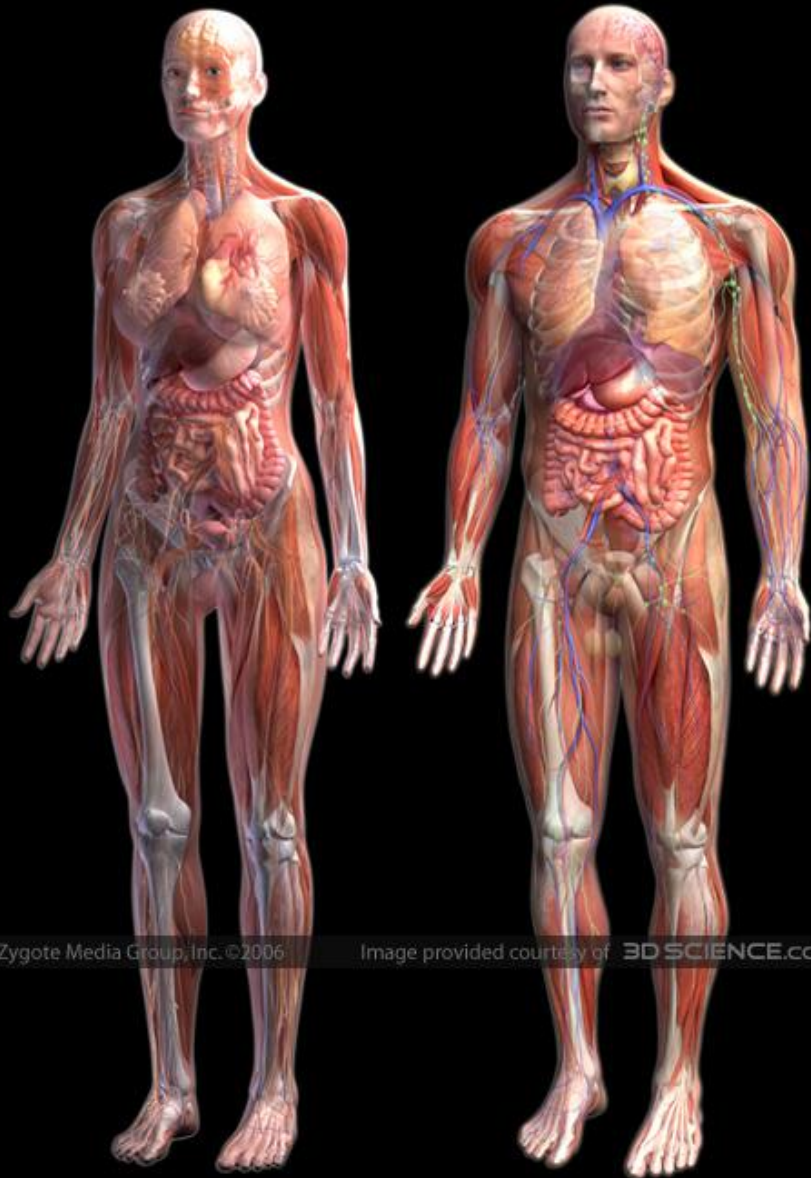


opposition of thumb and little finger





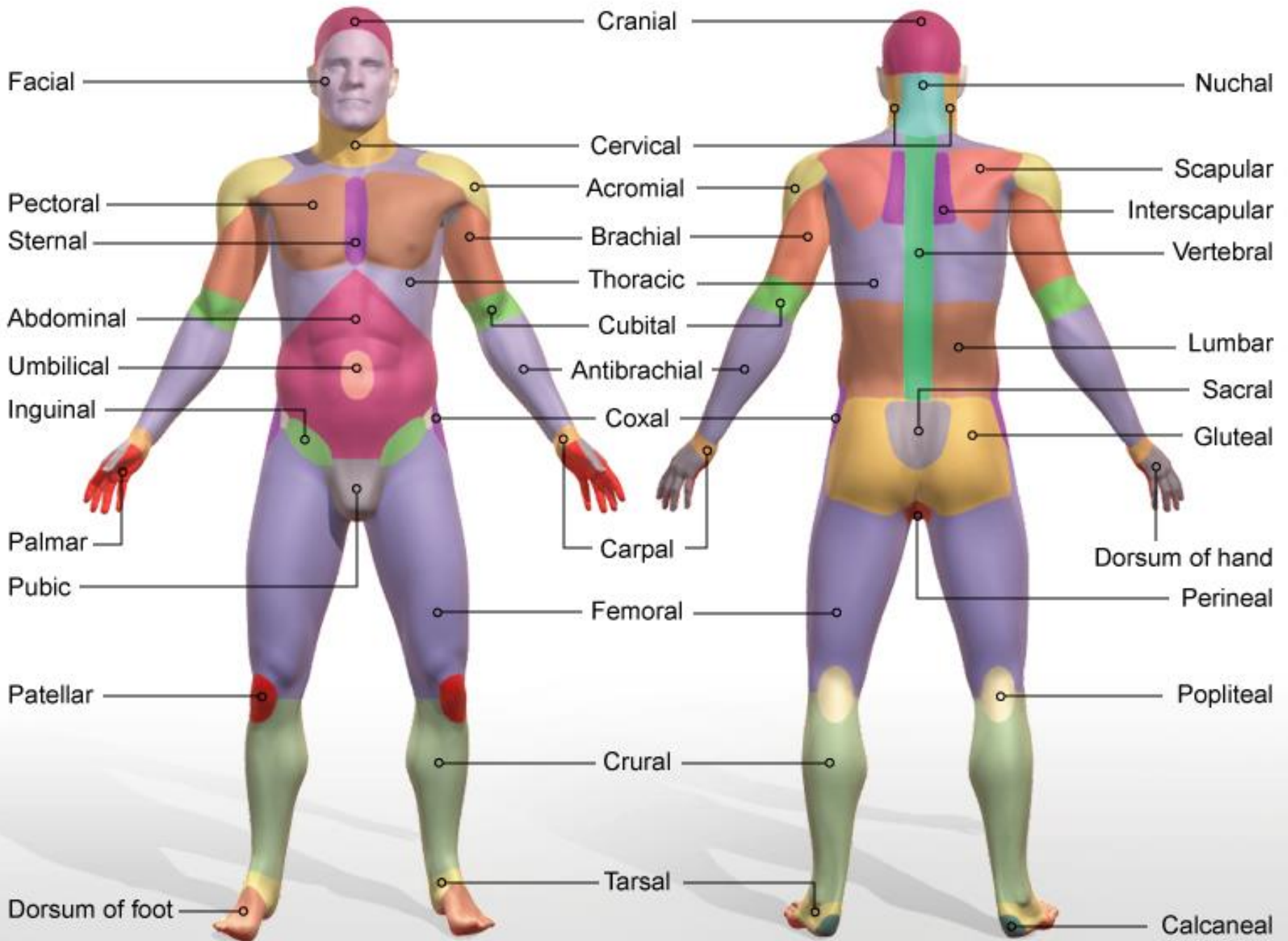




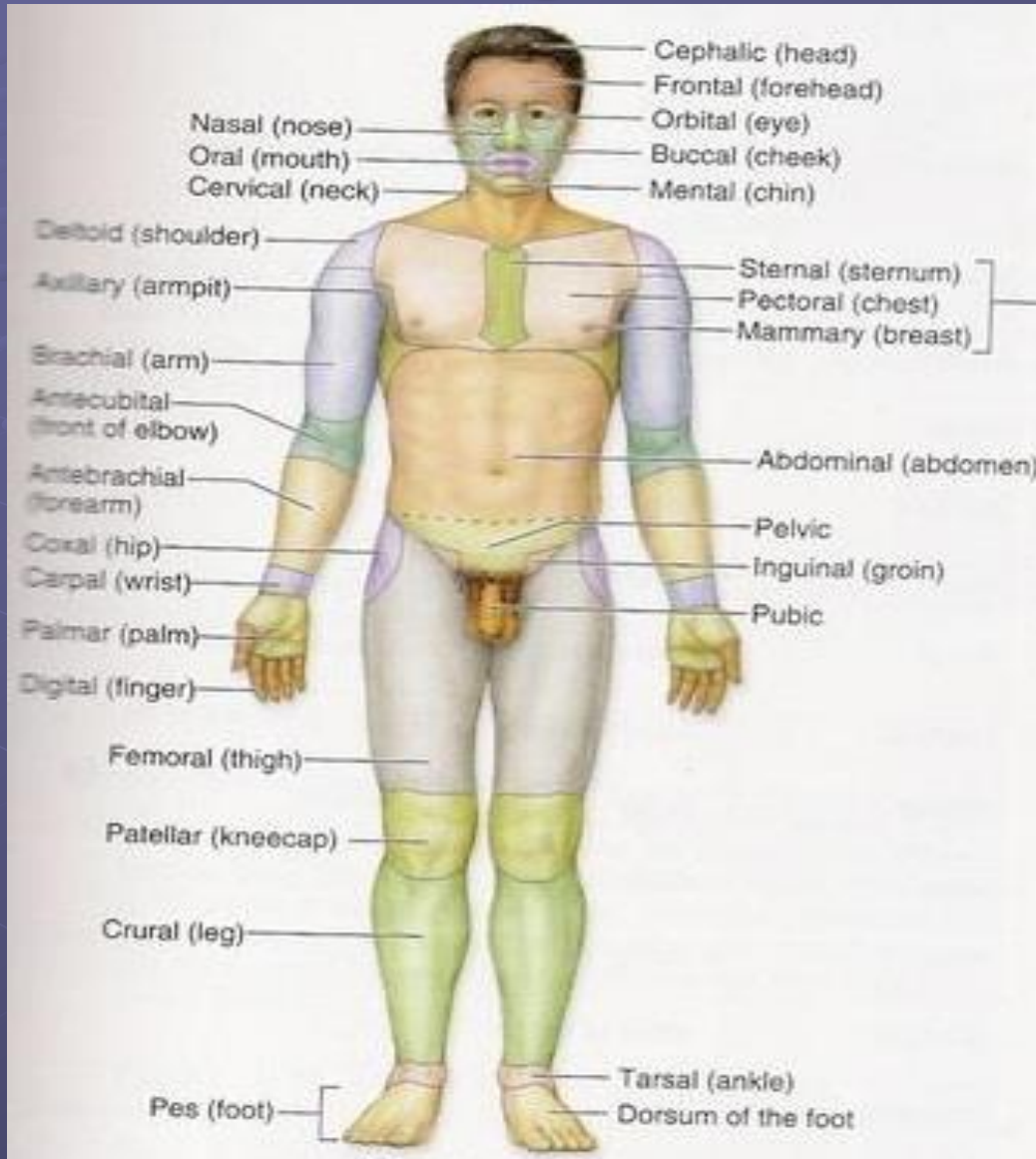
Body Regions

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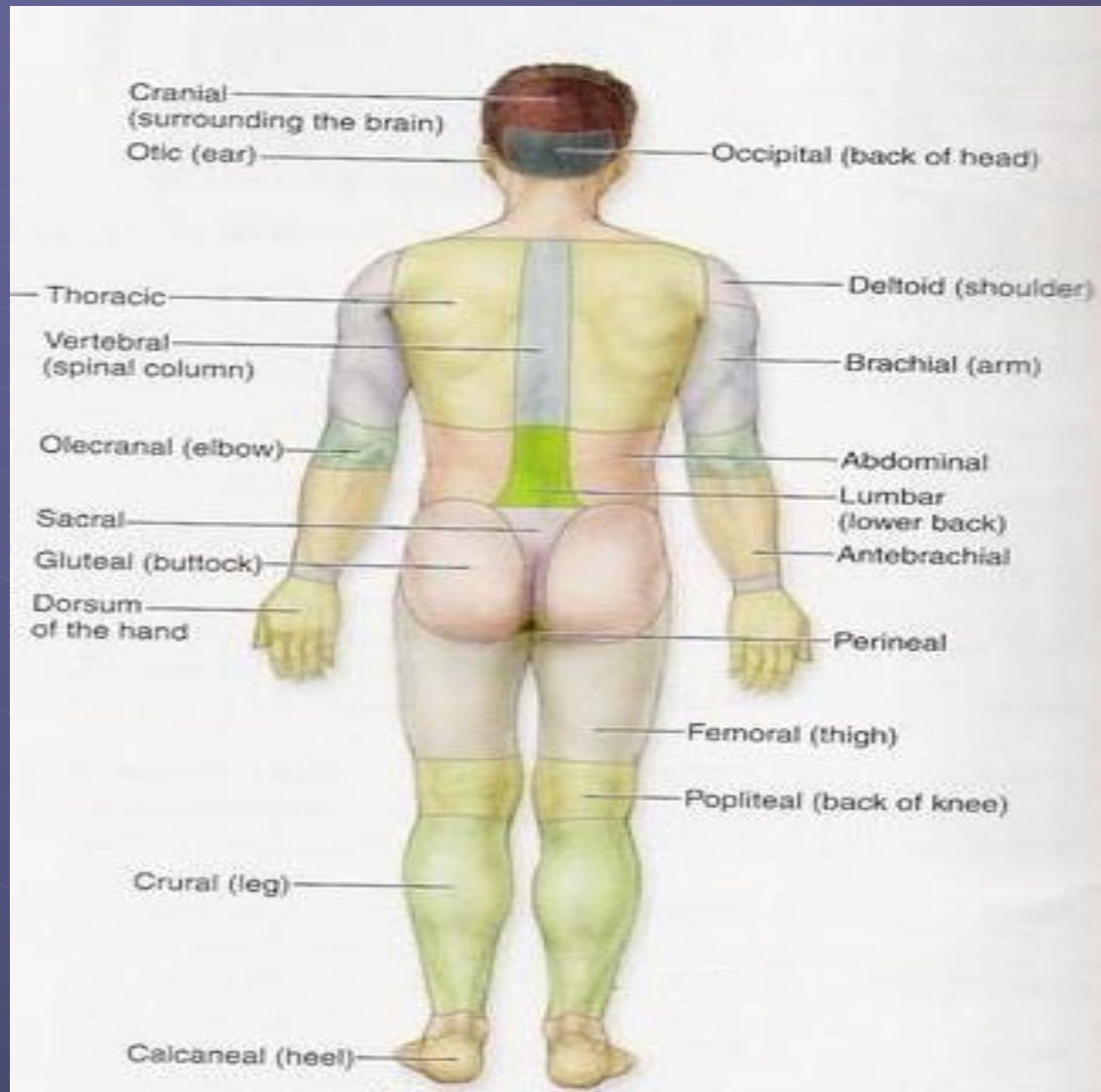
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Anterior Regions of Body



Posterior Regions of Body



The body is split up into two main areas, the axial and appendicular regions. The axial region refers to the head, vertebral column and trunk.

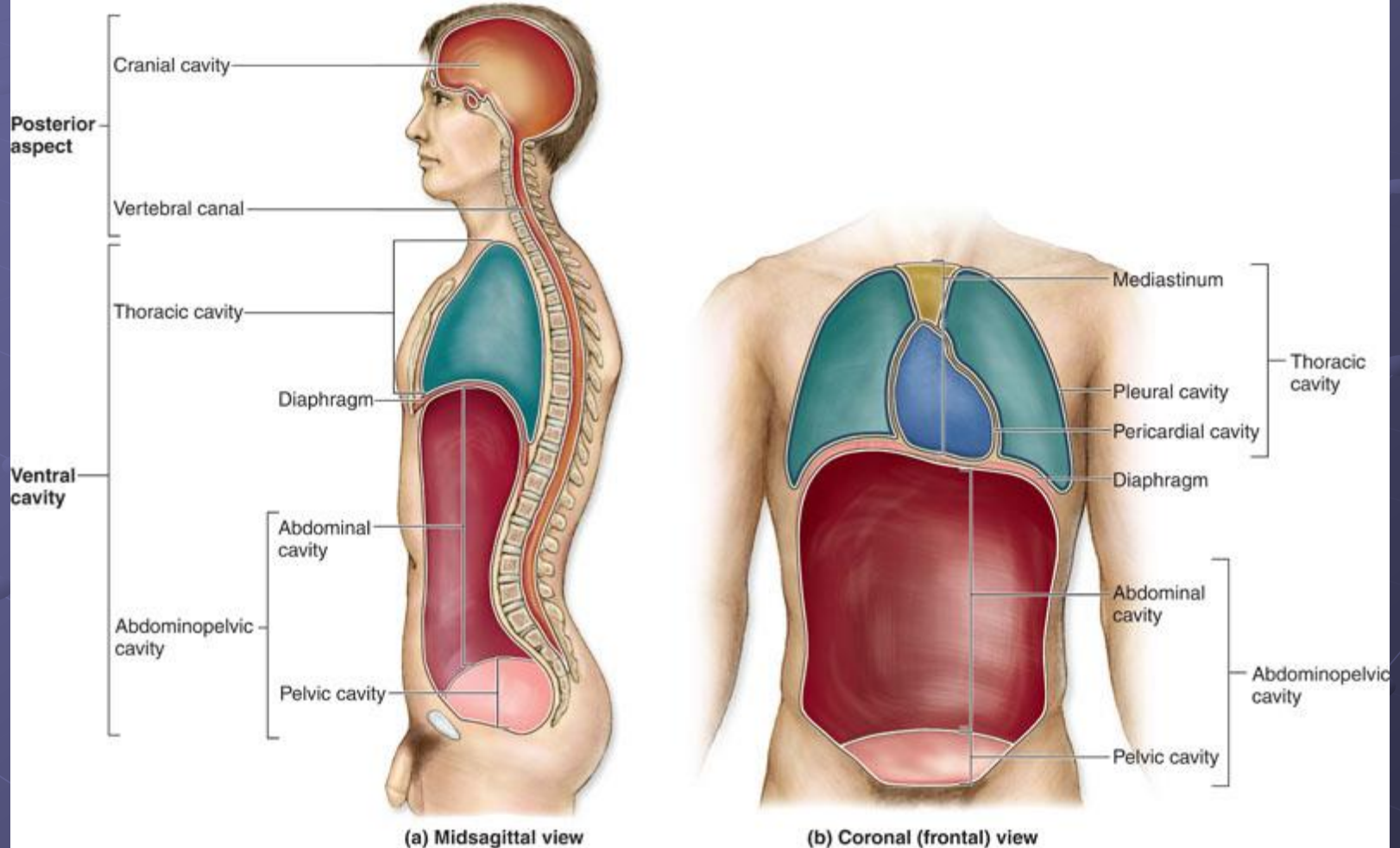
Axial regions	Description (pertaining to)
Cephalic	Head
Frontal	Forehead
Facial	Face
Occipital	Back of the head
Orbital	Eye cavity
Buccal	Cheek
Thoracic	Chest
Sternal	Sternum
Umbilical	Navel (belly button)
Inguinal	Groin
Pubic	Mons pubis (pubic bone)
Genital	Reproductive organs
Perineal	Perineum
Dorsum	Back
Vertebral	Spinal column
Cervical	Neck
Thoracic	Middle of the back
Lumbar	Lower back
Sacral	Sacrum

The appendicular region refers to the pelvic girdles and the upper and lower limbs. Each area is further divided into descriptive regions.

Appendicular regions	Description (pertaining to)	Lower Limb	
Upper limb			
Pectoral	Chest	Gluteal	Buttocks
Clavicular	Clavicles	Coxal	Hip
Acromial	Acromion of the shoulder	Femoral	Thigh
Scapular	Scapula	Patellar	Front of the knee
Interscapular	Between the two scapulae	Popliteal	Back of the knee
Axillary	Armpit	Crural	Leg
Brachial	Arm	Tarsal	Ankle
Antebrachial	Forearm	Calcaneal	Heel
Cubital	Elbow	Pedal	Foot
Carpal	Wrist	Plantar	Sole of the foot
Digits	Fingers		
Pollicis	Thumb		
Palmar	Palm of the hand		

Body Cavities

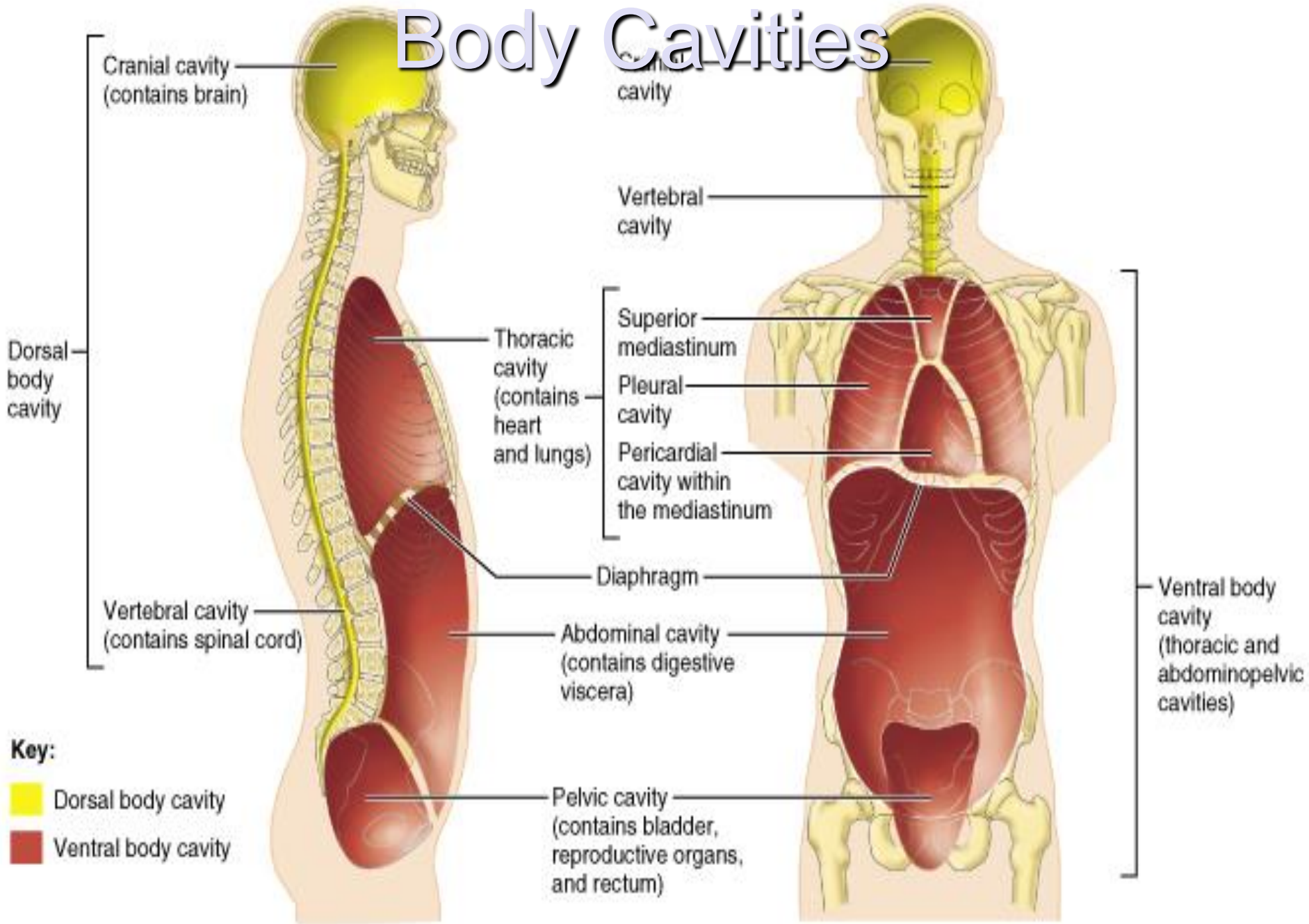
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Body Cavities

- **Dorsal cavity** protects the nervous system, and is divided into two subdivisions
 - **Cranial cavity** is within the skull and encases the brain
 - **Vertebral cavity** runs within the vertebral column and encases the spinal cord
- **Ventral cavity** houses the internal organs (viscera), and is divided into two subdivisions: **thoracic** and **abdominopelvic**

Body Cavities



(a) Lateral view

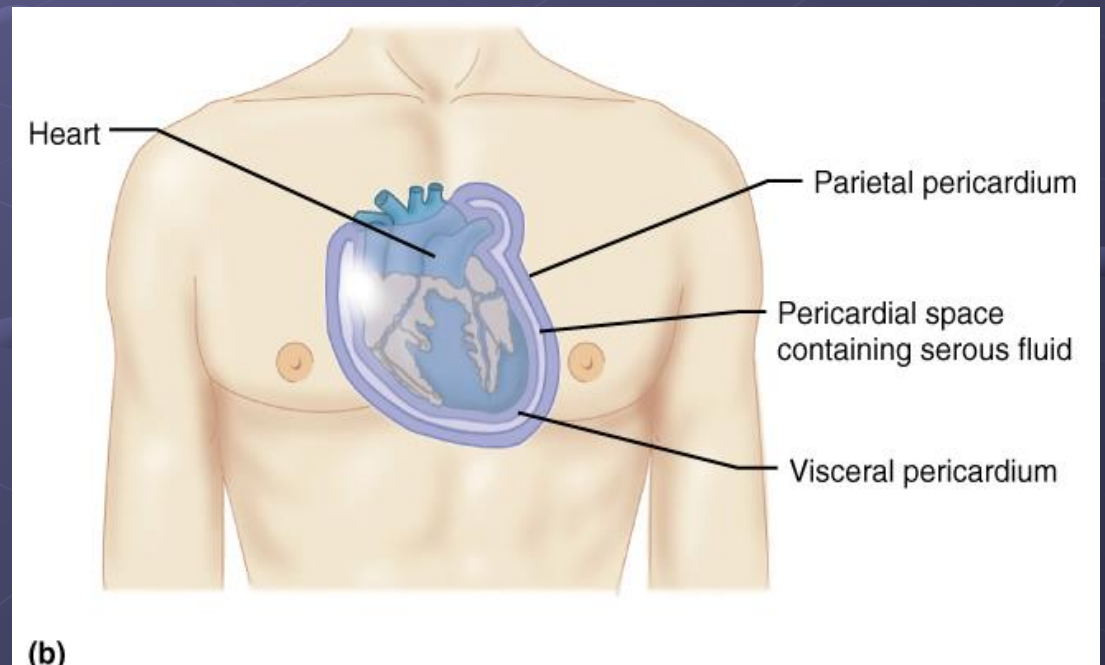
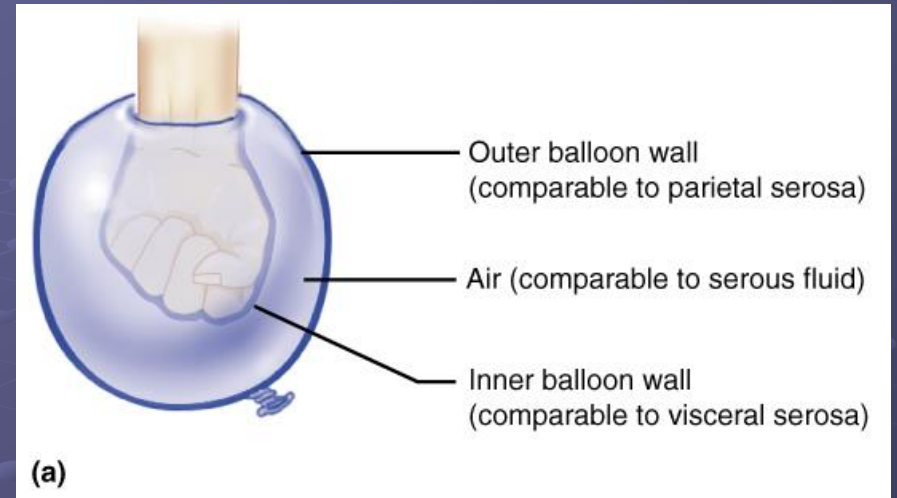
(b) Anterior view

Body Cavities

- **Thoracic cavity** is subdivided into pleural cavities, the mediastinum, and the pericardial cavity
 - Pleural cavities – each houses a lung
 - Mediastinum – contains the pericardial cavity, and surrounds the remaining thoracic organs
 - Pericardial – encloses the heart

Ventral Body Cavity Membranes

- Parietal serosa covering the body walls
- Visceral serosa covering the internal organs
- Serous fluid separates the serosae



Body Cavities

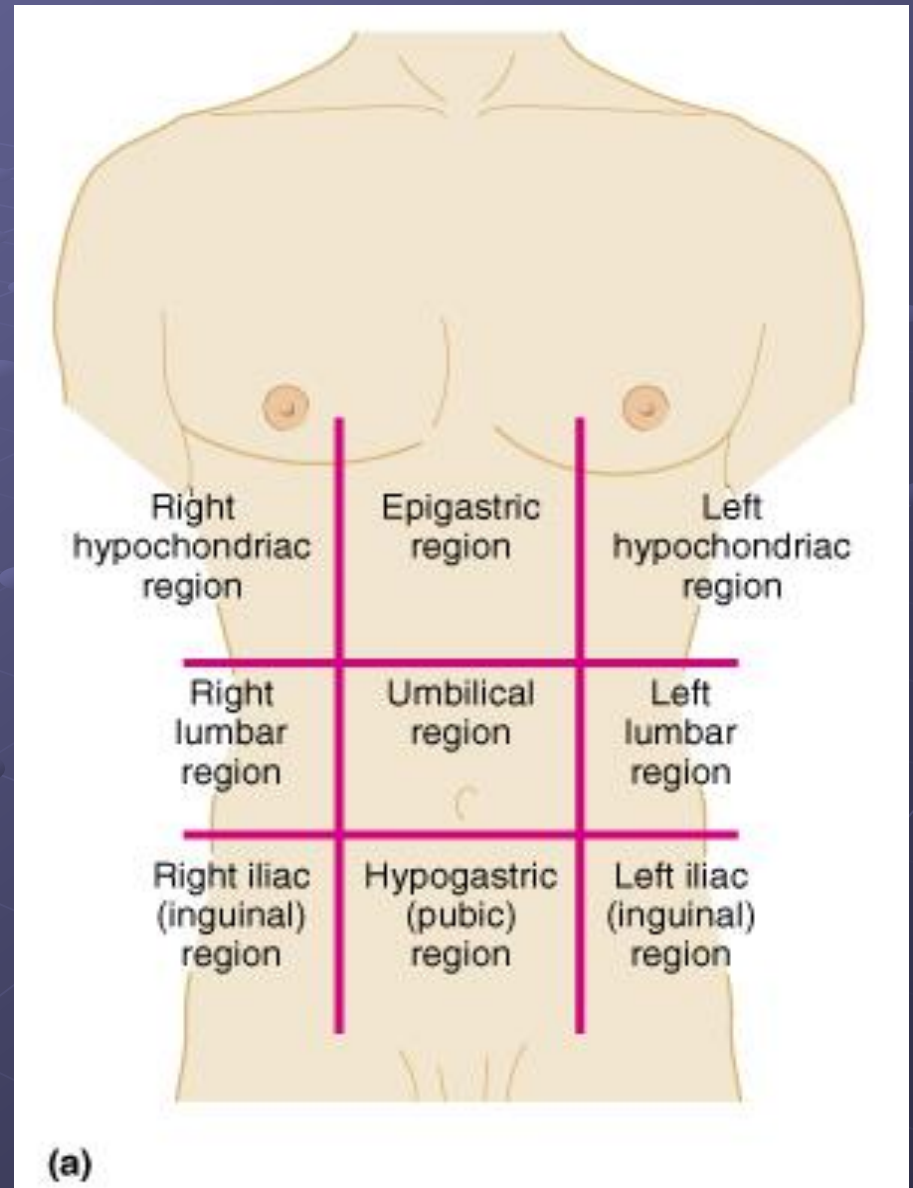
- The **abdominopelvic cavity** is separated from the superior thoracic cavity by the dome-shaped diaphragm
- It is composed of two subdivisions
 - **Abdominal cavity** – contains the stomach, intestines, spleen, liver, and other organs
 - **Pelvic cavity** – lies within the pelvis and contains the bladder, reproductive organs, and rectum

Other Body Cavities

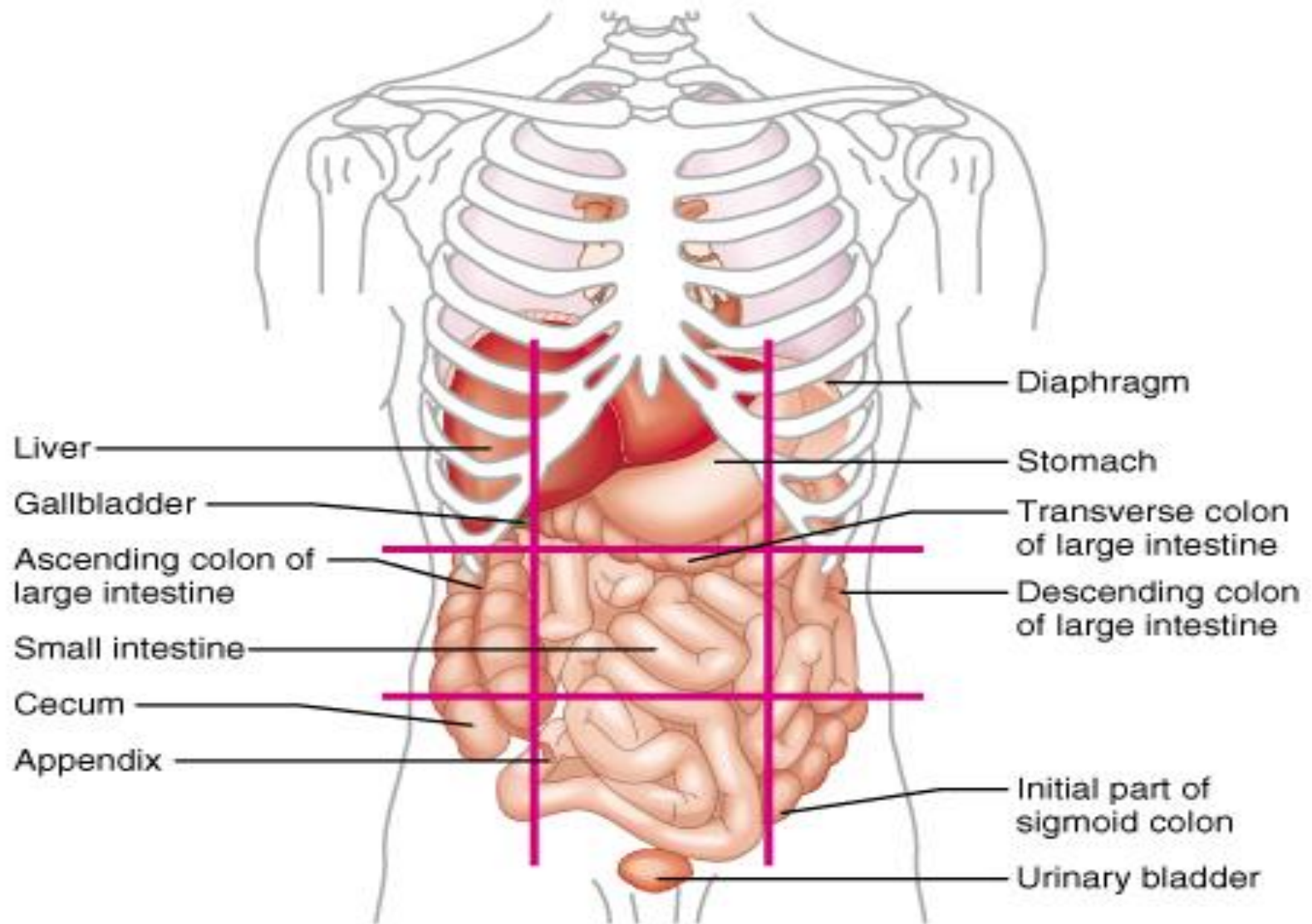
- **Oral and digestive** – mouth and cavities of the digestive organs
- **Nasal** – located within and posterior to the nose
- **Orbital** – house the eyes
- **Middle ear** – contain bones (ossicles) that transmit sound vibrations
- **Synovial** – joint cavities

Abdominopelvic Regions

- Umbilical
- Epigastric
- Hypogastric
- Right and left iliac or inguinal
- Right and left lumbar
- Right and left hypochondriac



Abdominopelvic Regions



(b)

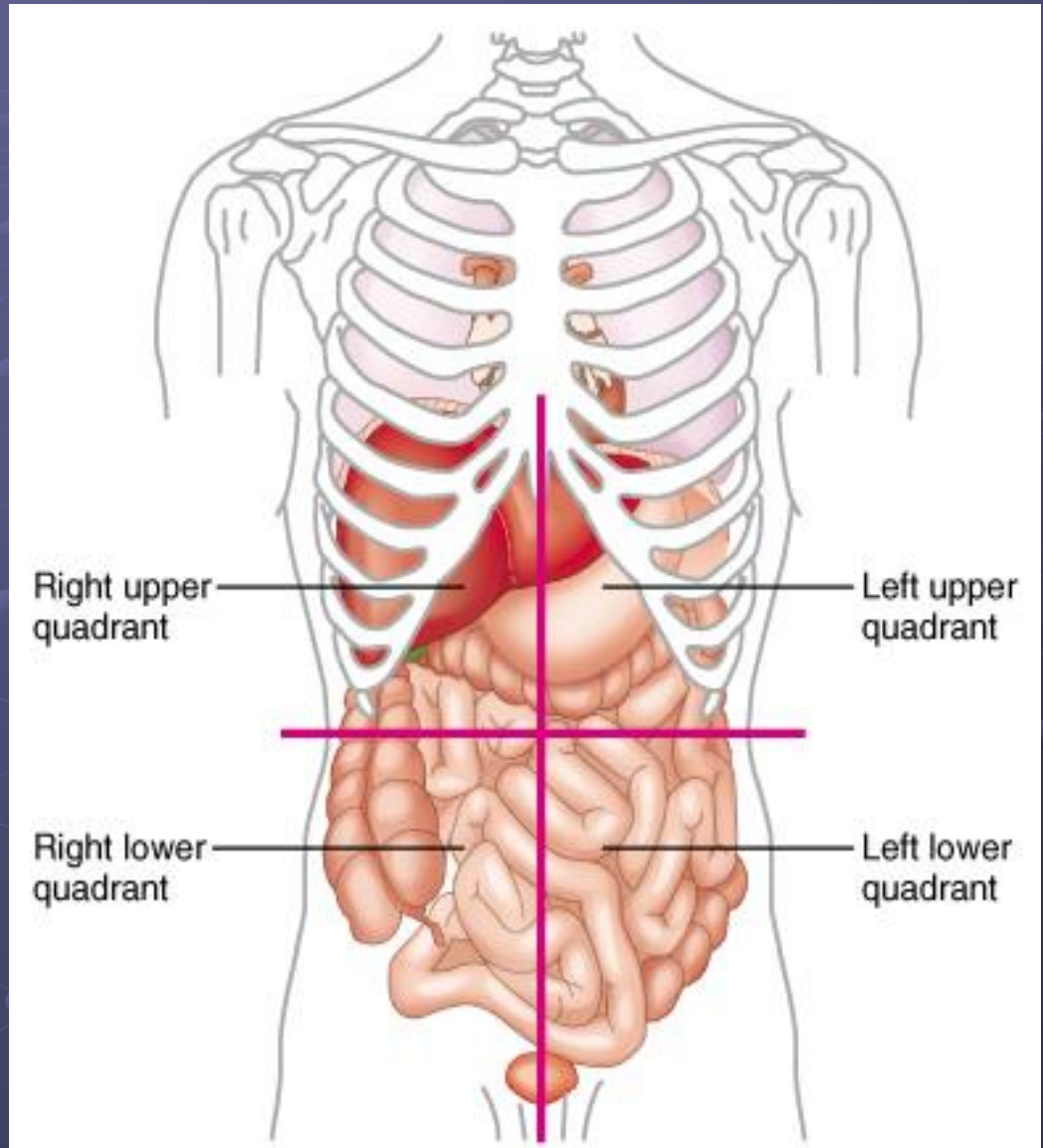
Abdominopelvic Quadrants

● Right upper

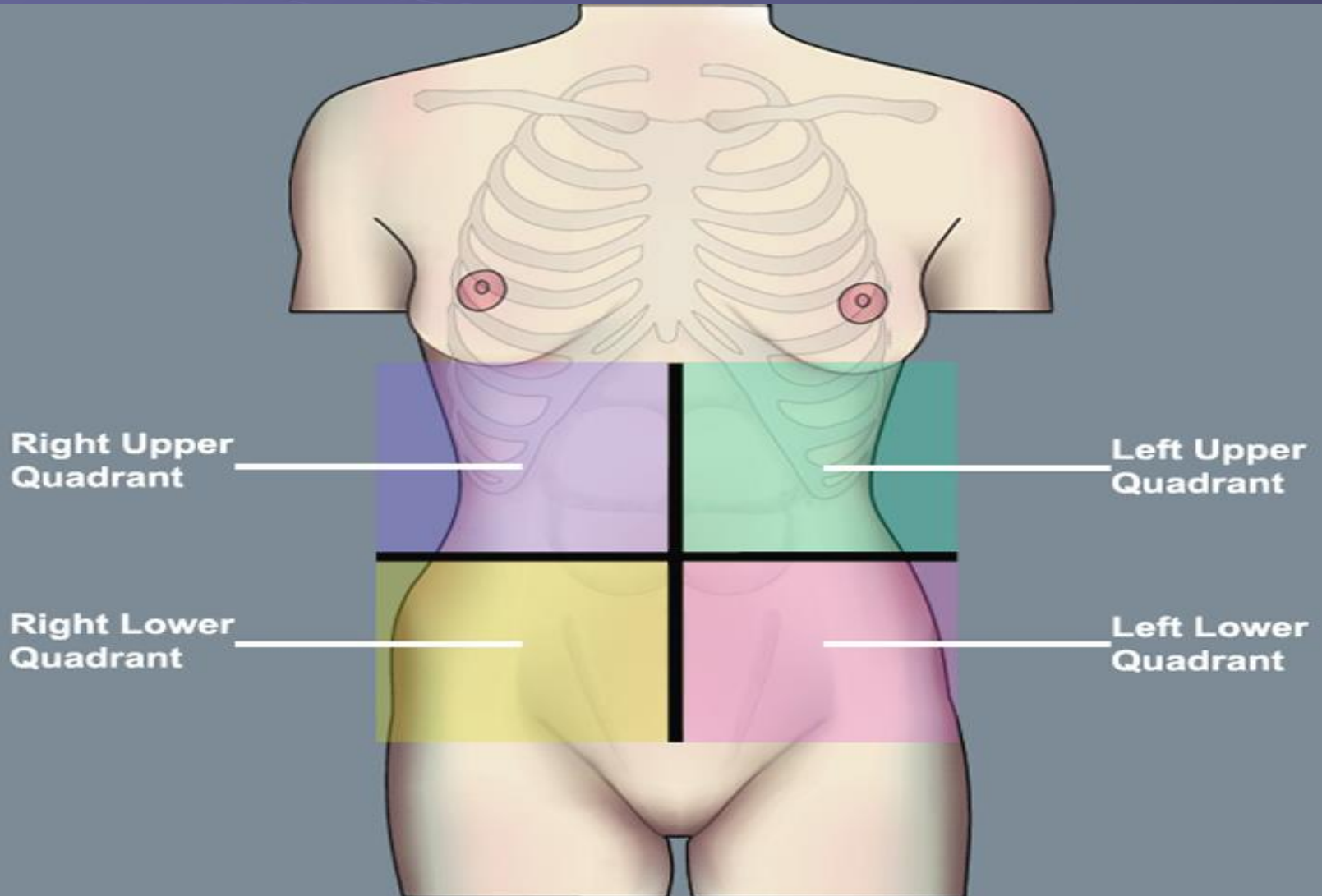
● Left upper

● Right lower

● Left lower



Four Quadrants



Nine Regions of Abdomen

