



ANATOMICAL TERMINOLOGIES

OUTLINE

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| <p>I. Body Regions</p> <p>II. Body Systems</p> <p>A. Integumentary System</p> <p>B. Skeletal System</p> <p>C. Articular System</p> <p>D. Muscular System</p> <p>E. Digestive System</p> <p>F. Nervous System</p> <p>G. Cardiovascular System</p> <p>H. Pulmonary System</p> <p>I. Lymphatic System</p> <p>J. Urinary System</p> <p>K. Endocrine System</p> <p>L. Reproductive System</p> <p>III. Anatomic Stance</p> <p>IV. Anatomic Planes</p> <p>A. Median Plane</p> <p>B. Sagittal Plane</p> <p>C. Frontal Plane</p> <p>D. Transverse Plane</p> | <p>V. Anatomical Sections</p> <p>A. Longitudinal Section</p> <p>B. Transverse Section</p> <p>C. Oblique Section</p> <p>VI. Body Cavities</p> <p>A. Dorsal Cavity</p> <p>B. Ventral Cavity</p> <p>VII. Anatomical Relationship and Comparison</p> <p>A. Terms Used for the Entire Body</p> <p>B. Terms Used for Hands and Feet</p> <p>C. Combined Terms</p> <p>D. Terms Used for Surface and Core Orientation</p> <p>VIII. Terms of Laterality</p> <p>IX. Terms of Movement</p> <p>A. Antagonistic (Opposing) Pairs</p> |
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LEGENDS

Must know	Lecturer	Book	Presentation	Old Trans
!				

LEARNING OBJECTIVES

- At the end of the lecture, the student should be able to:
- ✓ Describe the anatomical positions;
 - ✓ Discuss the anatomical planes;
 - ✓ Discuss the sections that arise from the different planes;
 - ✓ Discuss the different terms of relationship and comparison used;
 - ✓ Discuss the terms used in lateralization; and,
 - ✓ Discuss the terms used in describing the movements of the body.

BODY REGIONS

Regions of the Head

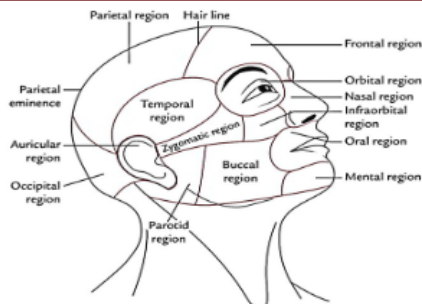


Figure 1. Regions of the Head

Regions of the Neck

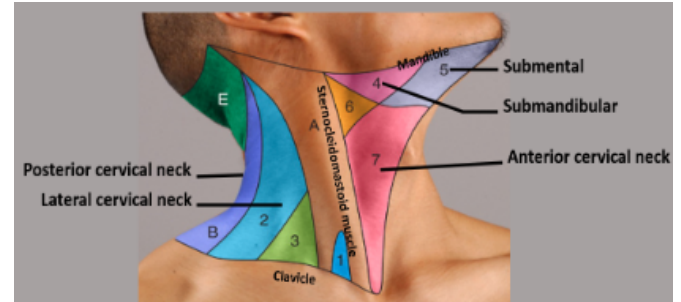


Figure 2. Regions of the Neck

Regions of the Chest

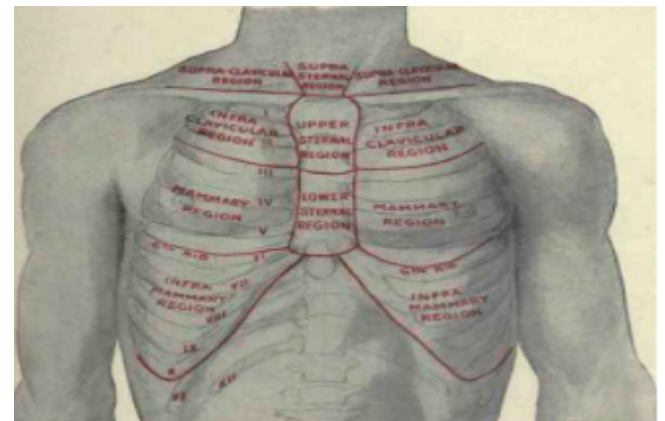


Figure 3. Regions of the Chest

Regions of the Abdomen

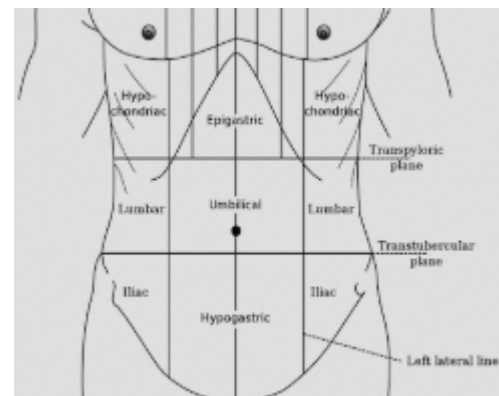


Figure 4. Regions of the Abdomen

Regions of the Pelvis

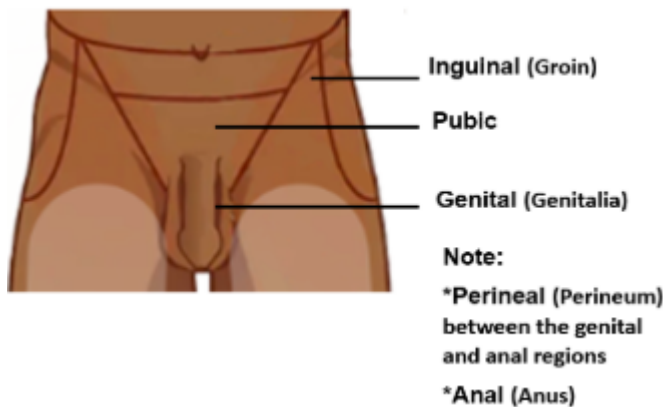


Figure 5. Regions of the Pelvis

Regions of the Back

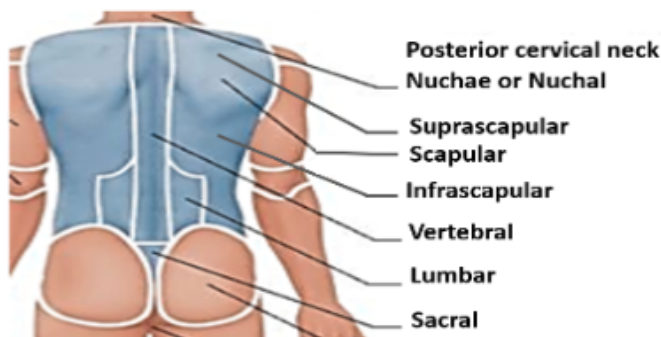


Figure 6. Regions of the Back

Regions of the Upper Limb

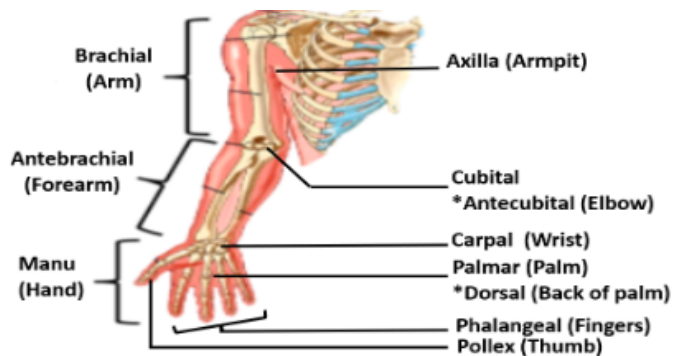


Figure 7. Regions of the Upper Limb

Regions of the Lower Limb

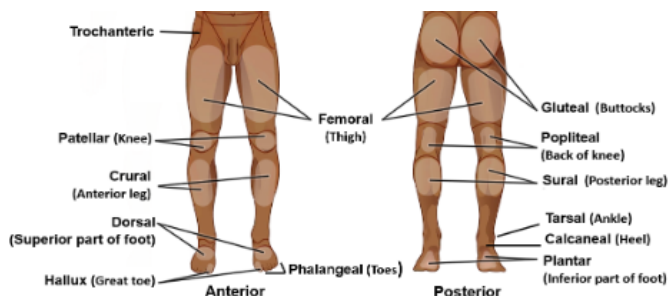


Figure 8. Regions of the Lower Limb

BODY SYSTEMS

- Systemic anatomy – study of the body's organ systems that work together to carry out complex functions.

A. INTEGUMENTARY SYSTEM

- Consists of the skin, and its appendages (hairs, nails, sweat glands)
- Largest organ
- Protective coating to the body
- Layers:
 - Epidermis – outer
 - Dermis – inner
- Melanin
 - produced by sebaceous gland
 - protection from UV light
- Sebum
 - produced by sebaceous gland
 - lubricates skin
 - bactericidal effect
- Sweat
 - produced by sweat gland
 - hydrates and cools skin
 - eliminates waste
- Hair
 - protection from cold environment
 - "Goosebumps" → due to Arrector pili muscle
- Blood vessel
 - reactions:
 - vasoconstriction - decreases diameter
 - vasodilation - increases diameter
 - acts as temperature regulator during inflammation
- Cutaneous receptors - accept sensation from environment

B. SKELETAL SYSTEM

- Consists of bones and cartilage
- Function:
 - framework of the body
 - muscle attachment
 - lever for locomotion
 - hemopoietic organ
- Types as to location:
 - Axial skeleton - midline of body
 - Appendicular skeleton - far from midline

C. ARTICULAR SYSTEM

- Consists of joints and associated ligaments, connecting the bony parts of the skeletal system, and providing the sites where movements occur
- Function: Fulcrum for motion
- Types as to degree of movement:
 - Movable joint - Shoulder joint, Hip joint
 - Slightly movable joint - Symphysis pubis
 - Non-movable joint - Sutures of skull
- Types as to uniting material:
 - Fibrous joint – uses collagenous connective tissue
 - Cartilaginous joint – uses cartilage tissue
 - Synovial joint – uses an oily fluid called synovium

D. MUSCULAR SYSTEM

- Consists of skeletal muscles that act to move or position parts of the body, or smooth and cardiac muscle that propels, expels, or controls the flow of fluids.
- Function: movement
- Types as to location:
 - Skeletal muscle
 - Cardiac muscle
 - Smooth muscle
- Types as to 'will' control:
 - Voluntary muscle
 - Involuntary muscle

- Types as to presence of striations:
 - striated muscle
 - non-striated muscle
- Types as to actions of muscle:
 - agonist muscle - prime mover or doer of action
 - antagonist - opposes the doer
 - synergist - assist the doer
 - fixator - stabilizes the bone where doer originates

E. DIGESTIVE SYSTEM

- F. Consists of the digestive tract from the mouth to the anus
- G. Functions:
 - Ingestion
 - Digestion
 - Absorption
 - Elimination
- H. Other organs and secretion
 - salivary glands - salivary amylase
 - liver - bile
 - pancreas - pancreatic amylase, protease, lipase
 - gallbladder - storage of bile

I. NERVOUS SYSTEM

- Consists of:
 - Central Nervous System
 - Brain and spinal cord
 - Peripheral Nervous System
 - Nerves, ganglia, motor and sensory endings
- Controls and coordinates the functions of the organ systems
- Often considered with the sense organs:
 - olfactory organ, eye or visual system, ear, and gustatory organ

J. CARDIOVASCULAR SYSTEM

- consists of the heart and blood vessels that propel and conduct blood

K. PULMONARY SYSTEM

- Consists of air passages and lungs
- Supplies oxygen to the blood for cellular respiration and eliminate carbon dioxide from it
- The diaphragm and larynx control the flow of air

L. LYMPHATIC SYSTEM

- Consists of: Networks of lymphatic vessels that withdraws excess tissue fluid from the body's interstitial fluid compartment
 - Filters it through lymph node, and returned to bloodstream

M. URINARY SYSTEM

- Consists of kidneys, ureters, urinary bladder, and urethra
- Functions in:
 - Filtration
 - Secretion
 - Reabsorption
- Final product: urine

N. ENDOCRINE SYSTEM

- O. Consists of specialized structure that secrete hormones
- P. Produce hormones
 - Thyroid gland - T₃, T₄
 - Adrenal gland - androgens
 - Kidney - erythropoietin

Q. REPRODUCTIVE SYSTEM

- Consists of:

- Glands that produce oocytes and sperms
- Ducts that transport them
- Genitalia for their union

ANATOMIC STANCE

- The standard anatomical position
- Universally agreed-upon reference posture
- Helps doctors/scientists describe the human body clearly without confusion
- In the visualization of patient, they are:
 - lying on their sides
 - **SUPINE** - recumbent, lying on the back, face upward
 - **PRONE** - lying on the abdomen, face downward
- This refers to the body position as if the person were standing upright with the:
 - Head, gaze (eyes), and toes directed anteriorly (forward)
 - Arms adjacent to the sides with the palms facing anteriorly
 - Lower limbs close together with the feet parallel

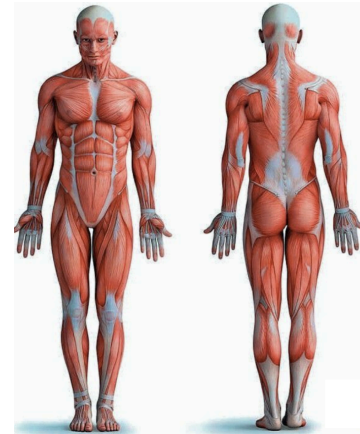


Figure 9. Anatomical stance

ANATOMIC PLANE

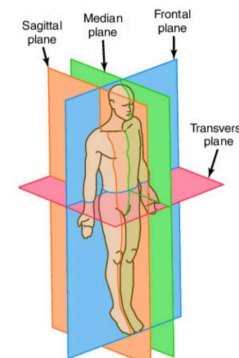


Figure 10. Anatomic Planes

A. MEDIAN PLANE

- Vertical anteroposterior plane
- Passing longitudinally through the midlines of the head, neck, and trunk
- Divides body into right and left halves
- Not synonymous with Midline
- Also referred to as the "median sagittal"

B. SAGITTAL PLANE

- Vertical planes
- Passing through the body parallel to the median plane
- Also referred to as the "parasagittal"

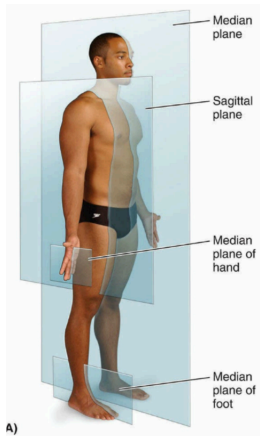


Figure 11. Median and Sagittal Plane

C. FRONTAL PLANE

- Vertical planes
- Pass through the body at right angles to the median plane
- Divides the body into anterior (front) and posterior (back) parts
- Also referred to as the “coronal”



Figure 12. Frontal Plane

D. TRANSVERSE PLANE

- Horizontal planes
- Pass through the body at right angles to the median and frontal planes
- Divides the body into superior (upper) and inferior (lower) parts
- Radiologists refer to transverse planes as transaxial (axial planes)



Figure 13. Transverse/Axial Plane and Frontal Plane

ANATOMIC SECTIONS

A. LONGITUDINAL SECTION

- run lengthwise or parallel to the long axis of the body
- term applies regardless of the position of the body
- heading is used for a major subtopic under the main topic

- median, sagittal, and frontal planes are the standard longitudinal sections



Figure 14. Longitudinal Section of the leg

B. TRANSVERSE SECTION

- slices of the body or its parts that are cut at right angles to the longitudinal axis
- “cross sections”
- Exception: transverse section of the foot lies in the frontal plane



Figure 15. Transverse section of the arm

C. OBLIQUE SECTION

- slices of the body or its parts that are not cut along the previously listed anatomical planes
- In practice, many radiographic images and anatomical sections do not lie precisely in sagittal, frontal, or transverse planes; often — they are slightly oblique

BODY CAVITIES

A. DORSAL CAVITY

- Located on the back (posterior) side of the body
- Protects the central nervous system
- Includes the cranial and spinal cavity

Table 1. Contents of the Dorsal Cavity

Cranial Cavity	Spinal Cavity
Brain	Spinal cord
Meninges	Meninges
Cerebrospinal fluid (CSF)	Cerebrospinal fluid (CSF)

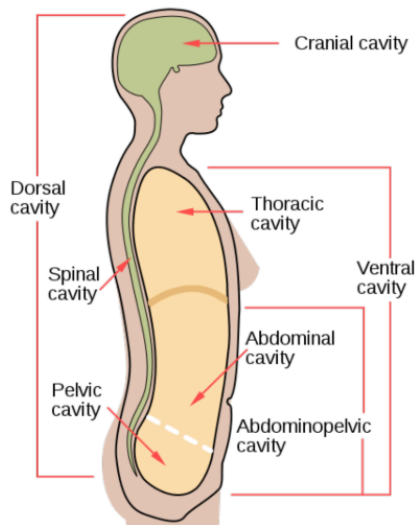


Figure 16. Illustration of the cavities of the human body

B. VENTRAL CAVITY

- Located on the front (anterior) side of the body
- separated by the diaphragm into the thoracic and abdominopelvic cavities

Table 2. Contents of the Ventral Cavity	
Thoracic Cavity	Abdominopelvic Cavity
Pleural Cavity	Abdominal Cavity
Pericardial Cavity	Pelvic Cavity
Mediastinum	

Thoracic Cavity

Table 3. Contents of the Thoracic Cavity		
Pleural Cavities	Pericardial Cavity	Mediastinum
Right lung	Heart	Heart (inside the pericardial cavity)
Left lung		Thymus
		Trachea
		Esophagus
		Major blood vessels (aorta, superior and inferior vena cava, pulmonary arteries and veins)

Abdominopelvic Cavity

Table 4. Contents of the Abdominopelvic Cavity			
Abdominal Cavity	Pelvic Cavity		
	Male	Female	Both
Stomach	Prostate	Uterus	Urinary bladder
Liver	Seminal Vesicles	Ovaries	Rectum
Gallbladder	Portions of the vas deferens	Uterine (fallopian) tubes	Internal reproductive organs
Spleen		Upper vagina	
Pancreas			
Small Intestines			
Most of Large intestines			
Kidneys and adrenal glands (retroperitoneal)			

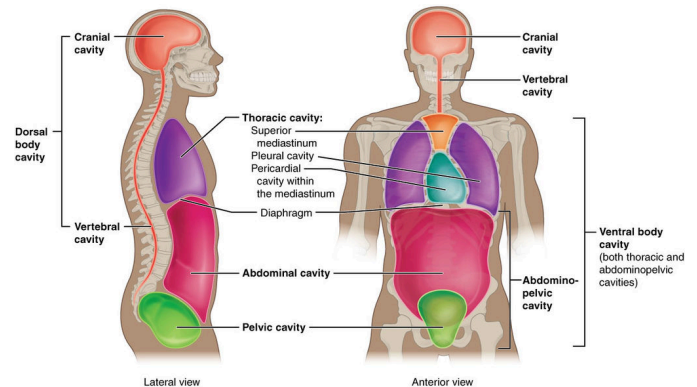


Figure 17. Dorsal and Ventral Body Cavities

ANATOMICAL TERMS OF RELATIONSHIP AND COMPARISON

A. Terms Used for the Entire Body

- Adjectives arranged as pairs of opposites – relationship of parts of the body or compare
- position of two structures relative to each other
- Some are specific for comparisons made in the anatomical position
- Some for comparisons made with reference to the anatomical planes

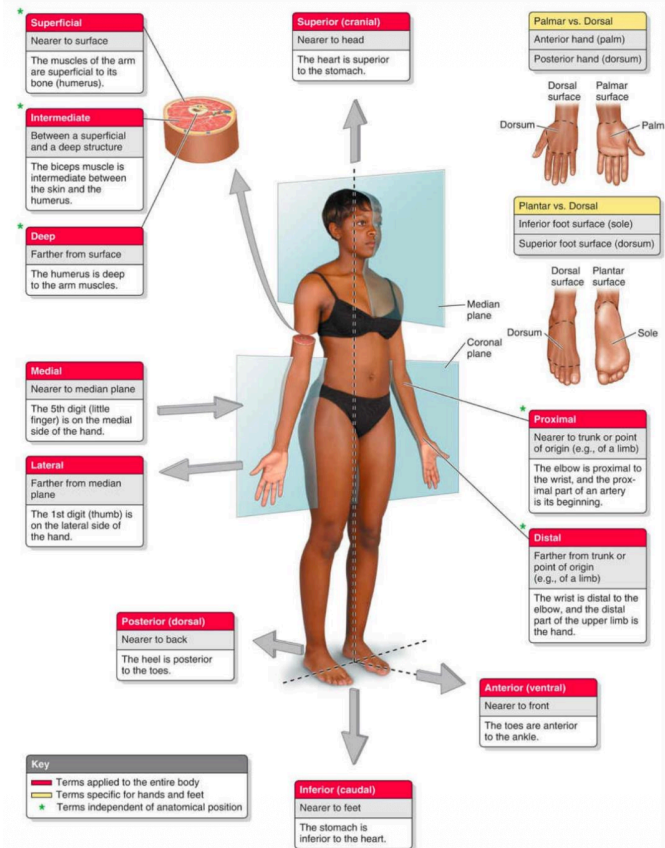


Figure 18. Terms of Relationship and Comparison

SUPERIOR (CRANIAL) VS. INFERIOR (CAUDAL)

- **SUPERIOR** - structure that is nearer the vertex (topmost point of the cranium)
Examples:
 - The heart is superior to the stomach.
 - The frontal lobe is superior to the pons in the brain.
- **CRANIAL** - toward the head or cranium (especially used when describing parts of the trunk)
Examples:
 - The lungs are cranial to the diaphragm.
 - The thyroid gland is cranial to the thymus.
- **INFERIOR** - situated nearer the sole of the foot
Examples:
 - The liver is inferior to the lungs.
 - The pelvis is inferior to the abdomen.
- **CAUDAL** - toward the feet or tail region. In humans, this refers to the coccyx (tail bone), the terminal end of the vertebral column.
Examples:
 - The sacrum is caudal to the lumbar vertebrae.
 - The spinal cord ends at the L1–L2 level, but the cauda equina extends caudally beyond that.

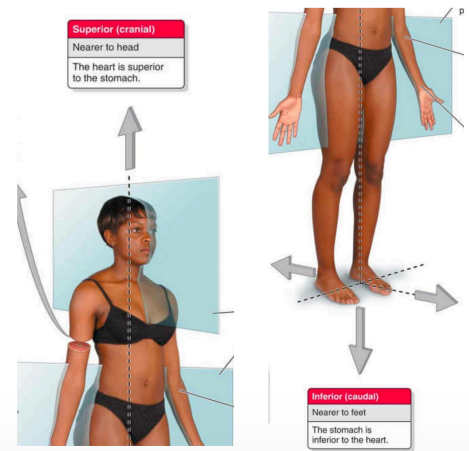


Figure 19. Superior and Inferior

POSTERIOR (DORSAL) VS. ANTERIOR (VENTRAL)

- **POSTERIOR (dorsal)** - back surface of the body or nearer to the back
Examples:
 - The esophagus is posterior to the trachea.
 - The scapula is located on the posterior aspect of the thorax.
- **ANTERIOR (ventral)** - front surface of the body or a structure closer to front.
Examples:
 - The sternum is anterior to the heart.
 - The patella is anterior to the femur.
- **ROSTRAL** - Refers to structures closer to the anterior part of the head (commonly used in neuroanatomy). Derived from Latin *rostrum*, meaning "beak."
Example:
 - The frontal lobe of the brain is rostral to the cerebellum
 - The optic chiasm is rostral to the midbrain.

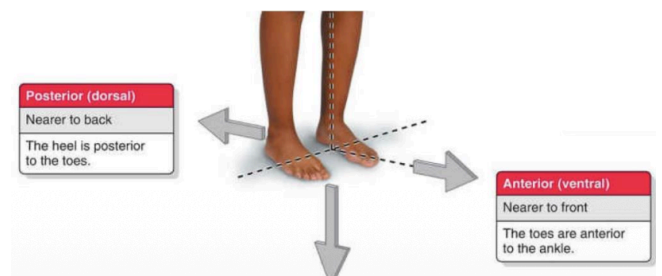


Figure 20. Posterior vs. Anterior

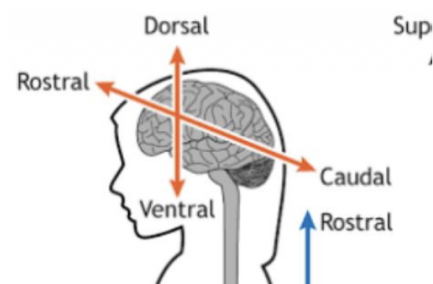


Figure 21. Rostral

MEDIAL VS. LATERAL

- **MEDIAL** – nearer to the **median plane** of the body
Examples:
 - The ulna is medial to the radius in the forearm.
 - The great saphenous vein is medial to the femoral artery in the thigh.
- **LATERAL** – farther away from the **median plane** of the body.
Examples:
 - The fibula is lateral to the tibia.
 - The lungs are lateral to the heart.

Medial
Nearer to median plane
The 5th digit (little finger) is on the medial side of the hand.

Lateral
Farther from median plane
The 1st digit (thumb) is on the lateral side of the hand.

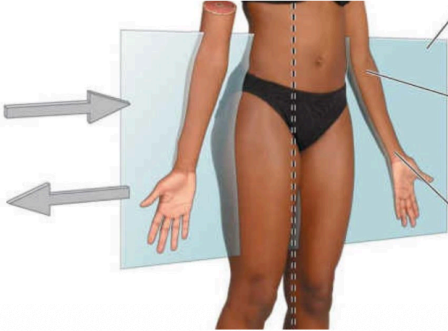


Figure 22. Medial vs. Lateral

B. Terms Used for Hands and Feet

- **DORSUM** – **Superior aspect** of any part that protrudes anteriorly from the body
Example:
 - dorsum of the tongue, nose, penis or foot
- **Posterior surface of the hand** – opposite the palm
- **DORSAL SURFACE** – surface of the hands, feet, and digits of both corresponding to the dorsum
- **PALMAR SURFACE** – surface of the hand and fingers corresponding to the palm
- **PLANTAR SURFACE** – surface of the foot and toes corresponding to the sole

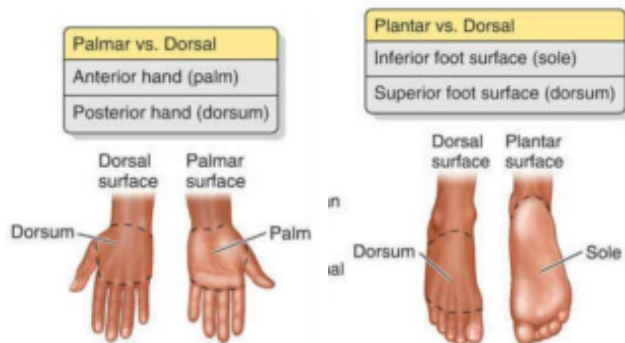


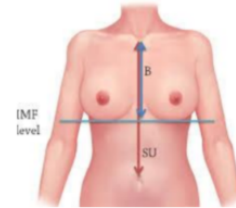
Figure 23. Palmar vs. Plantar

C. Combined Terms

- **Combined terms** – intermediate positional arrangements
 - **INFEROMEDIAL** – nearer to the feet and median plane
 - The anterior parts of the ribs run inferomedially



- **SUPEROLATERAL** – nearer to the head and farther from the **median plane**
 - The acromion process is superolateral to the sternoclavicular joint
 - The nipples are superolateral to the umbilicus



D. Terms Used for Surface and Core Orientation

- Other terms relate primarily to the **body's surface or its central core**
 - **SUPERFICIAL, INTERMEDIATE, DEEP**
 - Position of structures relative to the **surface** of the body
 - Relationship of one structure to another **underlying or overlying** structure
 - Examples:
 - The superficial veins of the arm are visible under the skin
 - The superficial fascia lies above the deep fascia
 - The muscular layer of the abdominal wall is intermediate between the skin and peritoneum
 - The pericardium is intermediate to the sternum and heart
 - The kidneys are deep to the posterior abdominal wall
 - Deep cervical lymph nodes lie beneath the sternocleidomastoid muscle

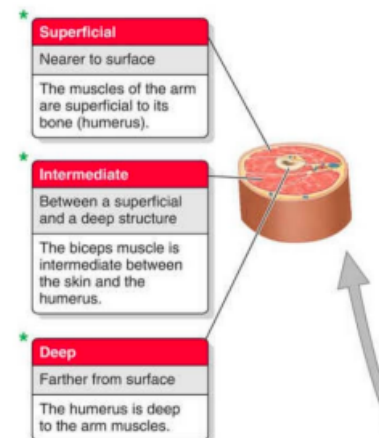


Figure 25. Superficial, Intermediate, Deep

- Other terms relate primarily to the **body's surface or its central core**
 - **EXTERNAL**
 - Outside of or farther from the center of an organ or cavity
 - **INTERNAL**
 - Inside or closer to the center, independent of direction
 - **PROXIMAL, DISTAL**

- Contrasting positions **nearer to or farther from** the attachment of a limb or the central aspect of a linear structure

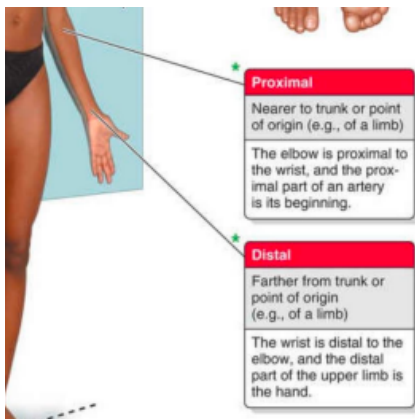


Figure 26. Proximal vs. Distal

TERMS OF LATERALITY

- BILATERAL**
 - Paired structures having right and left members
 - kidneys
- UNILATERAL**
 - Occurring on one side only
 - spleen
- IPSILATERAL**
 - Occurring on the same side of the body as another structure
 - right thumb and right great (big) toe
- CONTRALATERAL**
 - Occurring on the opposite side of the body relative to another structure
 - right hand is contralateral to the left hand

TERMS OF MOVEMENT

ANTAGONISTIC (OPPOSING) PAIRS

FLEXION AND EXTENSION

Occur in sagittal planes around a transverse axis

- Flexion:** bending or decreasing the angle between the bones or parts of the body (in anterior direction for joints above the knee)
 - Example: elbow, flexion involves movement in an anterior direction
- Extension:** straightening or increasing the angle between the bones or parts of the body (knee flexion involves posterior movement and extension involves anterior movement)
 - Usually in posterior direction

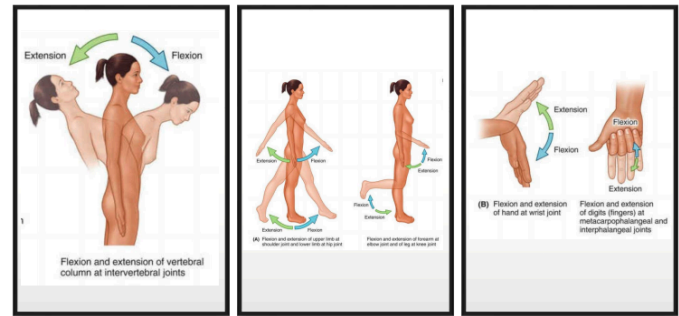


Figure 27. Flexion and Extension

ABDUCTION AND ADDUCTION

Occur in a frontal plane around an anteroposterior axis

- Abduction:** moving away from the median plane.
 - Moving upper limb laterally away from the side of the body
- Adduction:** moving toward the median plane

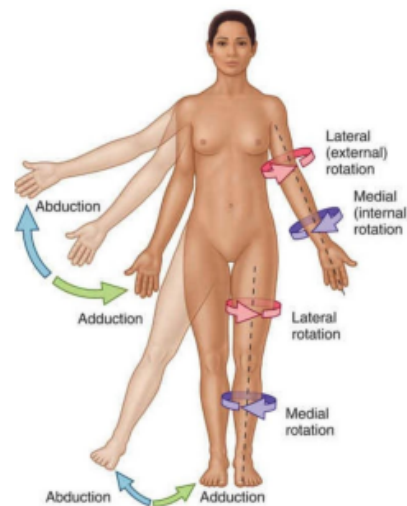
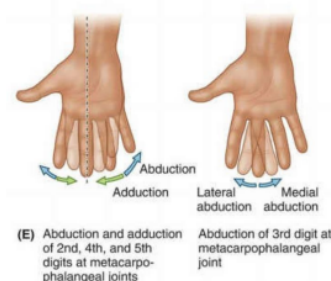
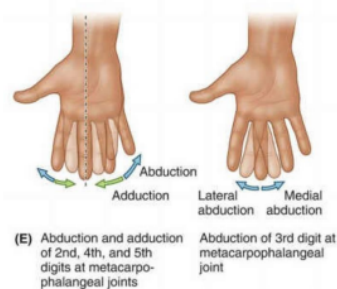


Figure 28. Abduction and Adduction

- Abduction of the digits (fingers or toes): spread apart**
 - Moving the other fingers away from the neutrally positioned 3rd (middle) finger
 - Moving the other toes away from the neutrally positioned 2nd toe
 - 3rd finger and 2nd toe medially or laterally abduct away from the neutral position



- Adduction of the digits (fingers or toes): bringing the spread digits together**
 - Toward the neutrally positioned 3rd finger or 2nd toe



LATERAL FLEXION (LATERAL BENDING)

special forms of **abduction**

- For the neck and trunk only
- Face and upper trunk are directed anteriorly as the head and/or shoulders tilt to the right or left side → midline of the body to become bent sideways
- Compound movement occurring between many adjacent vertebrae

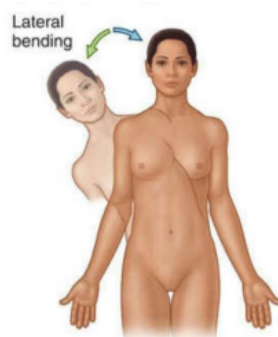
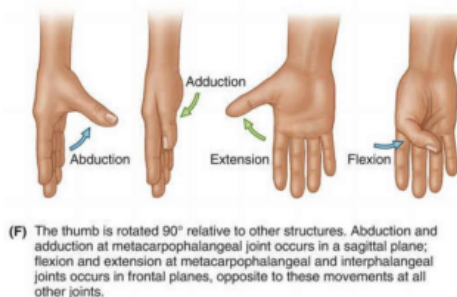


Figure 29. Lateral Flexion

- The **thumb** is rotated 90 degrees relative to the other digits
- The thumb **flexes and extends** in the frontal plane
- The thumb **abducts and adducts** in the sagittal plane



CIRCUMDUCTION

circular movement

- Sequential flexion, abduction, extension, and adduction (or in the opposite order)
- The distal end of the part moves in a circle
- Can occur at any joint at which circular movement is possible – shoulder and hip joints



(H) Circumduction (circular movement) of lower limb at hip joint

ROTATION

- Turning or revolving a part of the body around its longitudinal axis – turning one's head to face sideways
 - **Medial rotation** (internal rotation): anterior surface of a limb closer to the median plane
 - **Lateral rotation** (external rotation): anterior surface away from the median plane

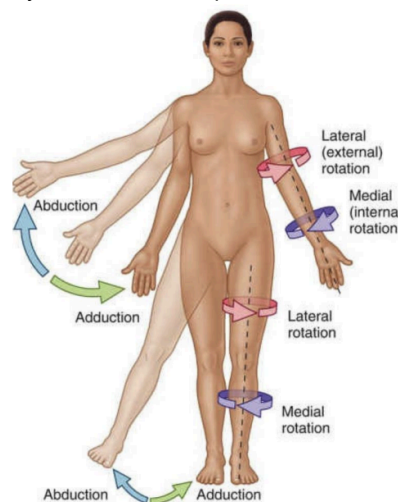


Figure 30. Rotation

PRONATION AND SUPINATION

- Rotational movements of the forearm and hand that swing the distal end of the radius medially and laterally around and across the anterior aspect of the ulna while the proximal end of the radius rotates in place
 - **Pronation**: medial rotation of the radius – palm of the hand faces posteriorly, dorsum faces anteriorly
 - **Supination**: lateral rotation of the radius – pronated forearm back to the anatomical position



Figure 31. Pronation and Supination

EVERSION

- Sole of the foot away from the median plane,
- turning the sole laterally
- Dorsiflexed when fully everted

INVERSION

- Sole of the foot toward the median plane,
- facing the sole medially
- Plantarflexed when fully inverted

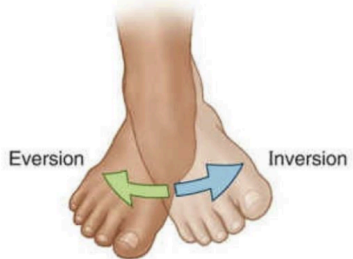


Figure 32. Eversion and Inversion

OPPOSITION

- Pad of the 1st digit (thumb) is brought to another digit pad
- Pinch, button a shirt, lift a teacup by the handle

REPOSITION

- Movement of the 1st digit from the position of opposition back to its anatomical position

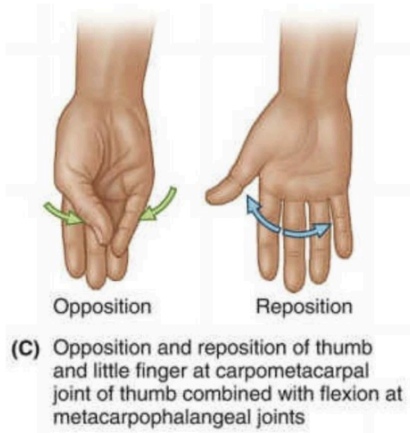


Figure 33. Opposition and Reposition

PROTRUSION

- Anterior (forward) movement
- Mandible (chin), lips, tongue

RETRUSION

- Posterior (backward) movement

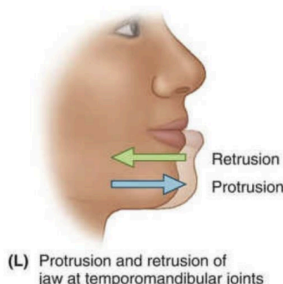
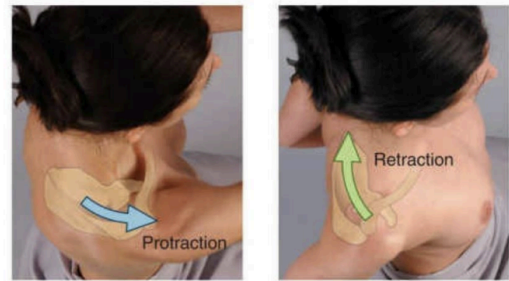


Figure 34. Protrusion and Retrusion

PROTRACTION and RETRACTION

- Most commonly for anterolateral and posteromedial movements of the scapula on the thoracic wall
- Anterior and posterior movement of the shoulder region



(M) Protraction and retraction of scapula on thoracic wall

Figure 35. Protraction and Retraction

ELEVATION

- Raises or moves a part superiorly
- Shrugging, opening the eyes, pushing the tongue against the palate

DEPRESSION

- Lowers or moves a part inferiorly

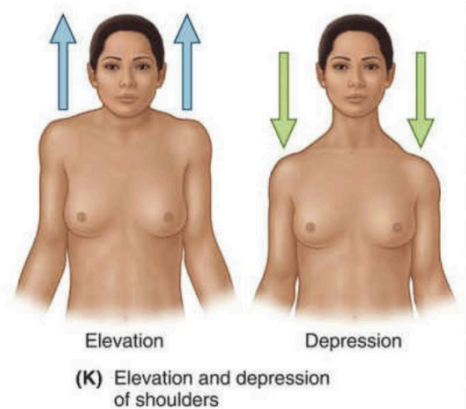


Figure 36. Elevation and Depression

REFERENCES

1. Moore, K. L., Dalley, A. F., II., & Agur, A. M. R. (2014). Clinically Oriented Anatomy (7th ed.). Lippincott Williams & Wilkins