

1. RESPECT
2. RESPECT &
3. RESPECT



# Biology 230

## Human Anatomy



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freshest of our  
could not be able  
individuality to our  
beauty and age.  
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Fig. 9.29

**WELCOME.**

FROM

**Dr. Attaullah Malik**

**DPT (Pak) MSPT (Pak)**

# Human Anatomy

## Chapter 1

### Introduction to Human Anatomy

ANATOMY?

Answer?

# Morphology?

Answer?

- I. **Introduction to Anatomy-** A broad field of science in which the body is studied at different levels.
- II. The art of separating the parts of an organism in order to ascertain their position, relations, & structure
- III. • Cutting something up to see what's inside—structure
- IV. The definition of anatomy is the study of human body or science of Structure;
- V. physiology is the study of body function.
- VI. As you study this subject pay attention to the theme of how "*Structure Determines Function*".

# Types of anatomy

- • **Microscopic anatomy**

- – Cytology-internal structure of cells
- – Histology-study of tissues (groups of cells)

- • **Gross anatomy ( Macroscopic)**

- – Surface anatomy
- – Regional anatomy
- – Systemic anatomy



# Gross anatomy

- **Surface anatomy-anatomy** that we can see at the surface of the body (everyday life)
- **Regional anatomy**-complete anatomy (internal) of a specific region of the body (learning every blood vessel, muscle, bones, etc. in the arm)
- **Systemic anatomy**-the body is divided into 11 organ systems-(our class)

# Subdivisions of anatomy

1. **Cadaveric anatomy** (Studied on dead body with naked eye)
2. **Living anatomy** (Studied on living human beings by inspection, palpation, percussion, auscultation etc)
3. **Developmental anatomy** (Prenatal and postnatal developmental changes)
4. **Microscopic anatomy** (Study of structures with help of microscope)
5. **Surface anatomy** (Study of deeper parts in relation to skin surfaces)
6. **Radiographic anatomy** (Study of deeper organs or structures by radiographs)

7. **Comparative anatomy** (Study of anatomy of other animal to explain the changes in form, structure and function of different parts of human body)

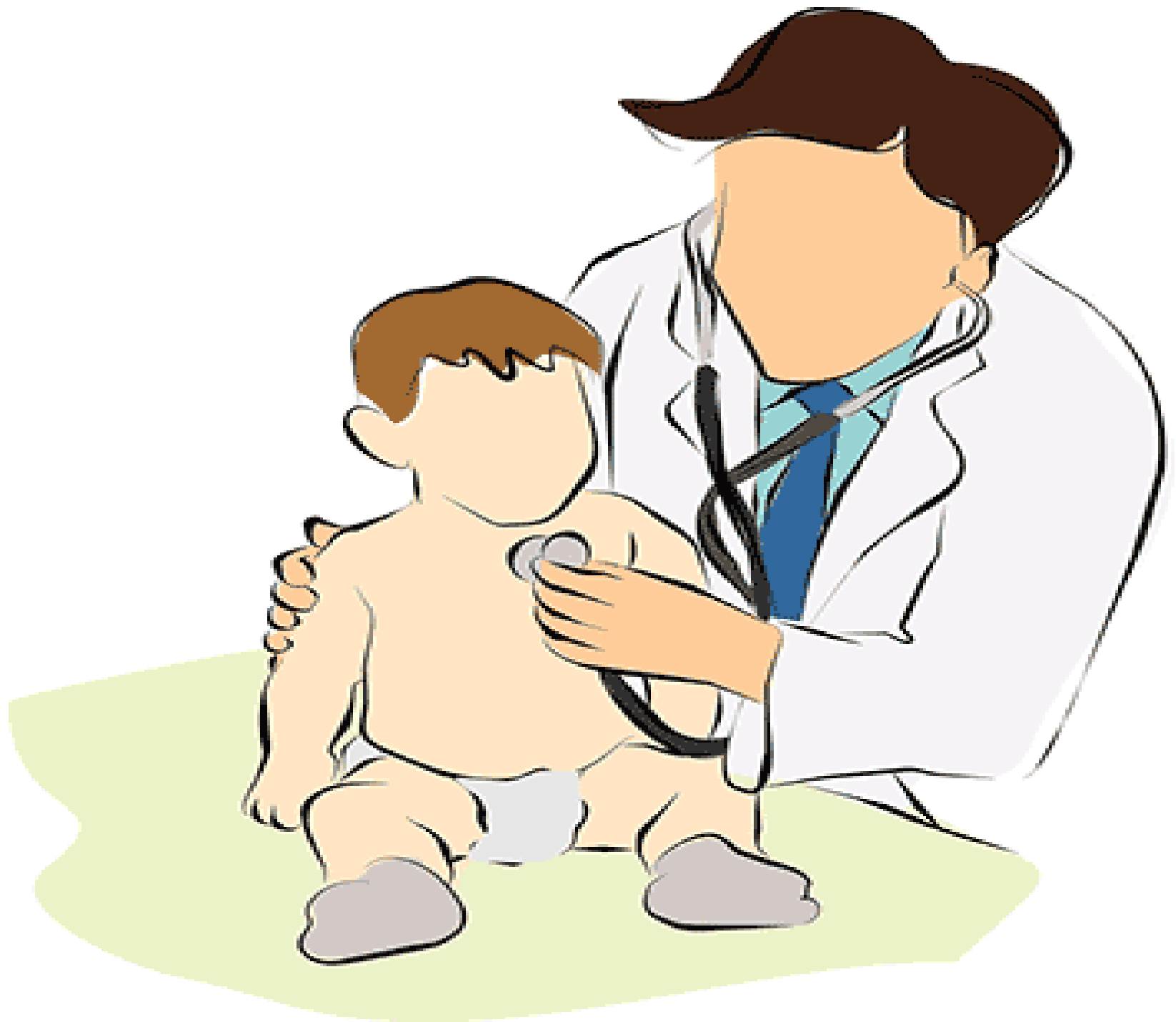
8. **Applied anatomy** (Application of anatomical knowledge to the medical and surgical practice)

9. **Experimental anatomy** (Doing experiments involving anatomical structures to collect information)

10. **Genetics** (The study of heredity, or how the characteristics of living things are transmitted from one generation to the next. Every living thing contains the **genetic** material that makes up DNA molecules. This material is passed on when organisms reproduce. The basic unit of heredity is the **gene**)

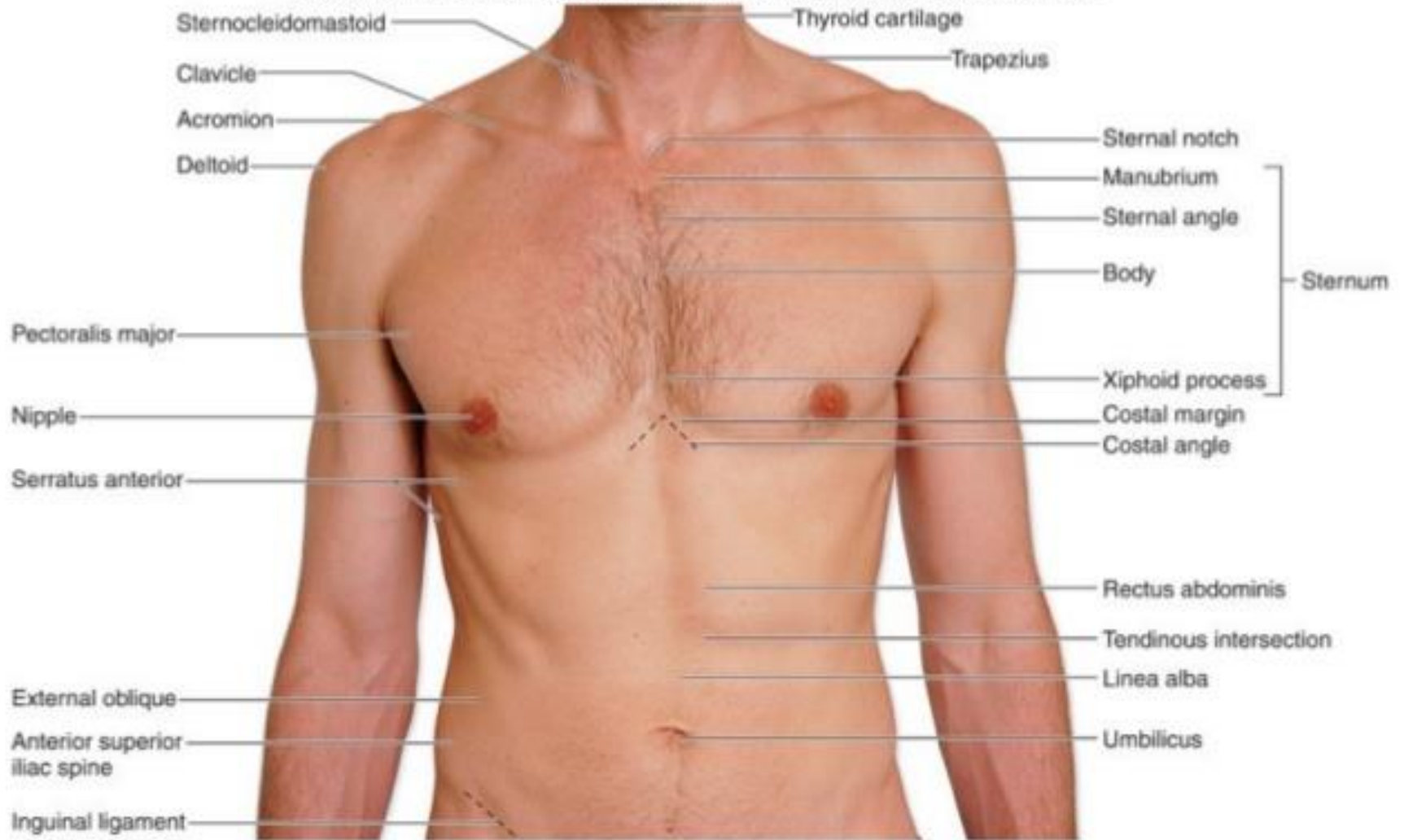




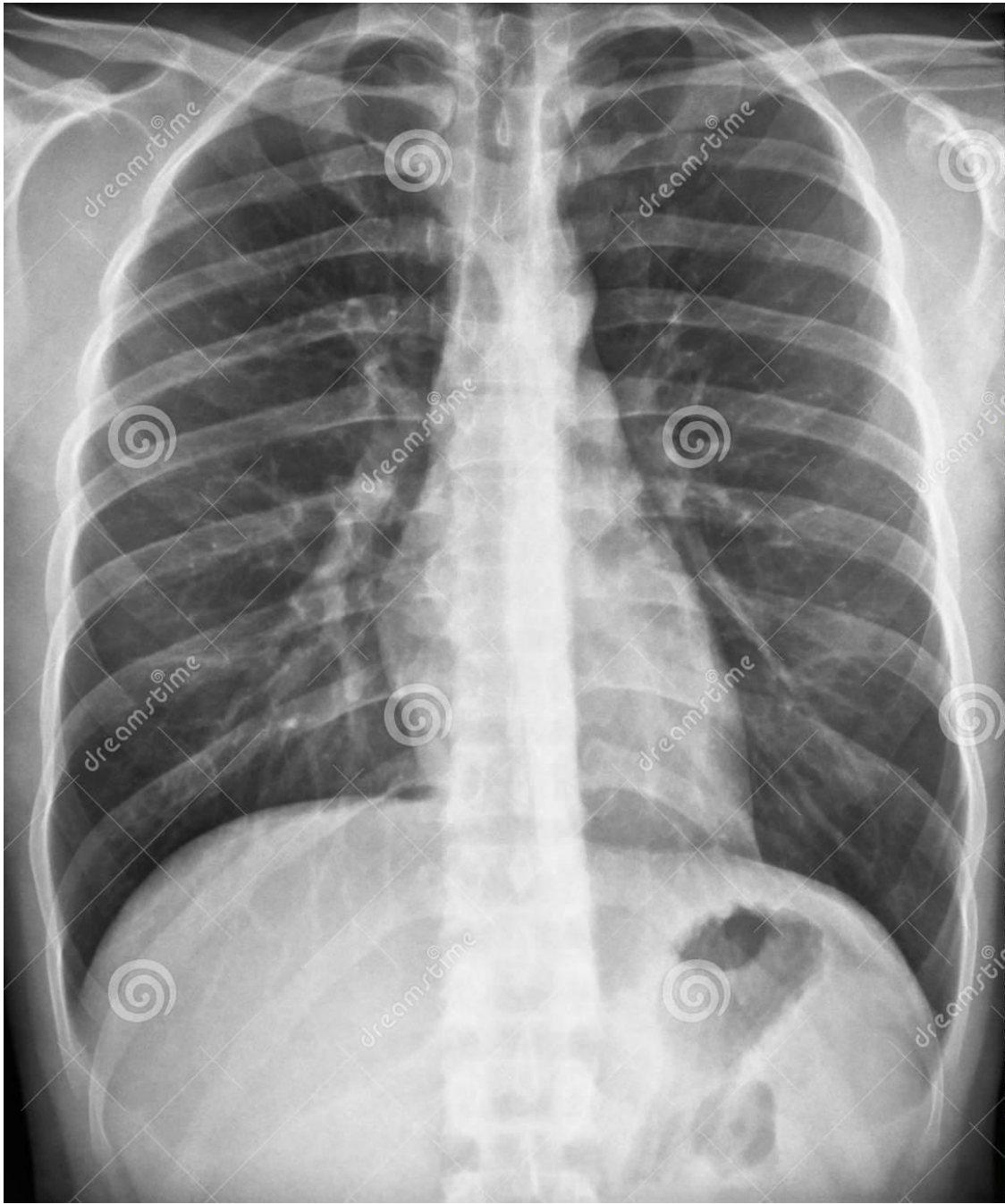




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(a) Male, anterior view



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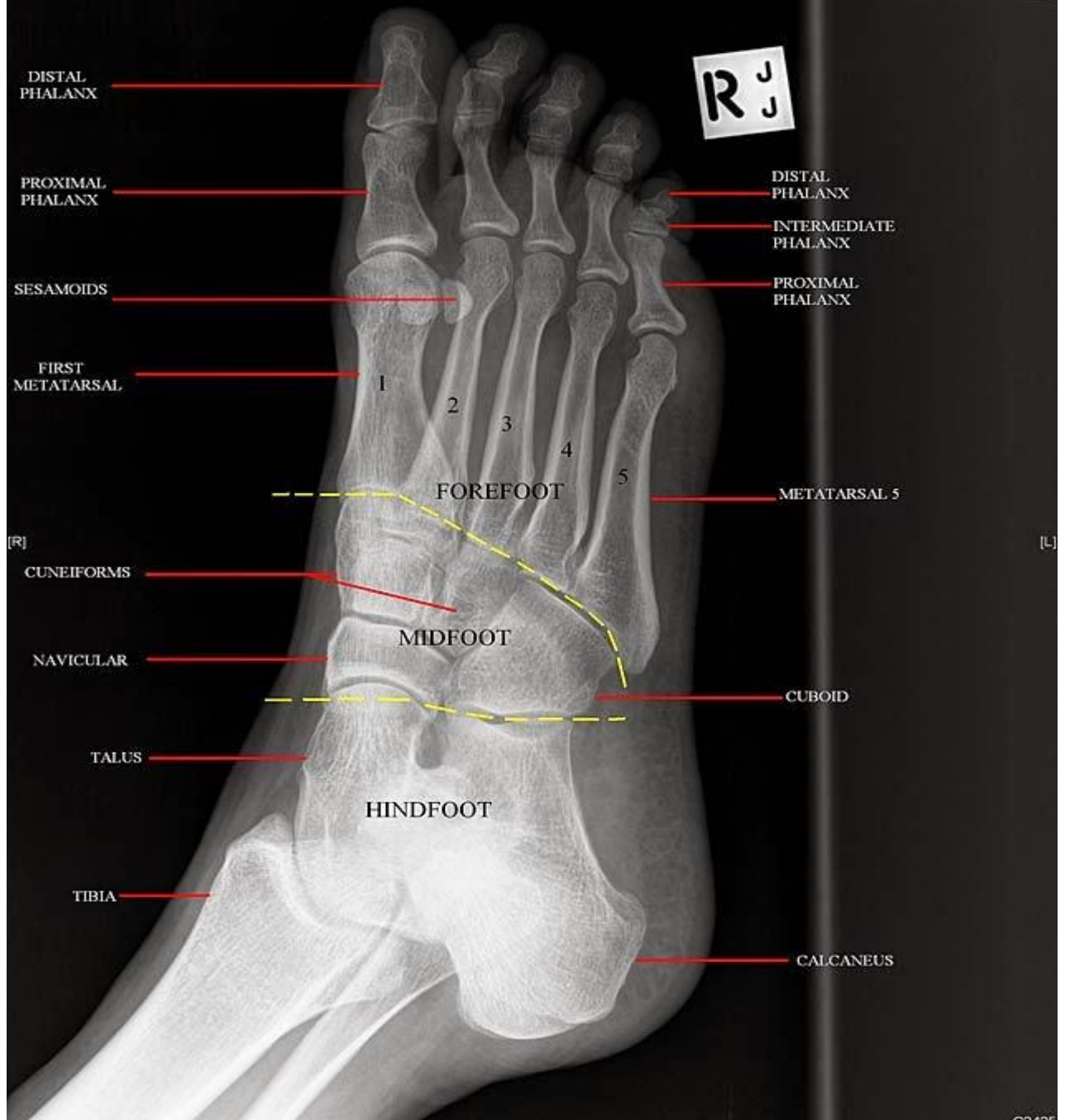
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Im:1



DISTAL PHALANX

PROXIMAL PHALANX

SESAMOIDS

FIRST METATARSAL

[R]

CUNEIFORMS

NAVICULAR

TALUS

TIBIA

R J

DISTAL PHALANX

INTERMEDIATE PHALANX

PROXIMAL PHALANX

METATARSAL 5

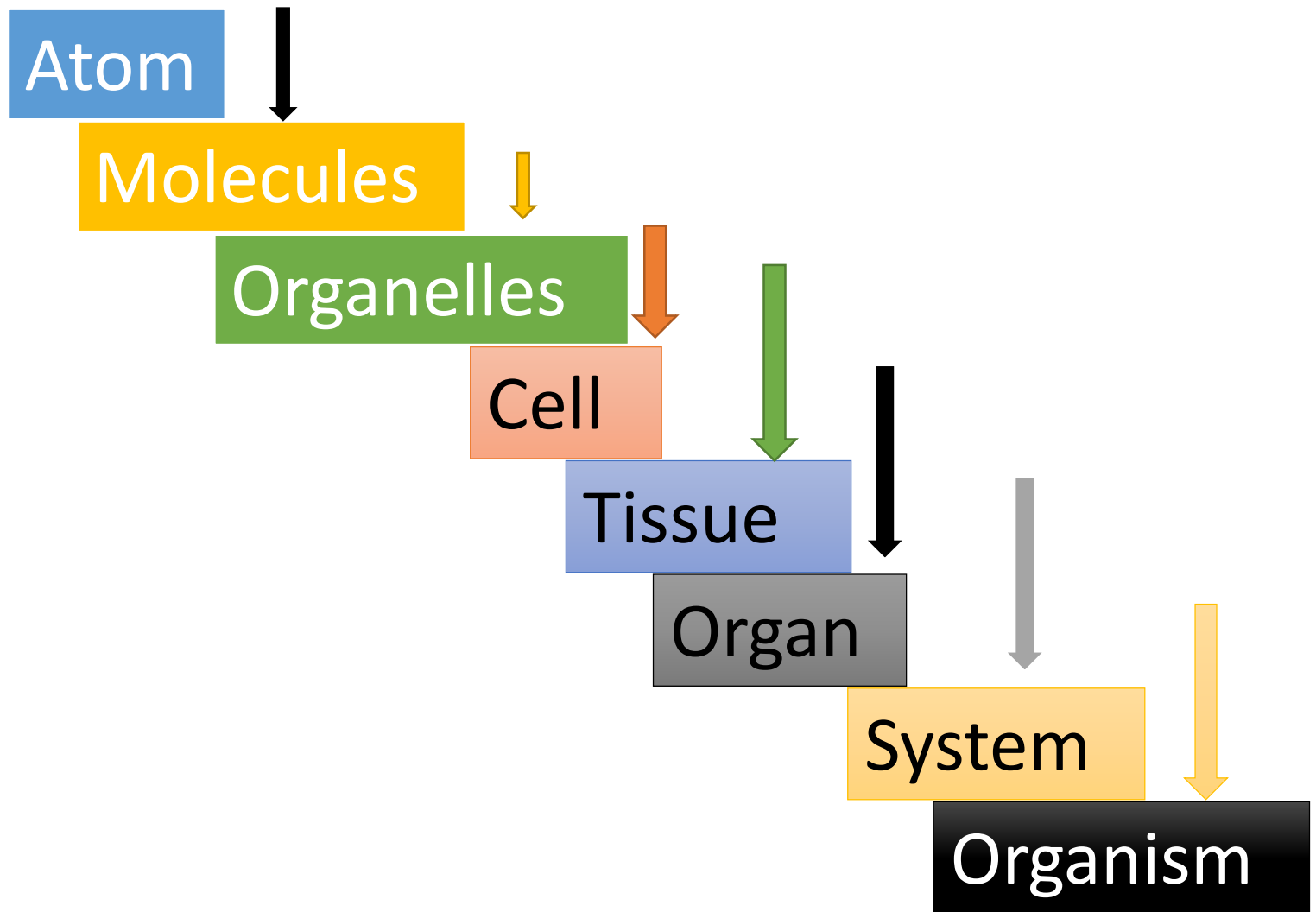
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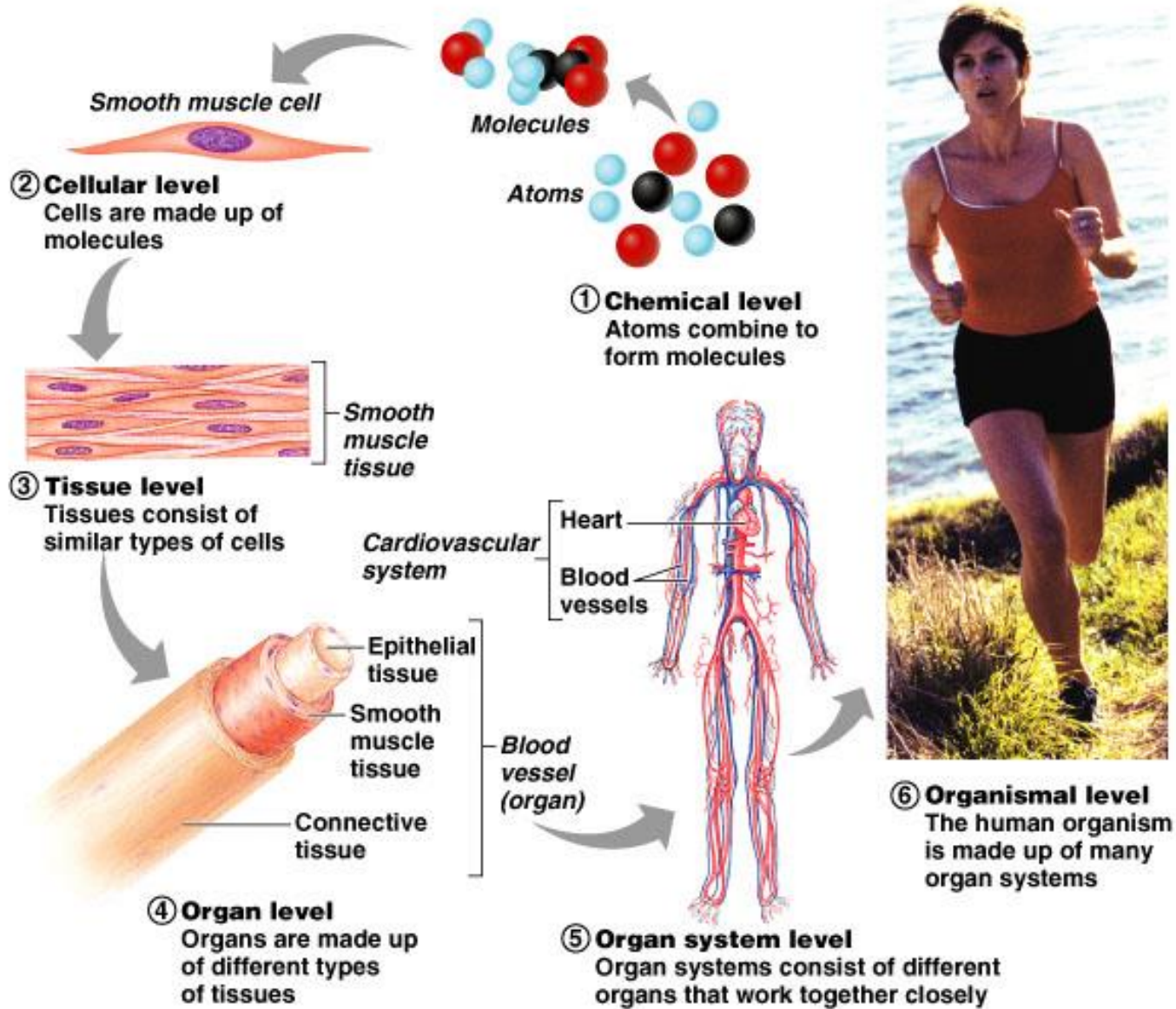
CALCANEUS

[L]



# Levels of organization





# Functions of the 11 systems

- **INTEGUMENTARY**-protection from the environment, helps control body temperature, energy storage
- **SKELETAL**-support, protection of soft tissues, mineral storage, blood cell formation
- **MUSCULAR**-locomotion, support posture, heat production-----skeletal muscles

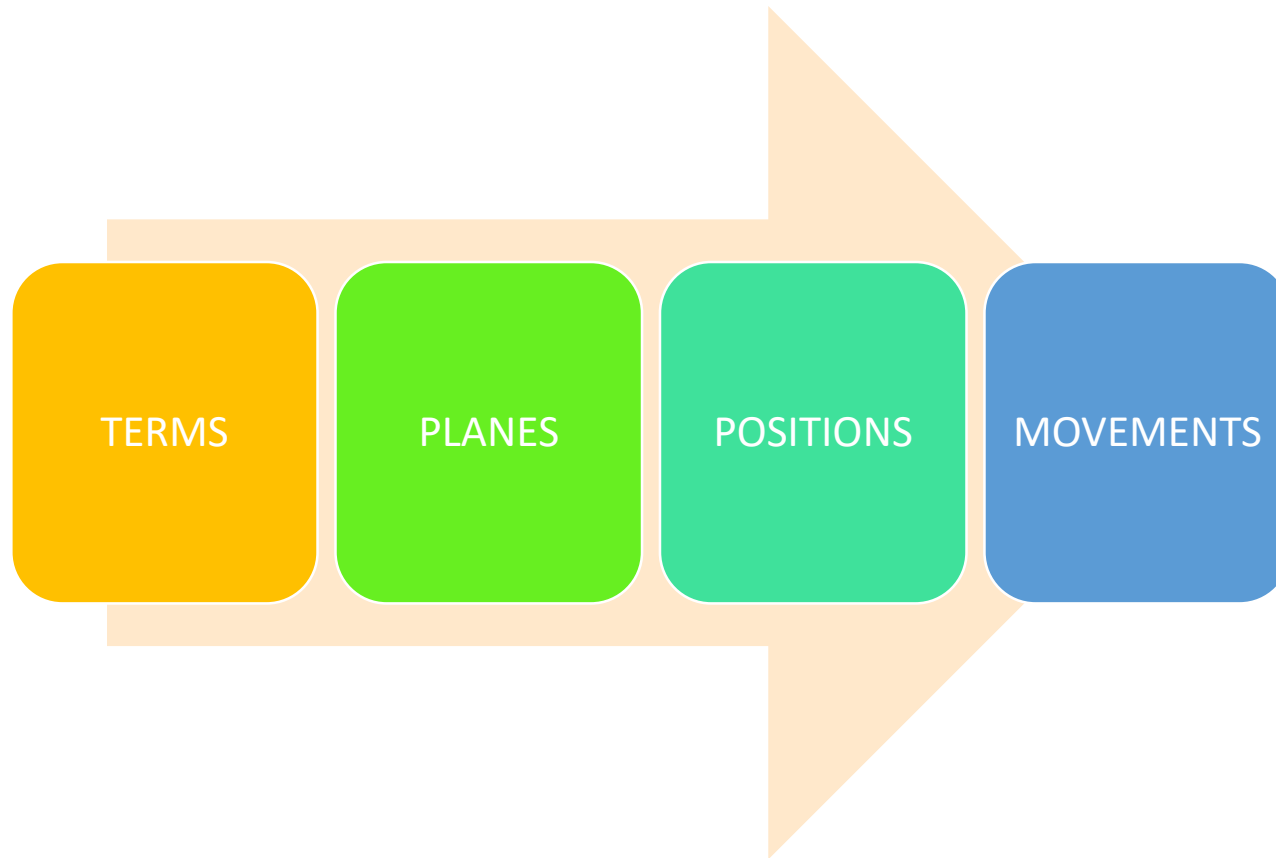
# Functions of the 11 systems

- **Nervous**-directing immediate responses to stimuli by coordinating the actions of other organs
- • **Endocrine**-directing long-term changes in the activities of other organ systems by release of hormones
- • **Cardiovascular**-internal transport of cells and dissolved materials, including nutrient, wastes, & gases

# Functions of the 11 organ systems

- **Lymphatic**-defense against infection & disease
- • **Respiratory**-delivery of air to where gas exchange can occur between the air & circulating blood
- • **Digestive**-processing of food & absorption of organic nutrients, minerals, vitamins, & Water
- • **Urinary**-elimination of excess water, salts, & waste products; controls pH of body fluids
- • **Reproductive**-production of sex cells & hormones

# Language of Anatomy

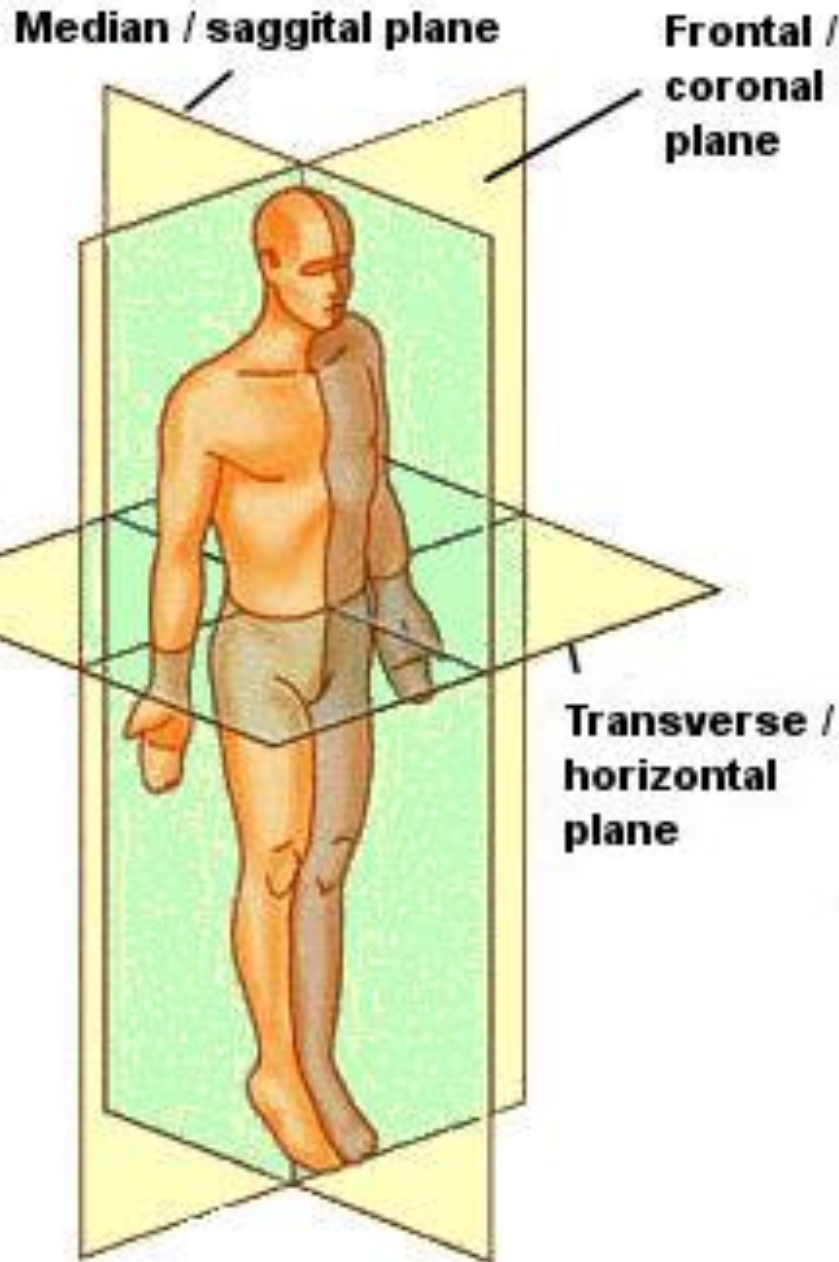




- **II Anatomical Terminology-** The study of anatomy will introduce you to a large vocabulary. It is as if you were learning a new language and mastery of this language is essential for your success in this class.

Pay attention to Greek and Latin roots as you learn the new vocabulary. At one point Latin was the official language used in science and thus it remains today as a way to maintain consistency worldwide.

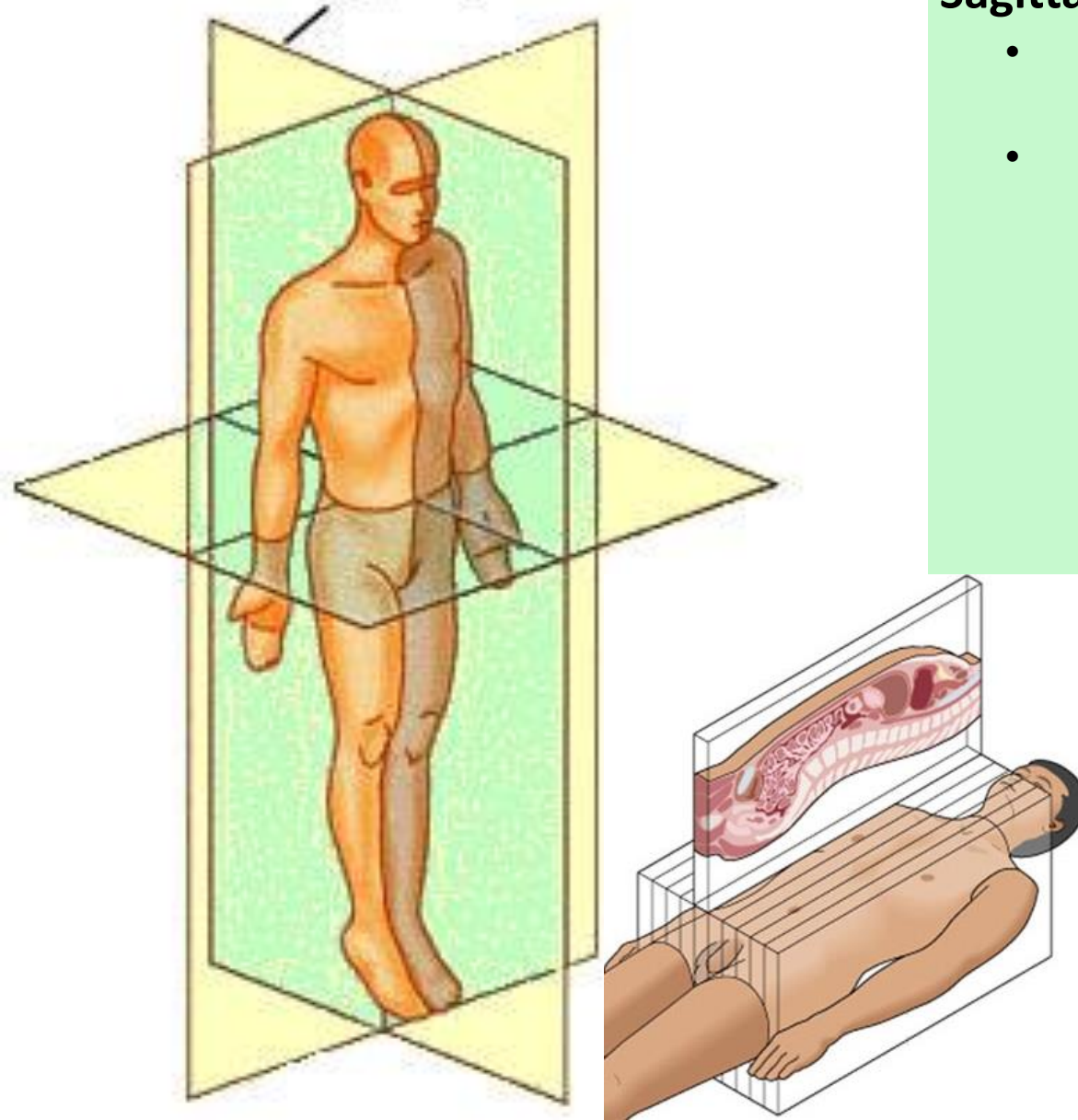
# Anatomical Planes



- Fixed lines of reference along which the body is often divided or sectioned to facilitate viewing of its structures
- Allow one to obtain a three-dimensional perspective by studying the body from different views

# Anatomical Planes

Median / saggital plane



## Sagittal plane

- The plane dividing the body into right and left portions
- Midsagittal or median are names for the plane dividing the body into equal right and left halves

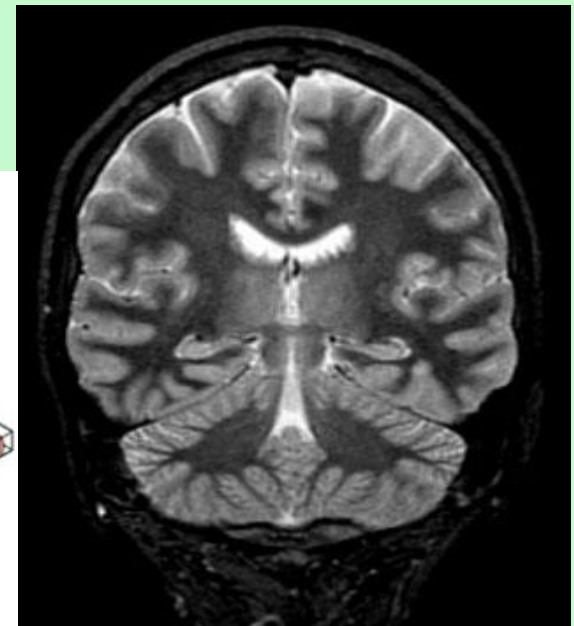
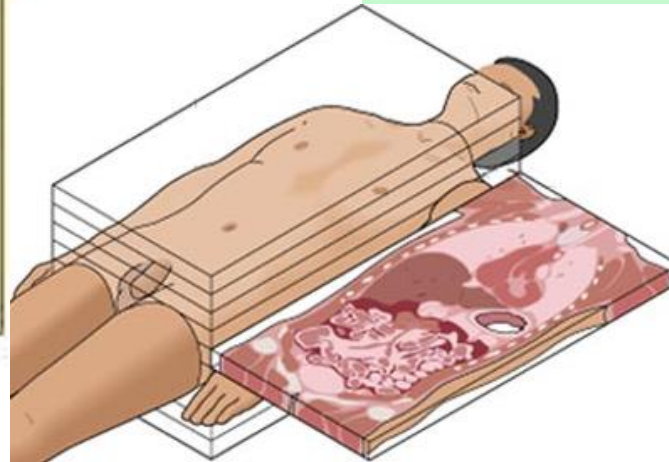
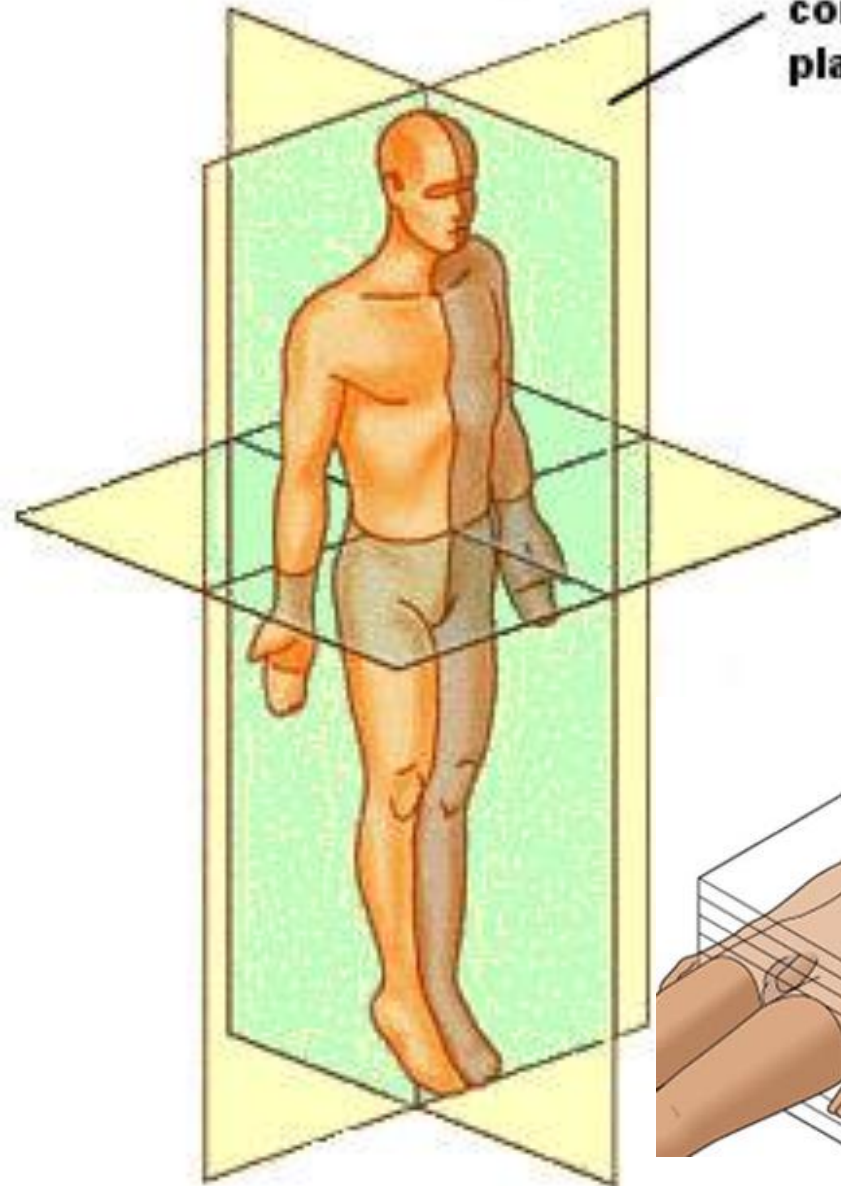


# Anatomical Planes

**Frontal /  
coronal  
plane**

## Frontal plane

- The plane dividing the body into front and back portions
- Also called the Coronal plane

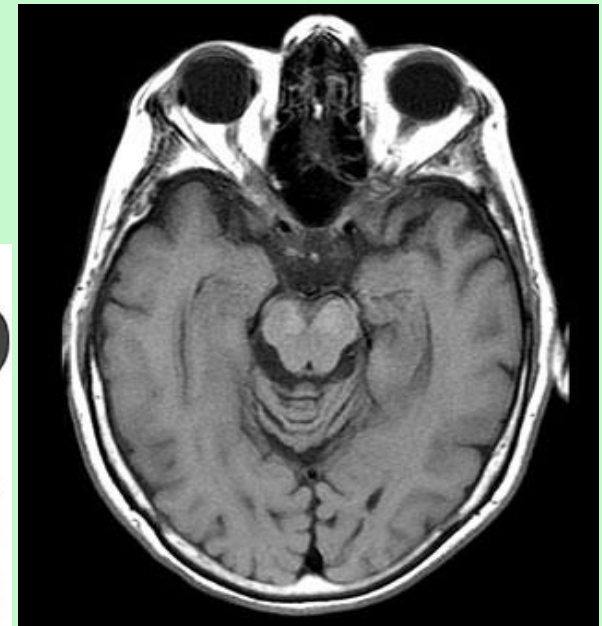
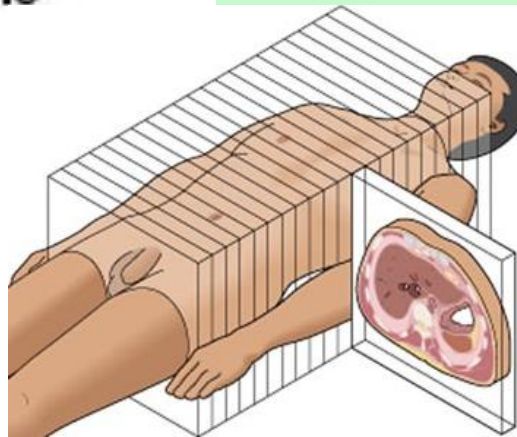
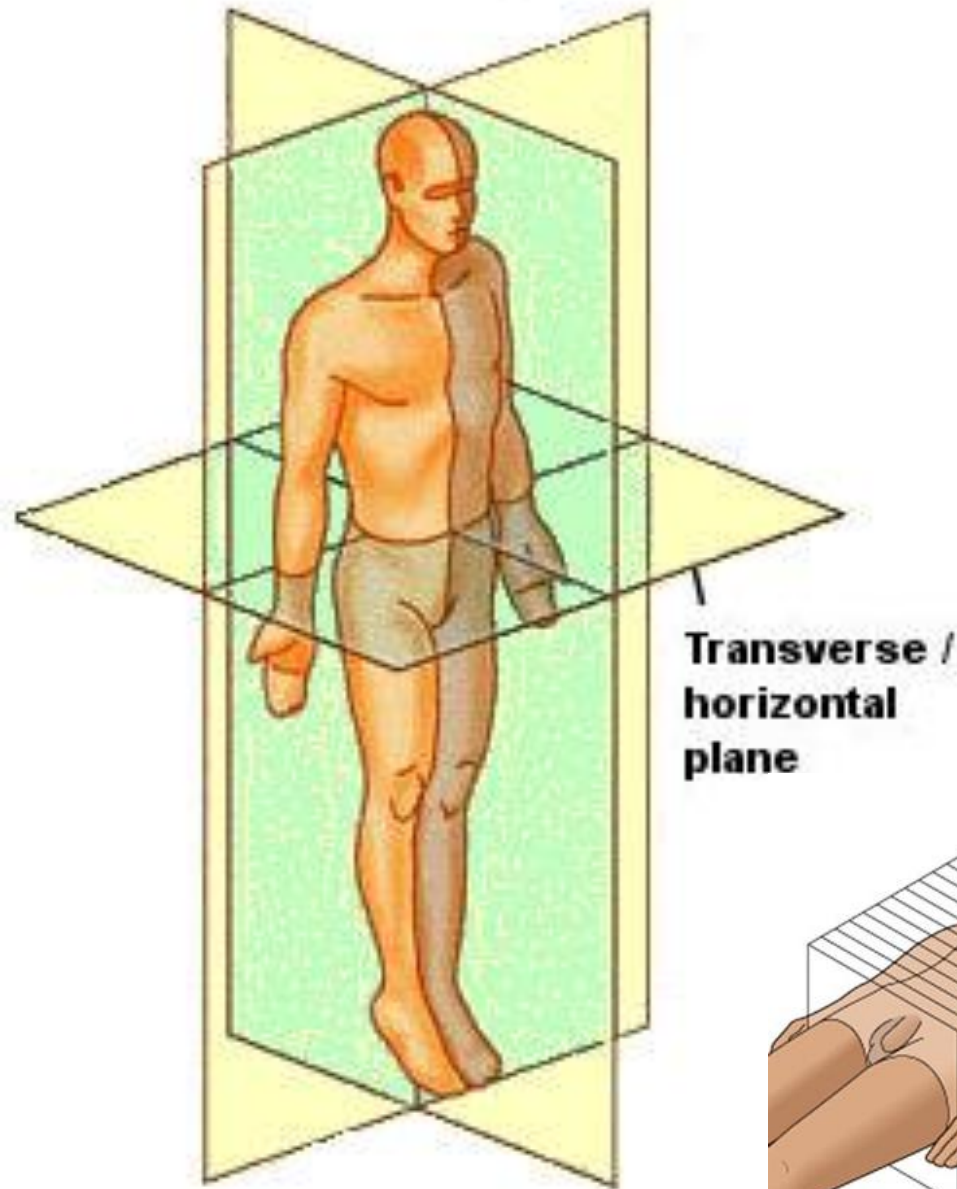




# Anatomical Planes

## Transverse plane

- The horizontal plane dividing the body into upper and lower portions
- Also called the Horizontal plane



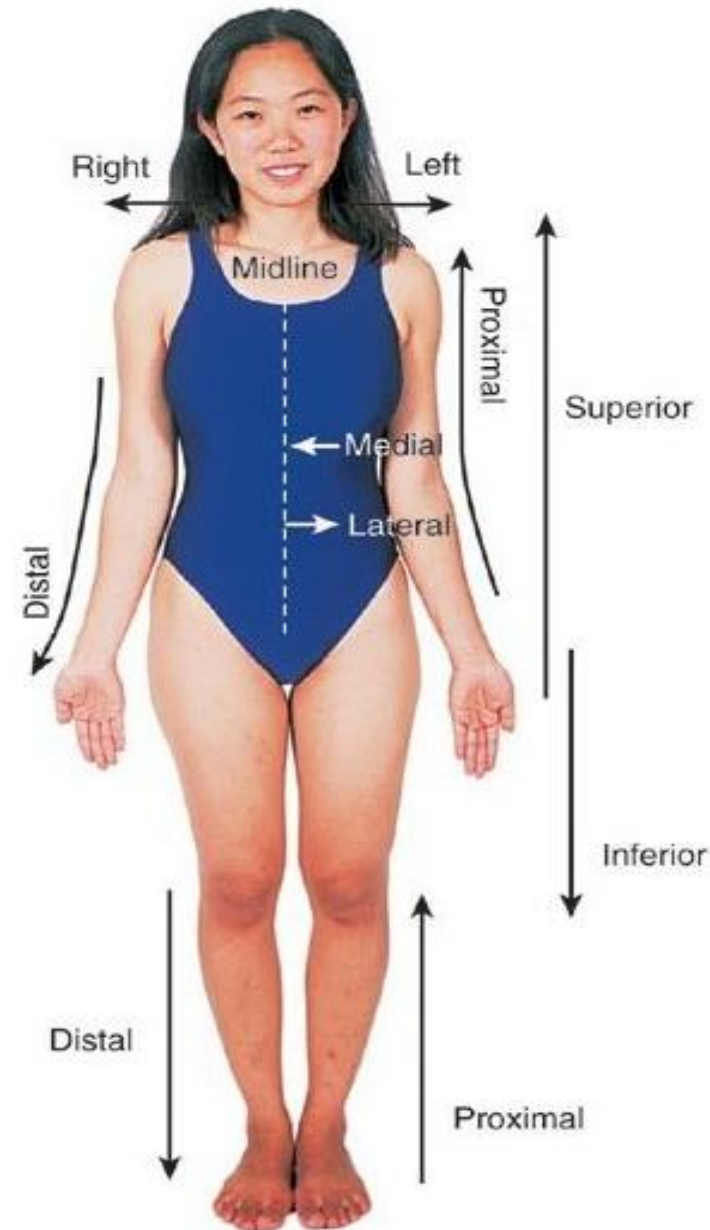
# Anatomical Position

- Standing erect, with palms and feet facing forward
- Is the standard reference point in which all positions, movements, and planes are described



# Positions and Directions

Terms of position and direction describe the position of one body part relative to another, usually along one of the three major body planes



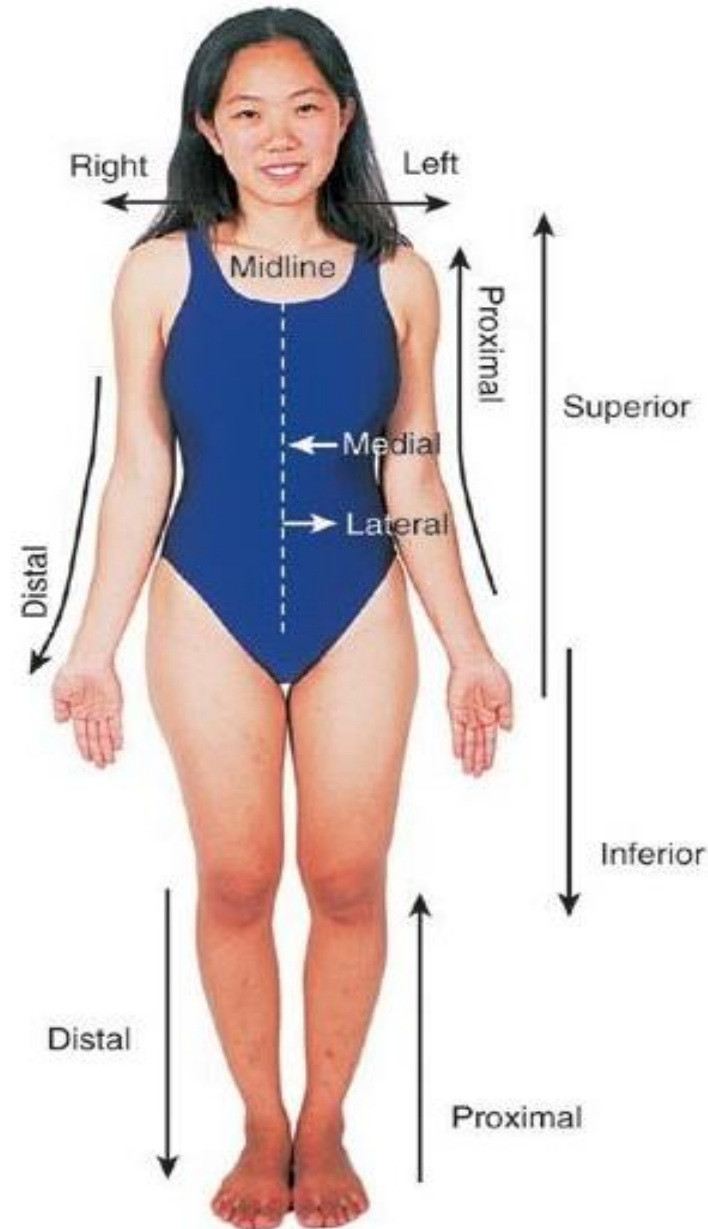
# Positions and Directions

## Superior

- Refers to a structure being closer to the head or higher than another structure in the body

## Inferior

- Refers to a structure being closer to the feet or lower than another structure in the body





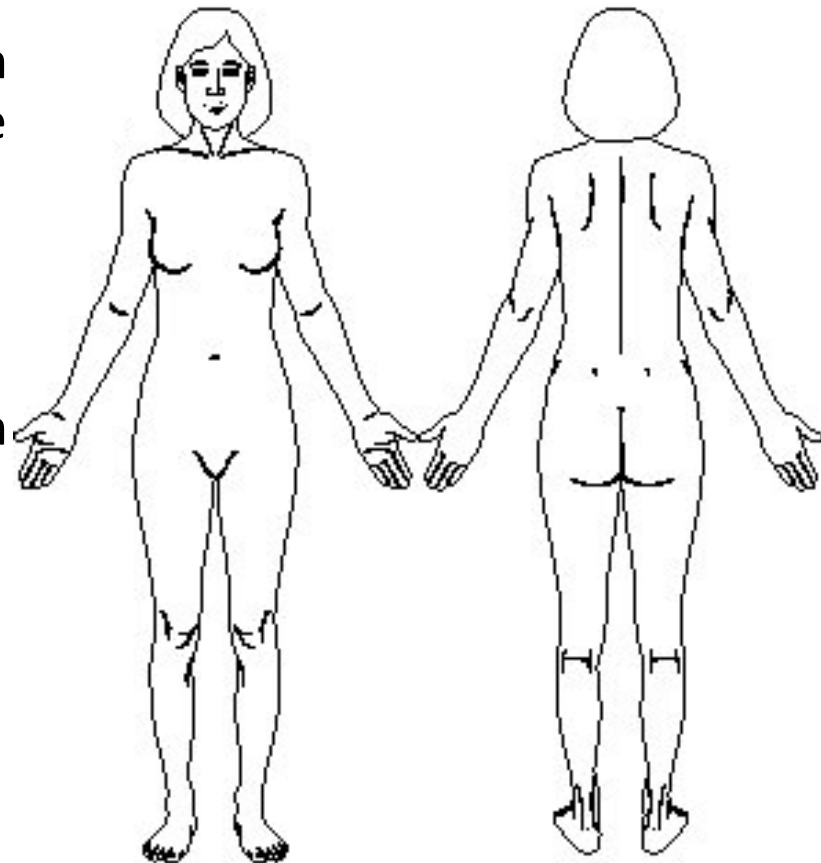
# Positions and Directions

## **Anterior**

- Refers to a structure being more in front than another structure in the body

## **Posterior**

- Refers to a structure being more in back than another structure in the body



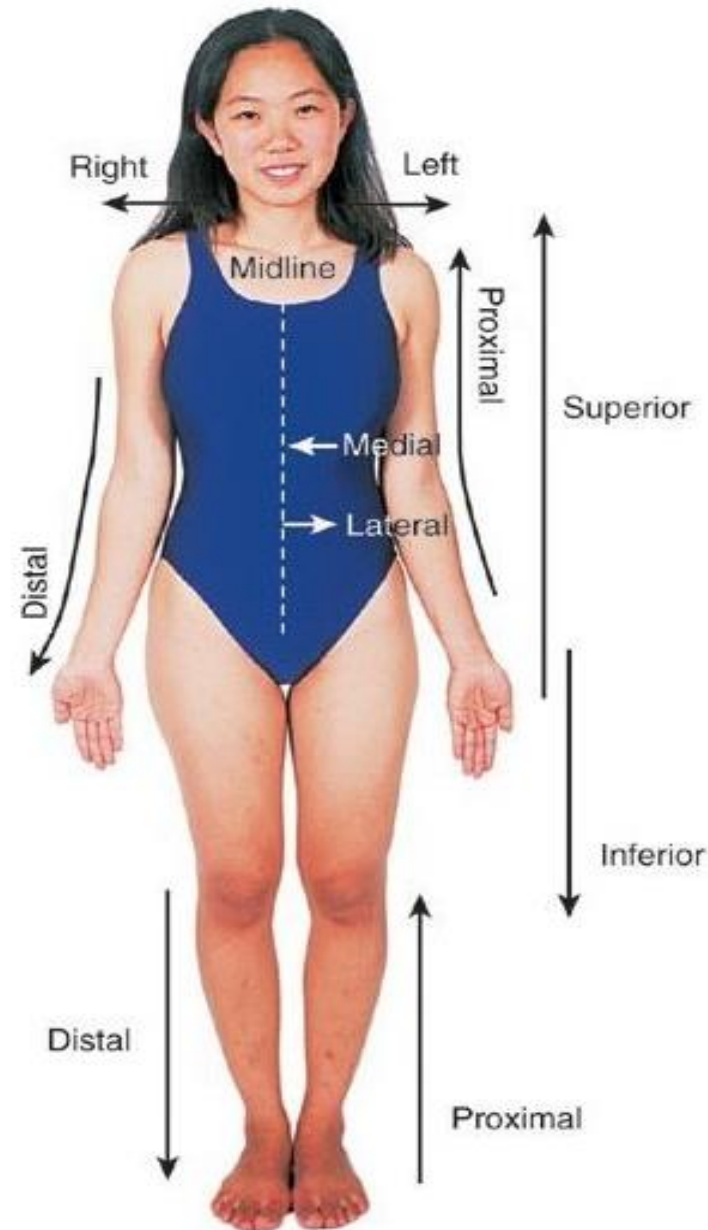
# Positions and Directions

## Medial

- Refers to a structure being closer to the midline or median plane of the body than another structure of the body

## Lateral

- Refers to a structure being farther away from the midline than another structure of the body



# Positions and Directions

## Distal

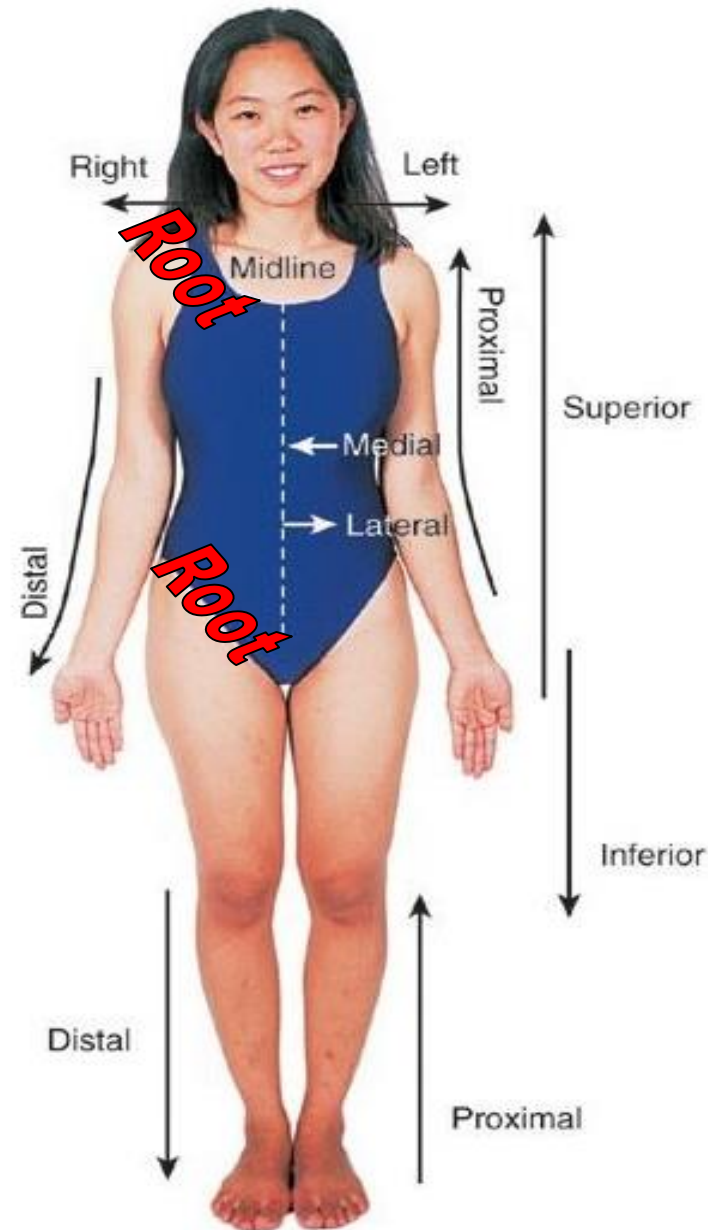
(Reference to the extremities only)

- Refers to a structure being further away from the root of the limb than another structure in the limb

## Proximal

(Reference to the extremities only)

- Refers to a structure being closer to the root of the limb than another structure in that limb



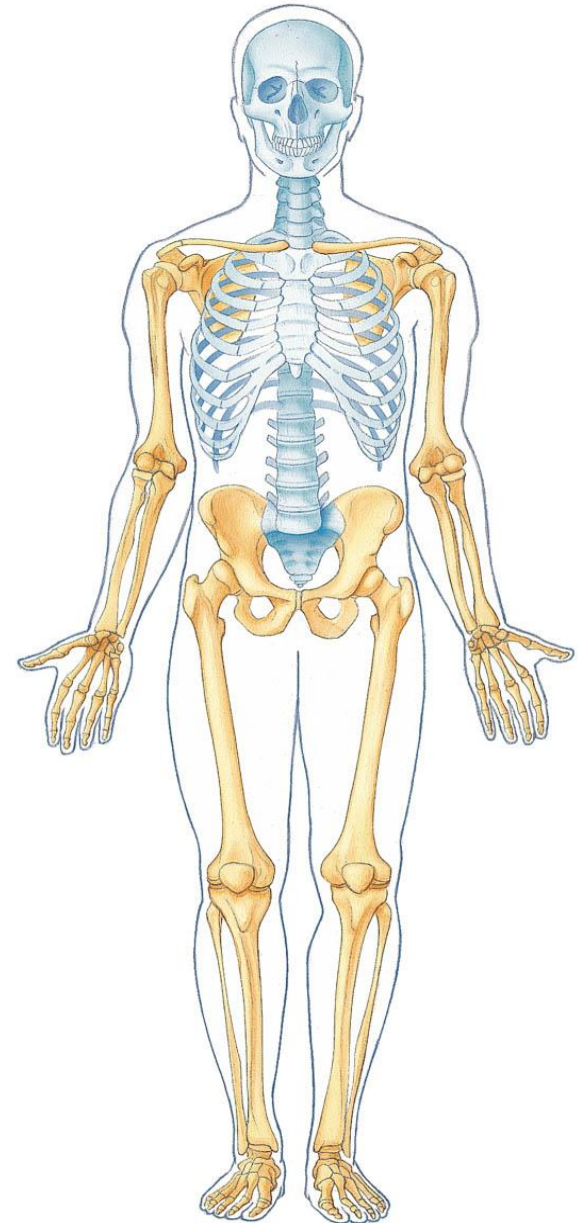
# Distal / Proximal Cont.

- When you divide the skeleton into **Axial** (Blue) and **Appendicular** (Yellow) you can better understand the extremities and their roots.

Proximal

Distal

**Root** \_\_\_\_\_



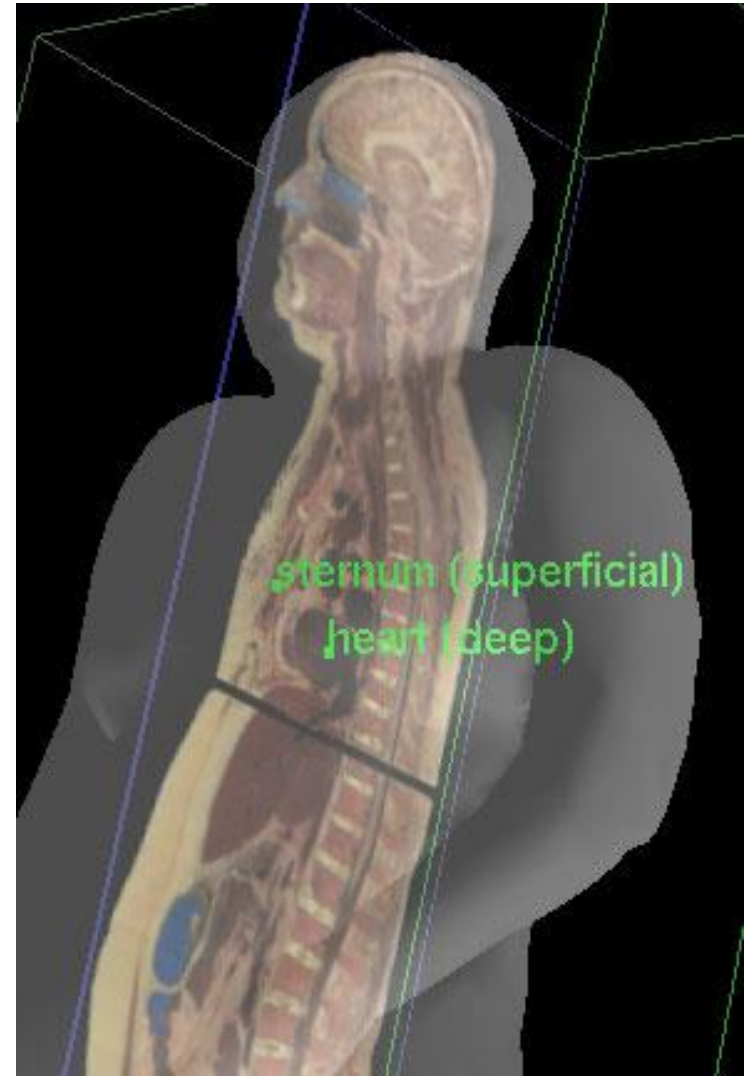
# Positions and Directions

## Superficial

- Refers to a structure being closer to the surface of the body than another structure

## Deep

- Refers to a structure being closer to the core of the body than another structure



# Positions and Directions

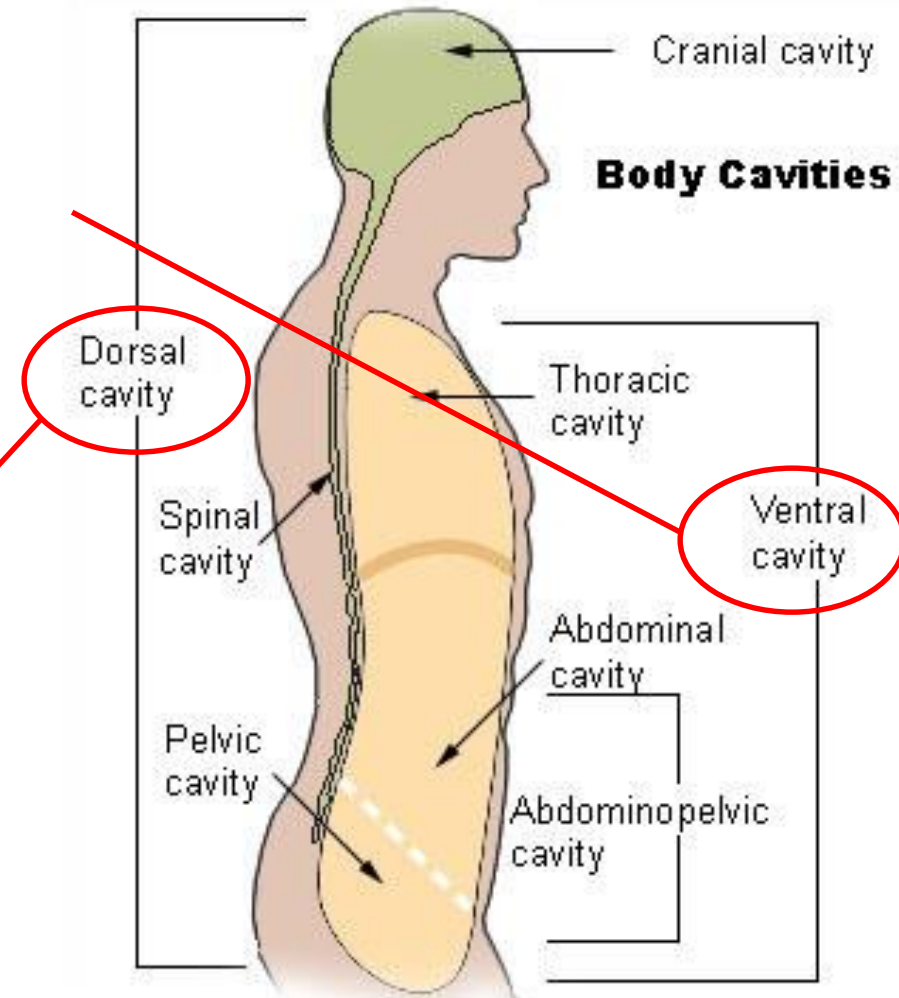
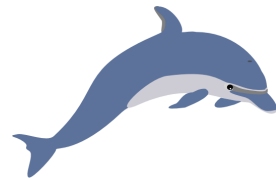
## Ventral

- Towards the front or belly
  - You Vent out or your nose and mouth.

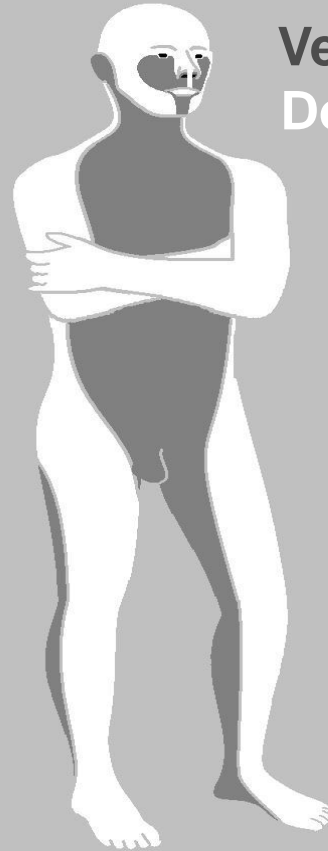
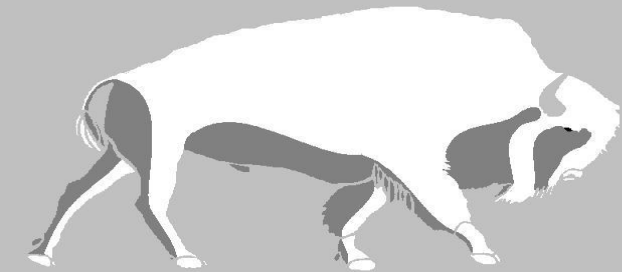
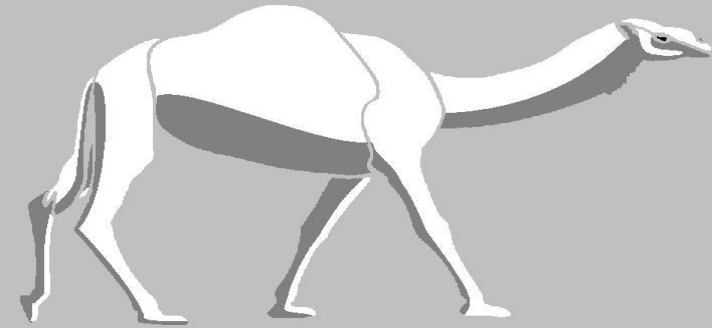


## Dorsal

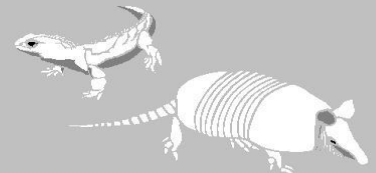
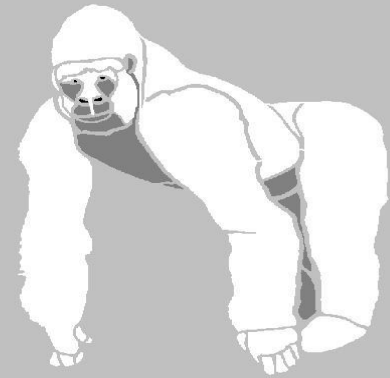
- Towards the back
  - Like the Dorsal fin of a dolphin.



Humans are bipedal, we walk on two legs, therefore our Ventral side / Dorsal side flips at our lower extremities.



**Ventral – Black**  
**Dorsal – White**



# Positions and Directions

## Prone

- Lying face down
  - Like a Pro Baseball player sliding



Prone



## Supine

- Lying face up
  - Lying on your spin



Supine

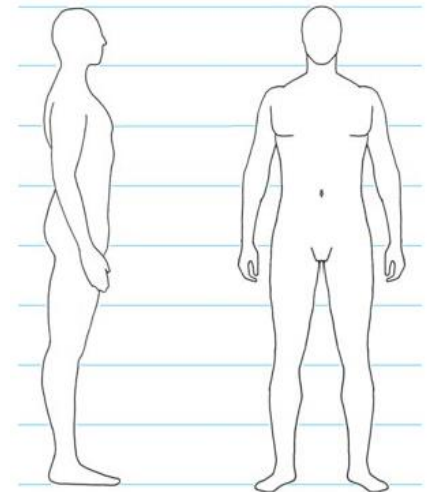
mouth.

## Unilateral

- Pertaining to one side of the body

## Bilateral

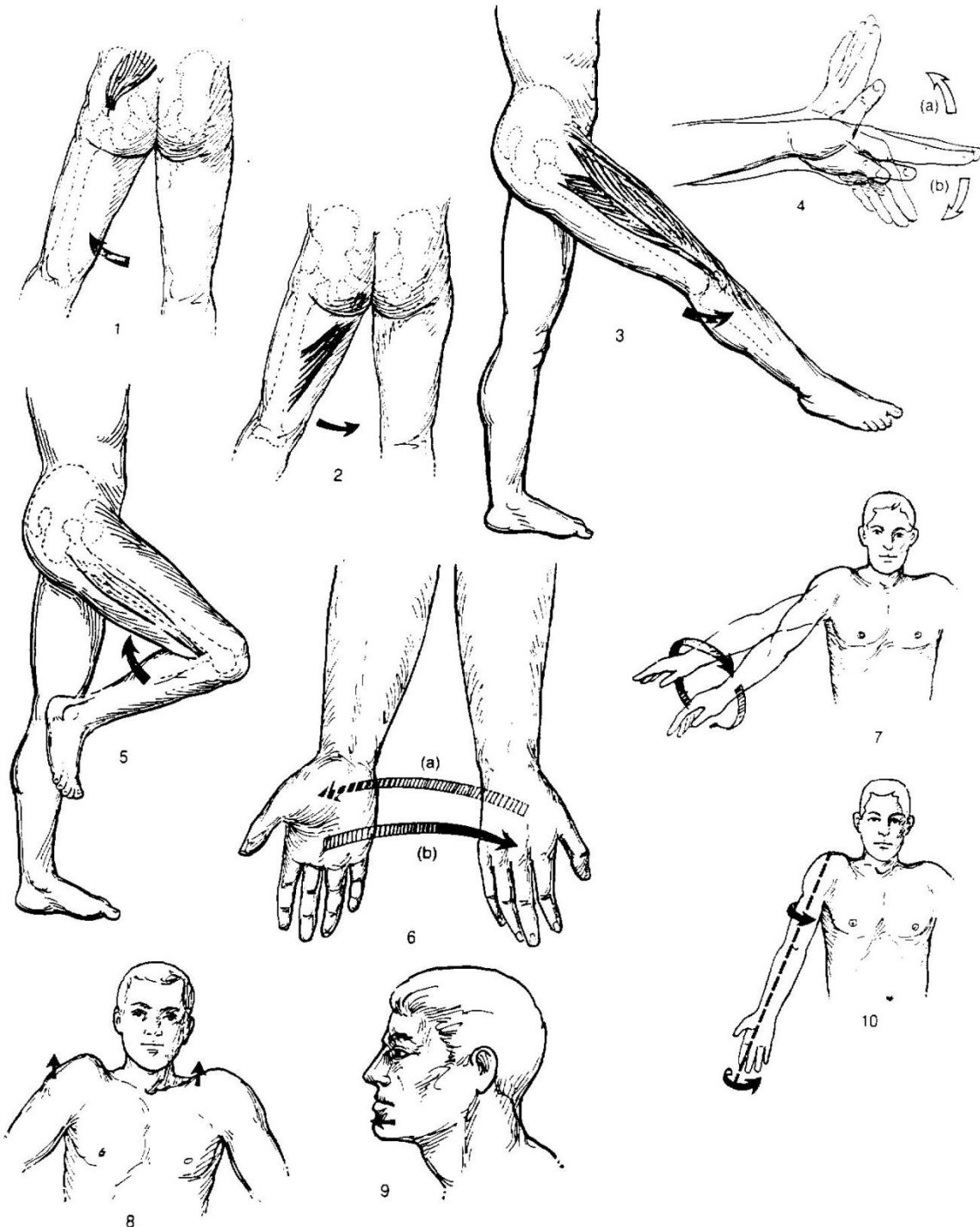
- Pertaining to both sides of the body





# Movements

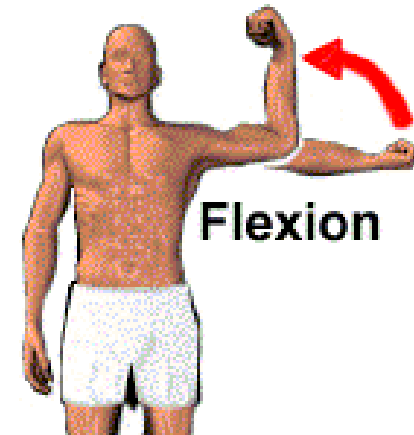
- Flexion
- Extension
- Hyperextension
- Adduction
- Abduction
- Pronation
- Supination
- Retraction
- Protraction
- Elevation
- Depression
- Rotation
- Circumduction
- External Rotation
- Internal Rotation
- Inversion
- Eversion
- Dorsiflexion
- Plantarflexion
- Radial Deviation
- Ulnar Deviation
- Opposition



# Movements

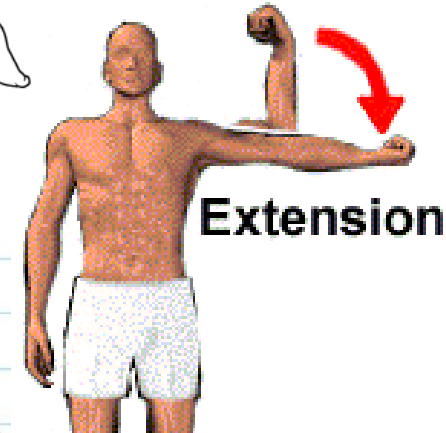
## Flexion

- Bending a joint or decreasing the angle between two bones
  - In the Fetal Position we are flexing our joint



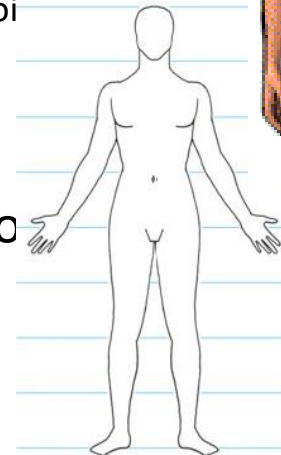
## Extension

- Straightening a joint or increasing the angle between two bones
  - In the Anatomical Position we are extending our joint

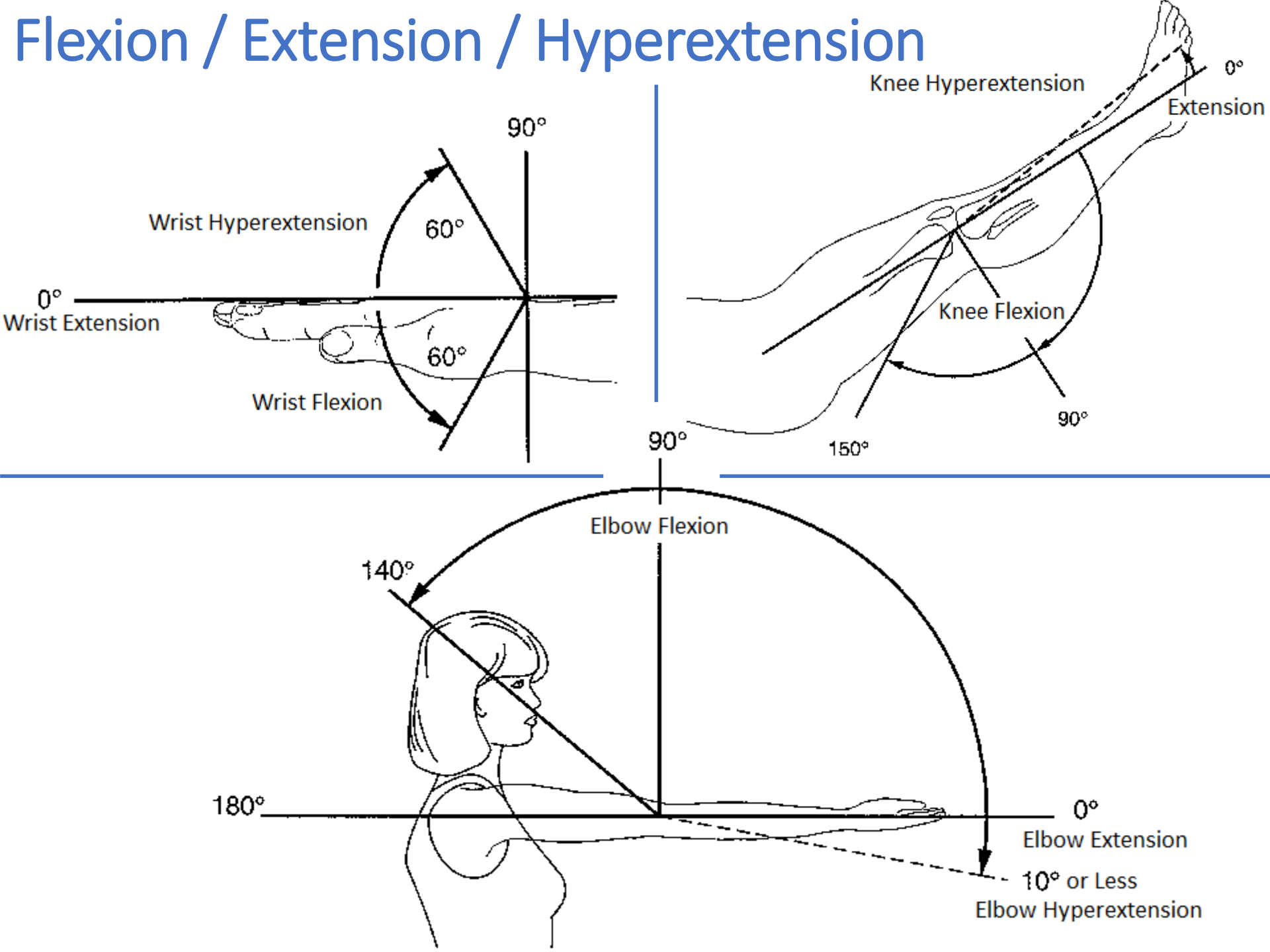


## Hyperextension

- Excessive extension of the parts at a joint beyond anatomical position.



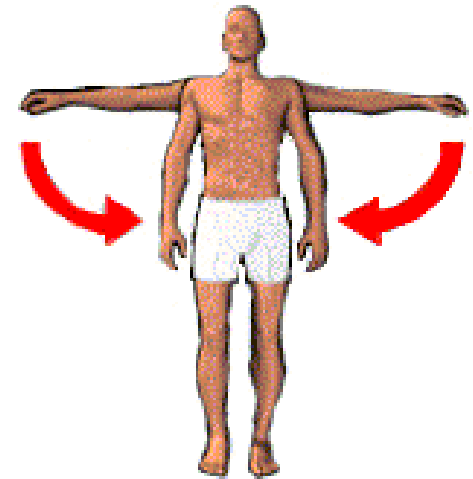
# Flexion / Extension / Hyperextension



# Movements

## Adduction

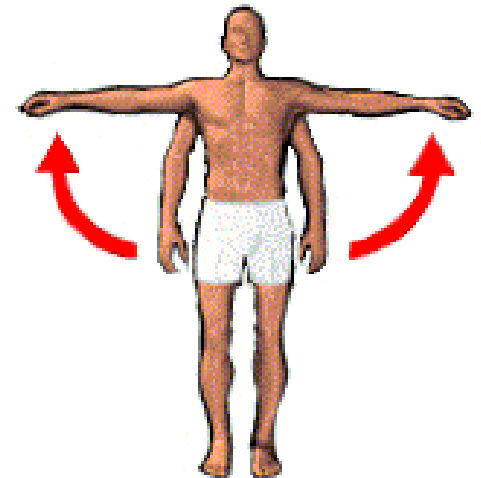
- Moving a body part towards the midline of the body



**Adduction**

## Abduction

- Moving a body part away from the midline of the body



**Abduction**

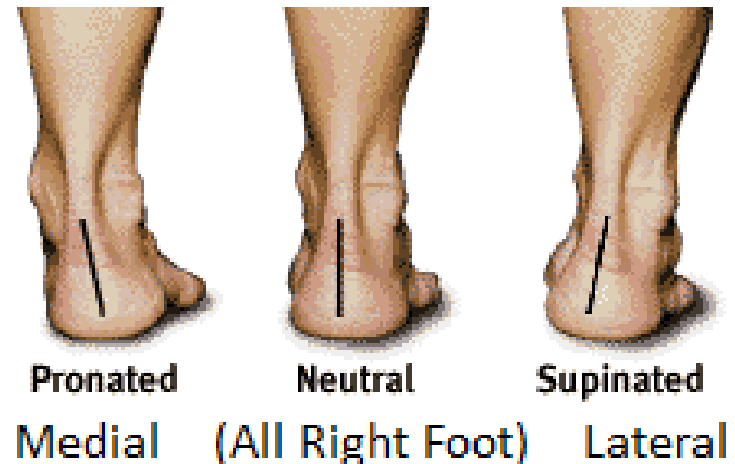
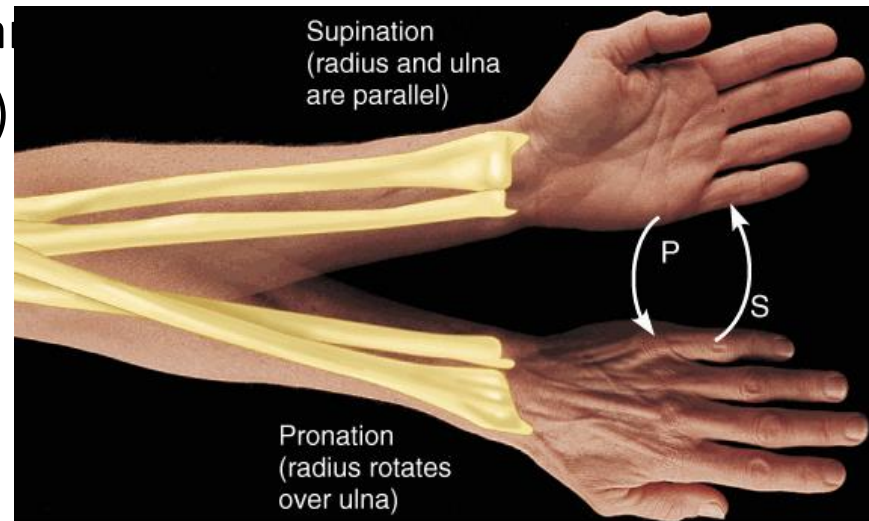
# Movements

## Pronation

- Turning the arm or foot downward
- (palm or sole of the foot - down)
  - Prone

## Supination

- Turning the arm or foot upward
- (palm or sole of the foot - up)
  - Supine



# Movements

## Retraction

- Moving a part backward

## Protraction

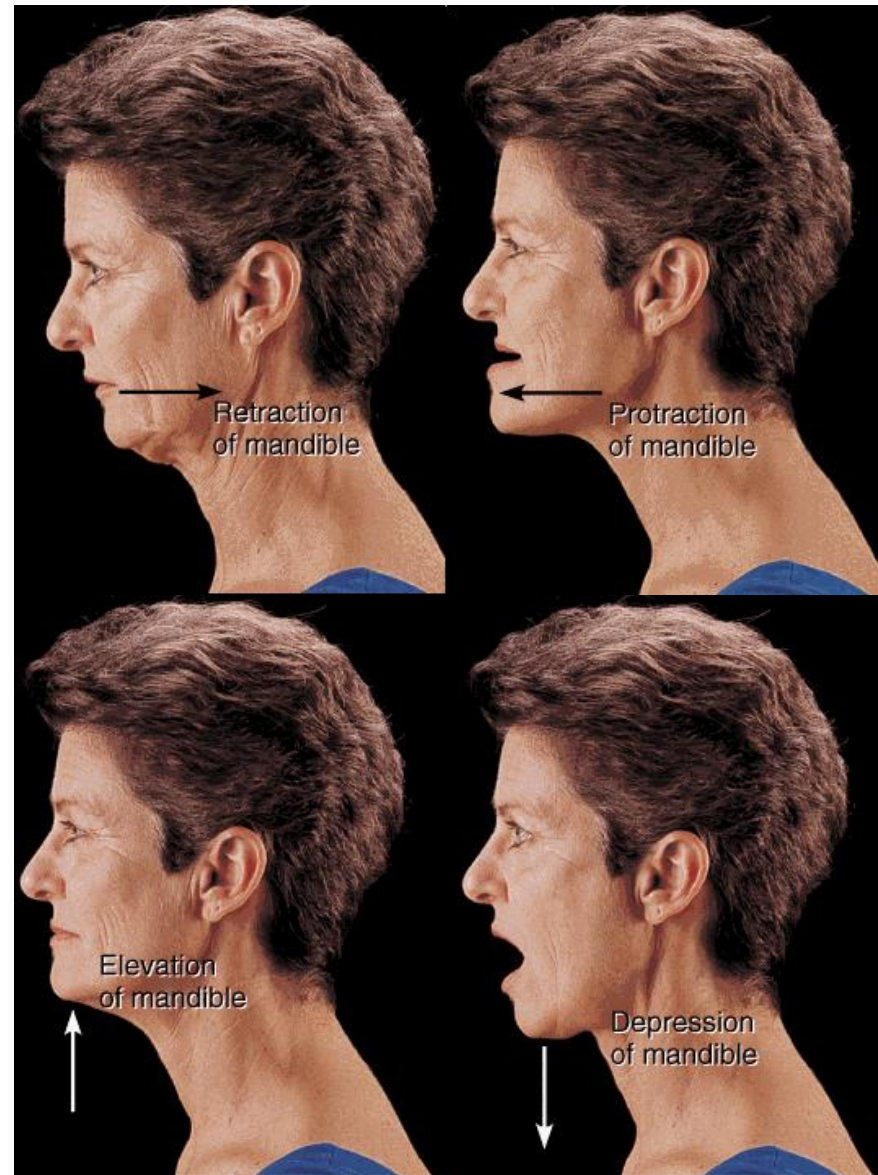
- Moving a part forward

## Elevation

- Raising a part

## Depression

- Lowering a part



# Movements

## Rotation

- Turning on a single axis

## Circumduction

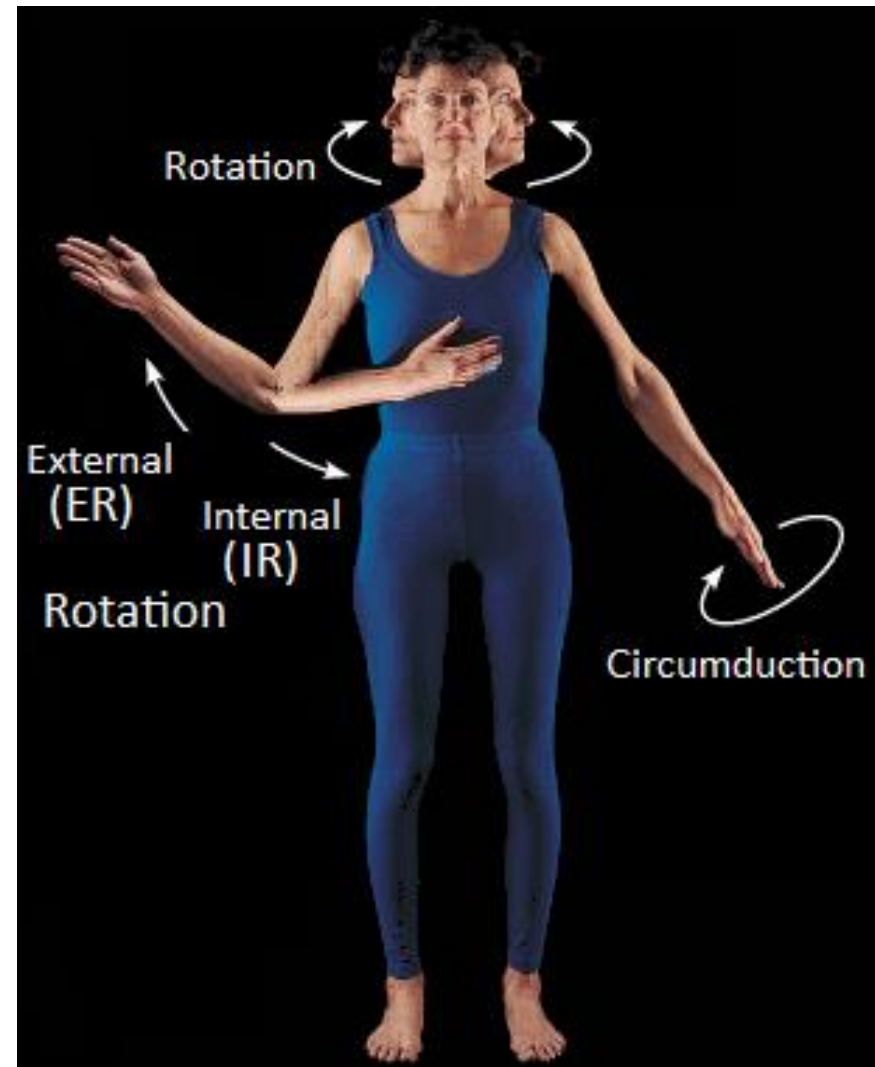
- Tri-planar, circular motion at the hip or shoulder

## External rotation

- Rotation of the hip or shoulder away from the midline

## Internal rotation

- Rotation of the hip or shoulder toward the midline

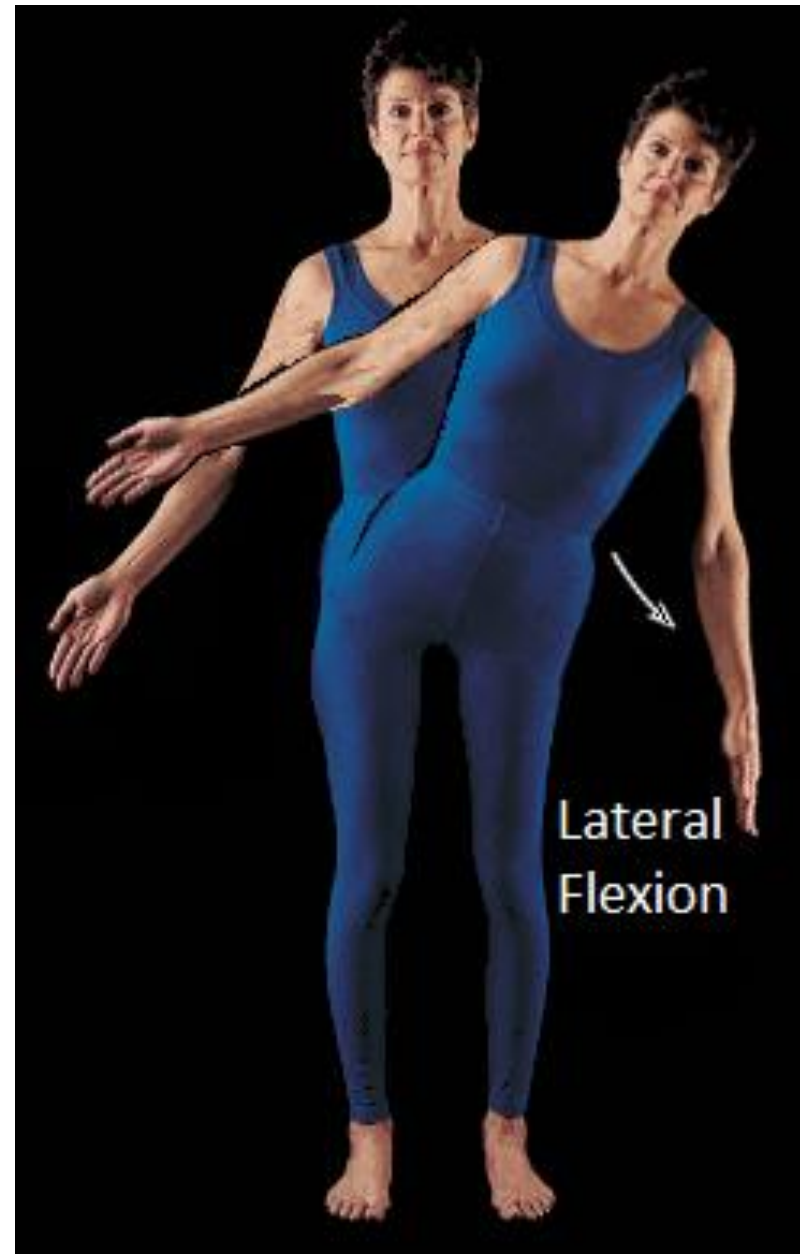




# Movements

## Lateral Flexion

- Side-bending left or right





# Movements of the Foot

## Inversion

- Turning the sole of the foot inward

## Eversion

- Turning the sole of the foot outward

## Dorsiflexion

- Ankle movement bringing the foot towards the shin

## Plantarflexion

- Ankle movement pointing the foot downward



# Movements of the Wrist & Thumb

## Radial Deviation

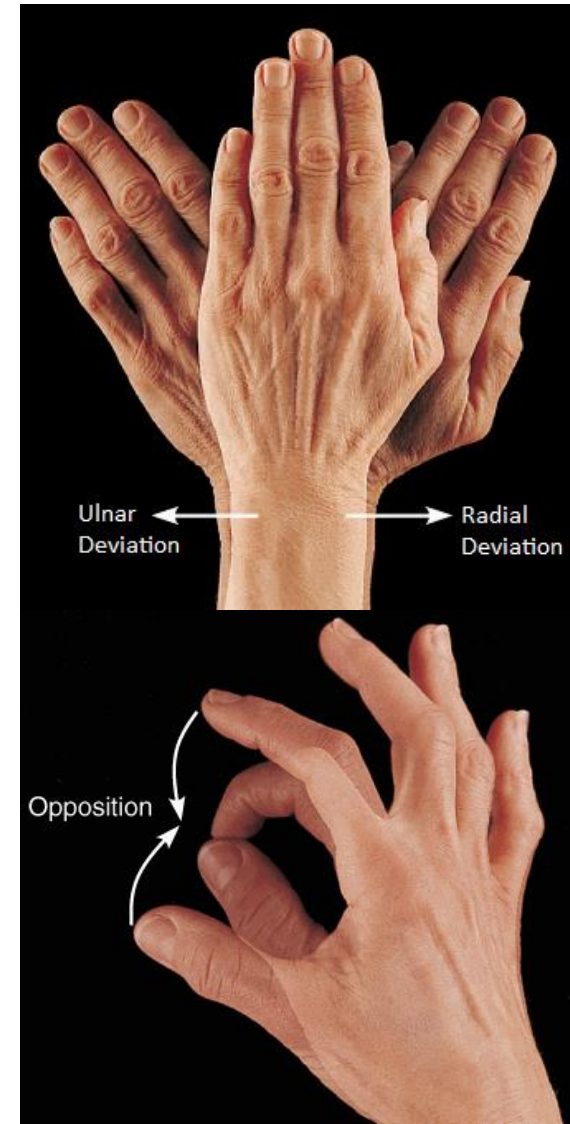
- Movement of the wrist towards the radius or lateral side.

## Ulnar Deviation

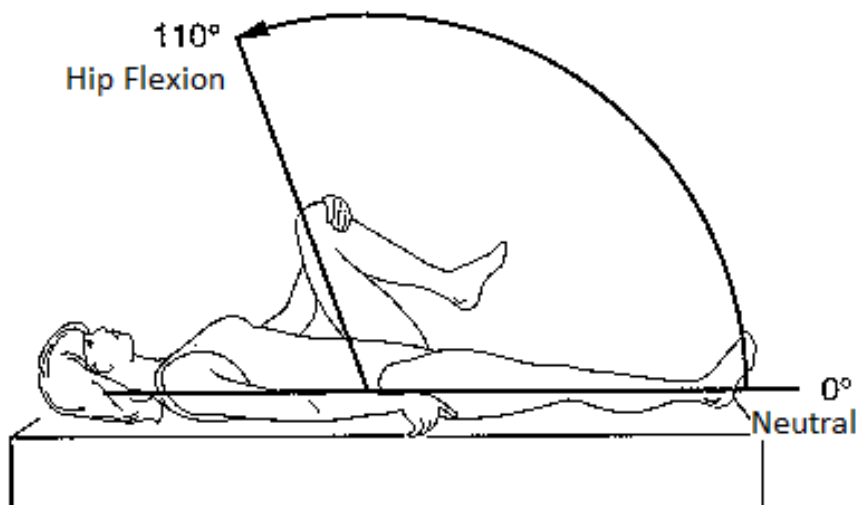
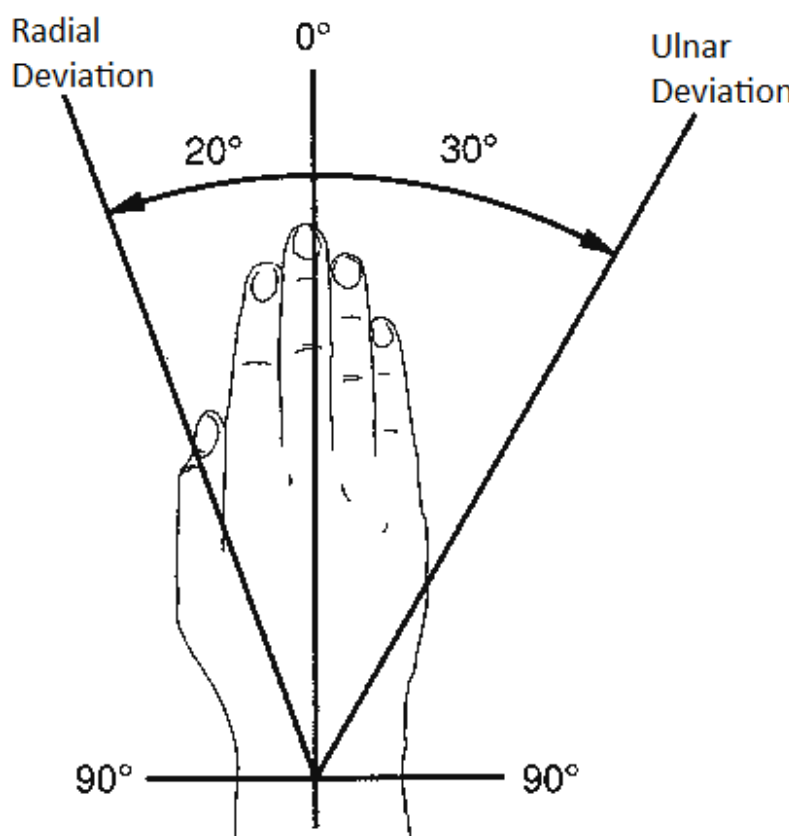
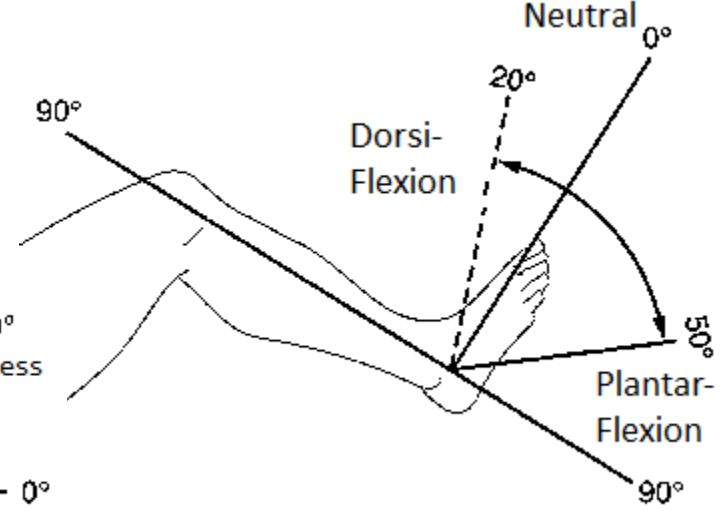
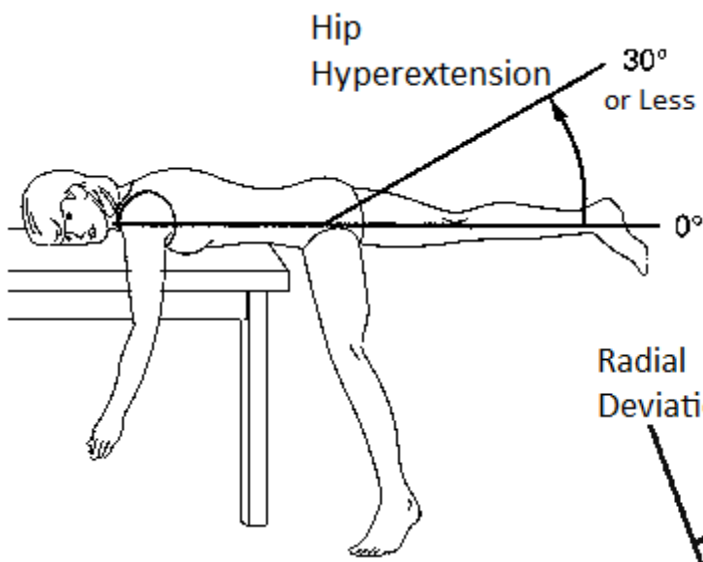
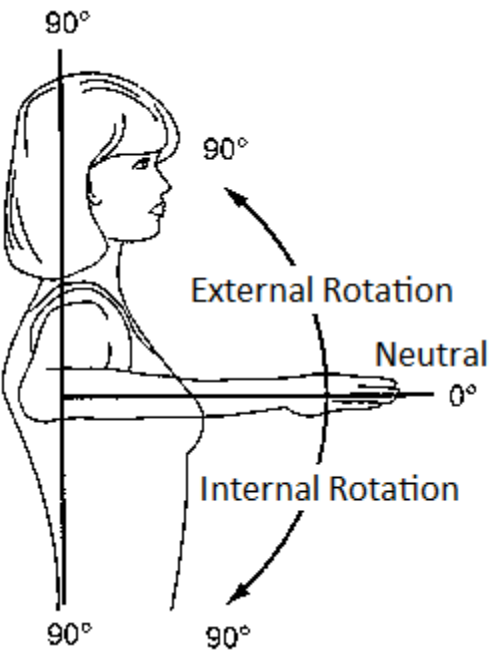
- Movement of the wrist towards the ulna or medial side.

## Opposition

- Movement of the thumb across the palm of the hand.



# Additional Range of Motion



THANK YOU