Kinesiology

THE STUDY OF HUMAN MOVEMENT

- a- Anatomical…which describes the structure of the body and its parts and their potential for movement.

- b-Mechanical, …which considers the force, time and distance relationships involved in body movement.

- c- Physiological …which studies the processes involved in the initiation, continuation and control of movement.

- **d-Psychological** …which examines the sensations, perceptions and motivations that stimulate movement. and

- **e-Sociocultural** …which considers the meanings given to various movements in different human settings.

MAPPING THE HUMAN BODY AT REST AND IN MOVEMENT

FUNDAMENTALS TO THE STUDY OF MOVEMENT (LAB)

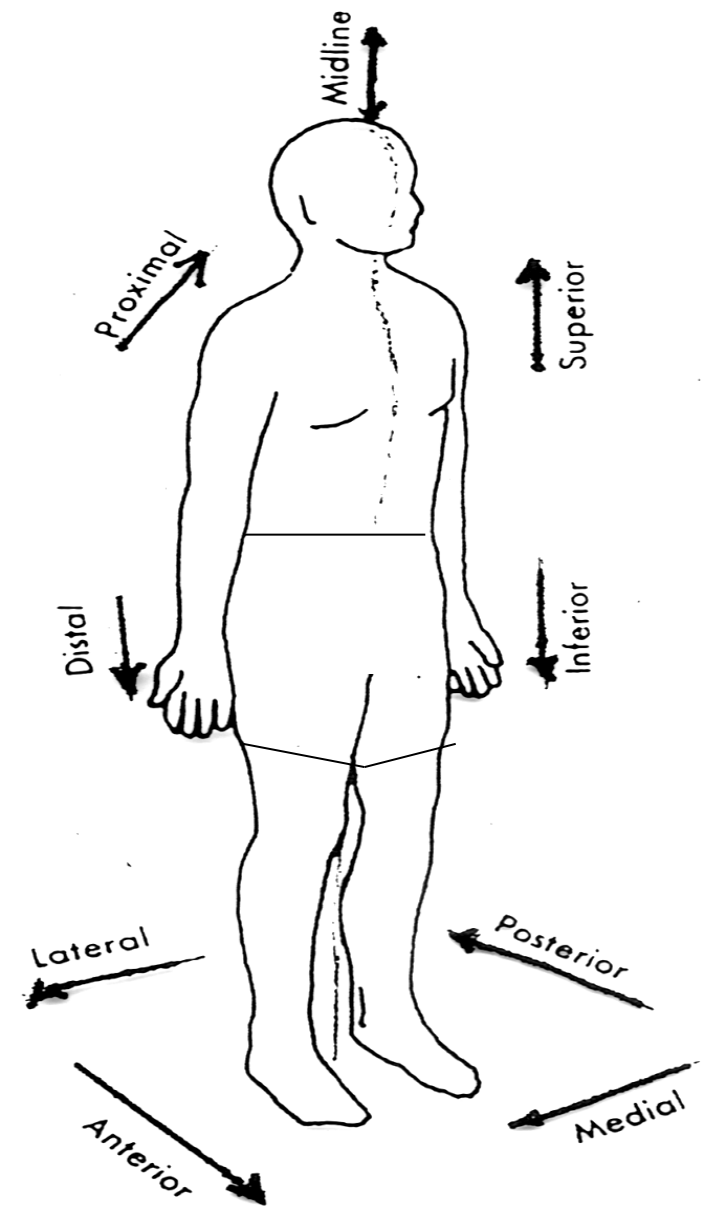
- A-Reference positions
- 1- Anatomic standing position
- 2- Fundamental positions

Standing position

Others:
– Lying:
- Supine or back lying;
-Prone lying or lying on abdomen -
Sitting; short sitting or long sitting
-derived position with possible combination; kneeling , quadruped

B-Directions

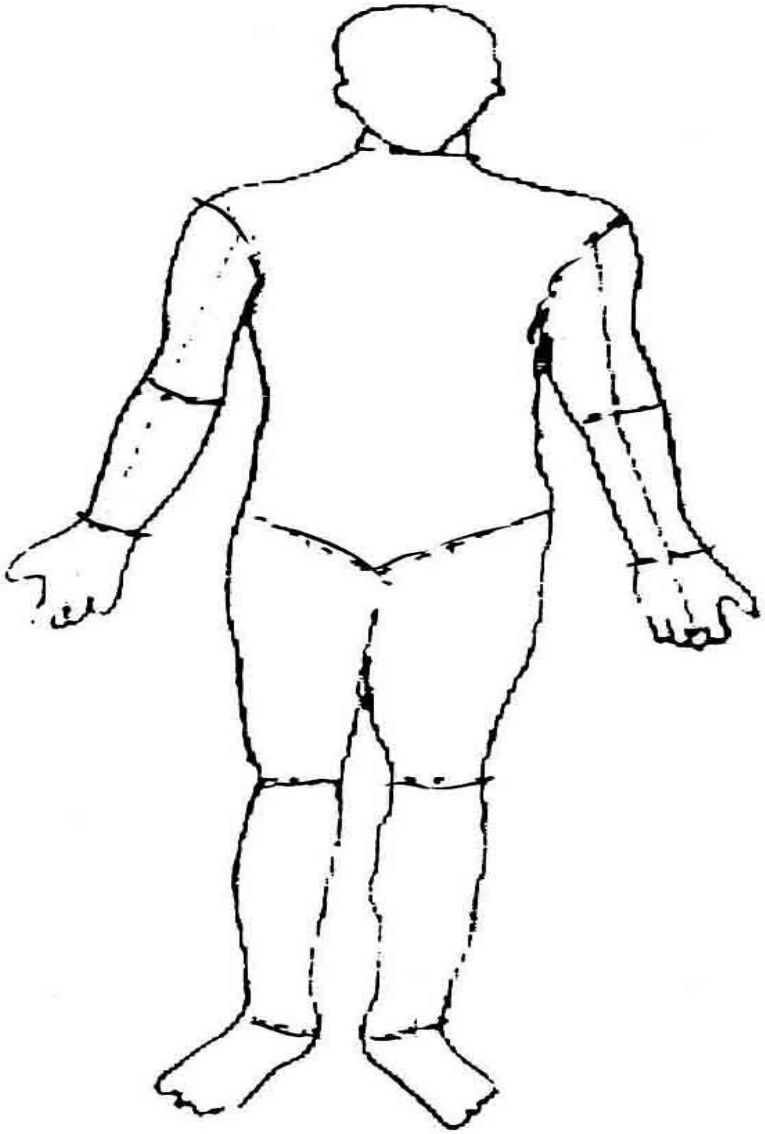
(Naming locations on the human body)Lab activity



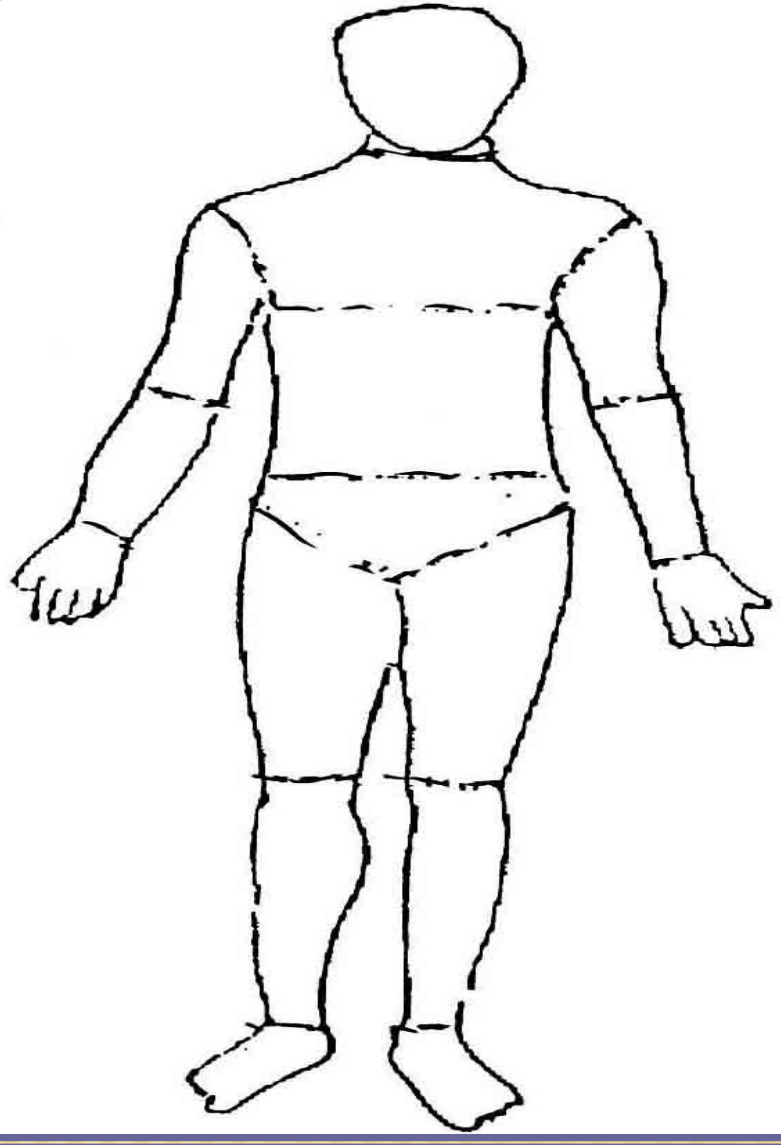
C-MAJOR DIVISIONS OF THE HUMAN BODY

- **Major body segments:** the term body segment is mostly used than body parts.

- A body segment consists of a core bony component (s) with the surrounding muscles and other soft tissue structure and can move in isolation from the rest of the body.



Major body segments
14 segments



Major body segments
16 segments

MOVEMENT OF A BODY SEGMENT RELATIVE TO AN ADJACENT BODY SEGMENT

- To name movement properly and fully, two things must be stated:

a- The name of the segment that is moving.

b- The joint where the movement is occurring.

e.g. forearm raising is an elbow joint flexion.

D- PLANES AND AXES OF REFERENCES LAB ACTIVITY BASICS

- The plane is an imaginary surface on which movement take place.

- The axis is an imaginary straight line around which movement takes place .

TYPES OF REFERENCE PLANES :

- 1- Planes defined with reference to earth's surface such as horizontal and vertical planes.

- 2- Planes defined with reference to the body itself. These planes are used for kinesiological analysis .***These planes remain the same regardless the change in position.***

- Kinesiological planes

These can be classified as

a -Cardinal planes

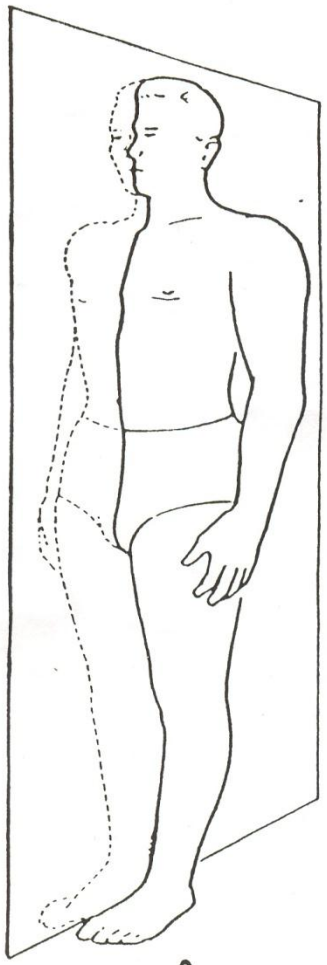
b -Parallel planes

c -Oblique planes

There are three kinesiologic planes each perpendicular to each of the other two. There are likewise three axis of motion, each perpendicular to the plane in which the movement occurs.

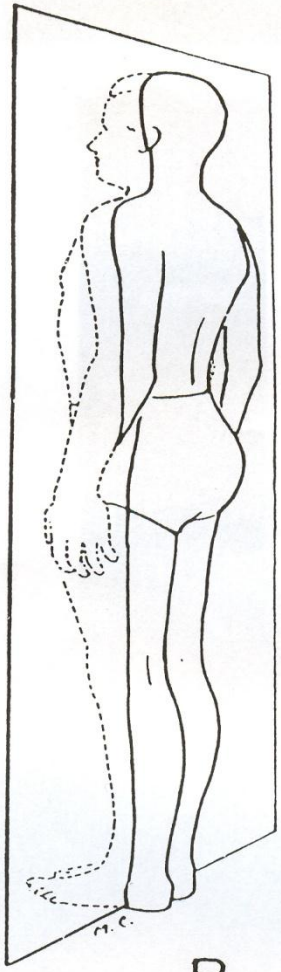
A-CARDINAL PLANES

- -Cardinal planes are defined relative to anatomic position .
- -These are three kinds of planes which divides the body into equal parts lie at right angle to each other .
- -Intersect at the center of gravity of the body.



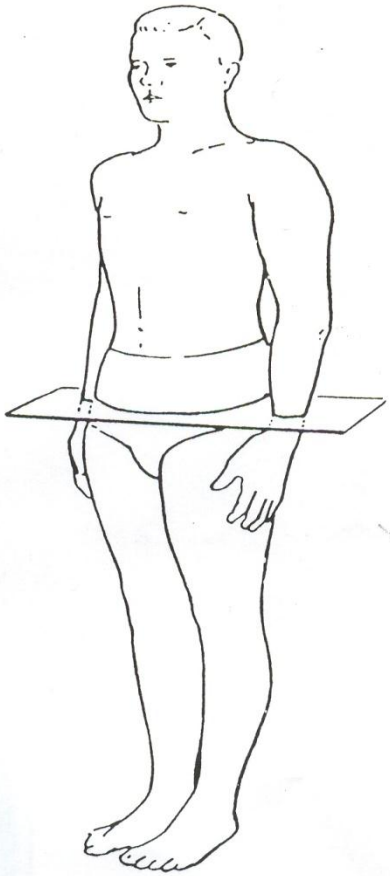
A

Sagittal



B

Frontal



C

Horizontal

Reference Planes

Cardinal planes

B-NON CARDINAL PARALLEL PLANES

- When the movements occur in a plane parallel to any of the cardinal planes are called parallel planes (e.g movements of upper and lower limbs).

- **1- Sagittal plane** (antero posterior or median):

Is an imaginary vertical plane passing through the body from front to back dividing it into the right and the left parts (e.g. flexion and extension of the neck).

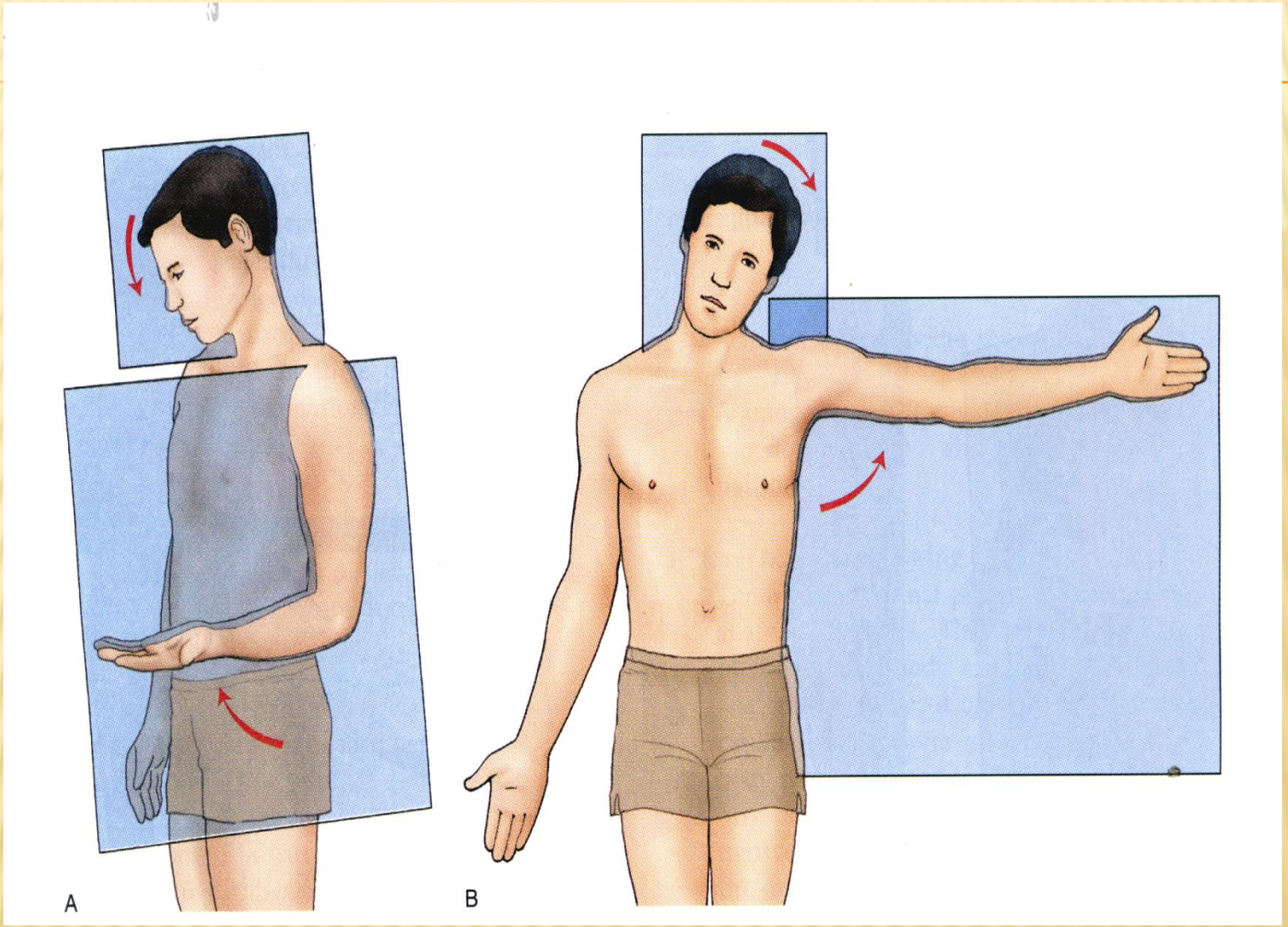
- **2- Frontal plane** (lateral or coronal):
- Is an imaginary vertical plane passing through the body from side to side dividing it into anterior and posterior parts (e.g. lateral bending of the neck).

- **3- Horizontal plane** (transverse plane):
- Is an imaginary horizontal plane dividing the body into upper and lower parts (e.g. rotation of the neck from side to side).

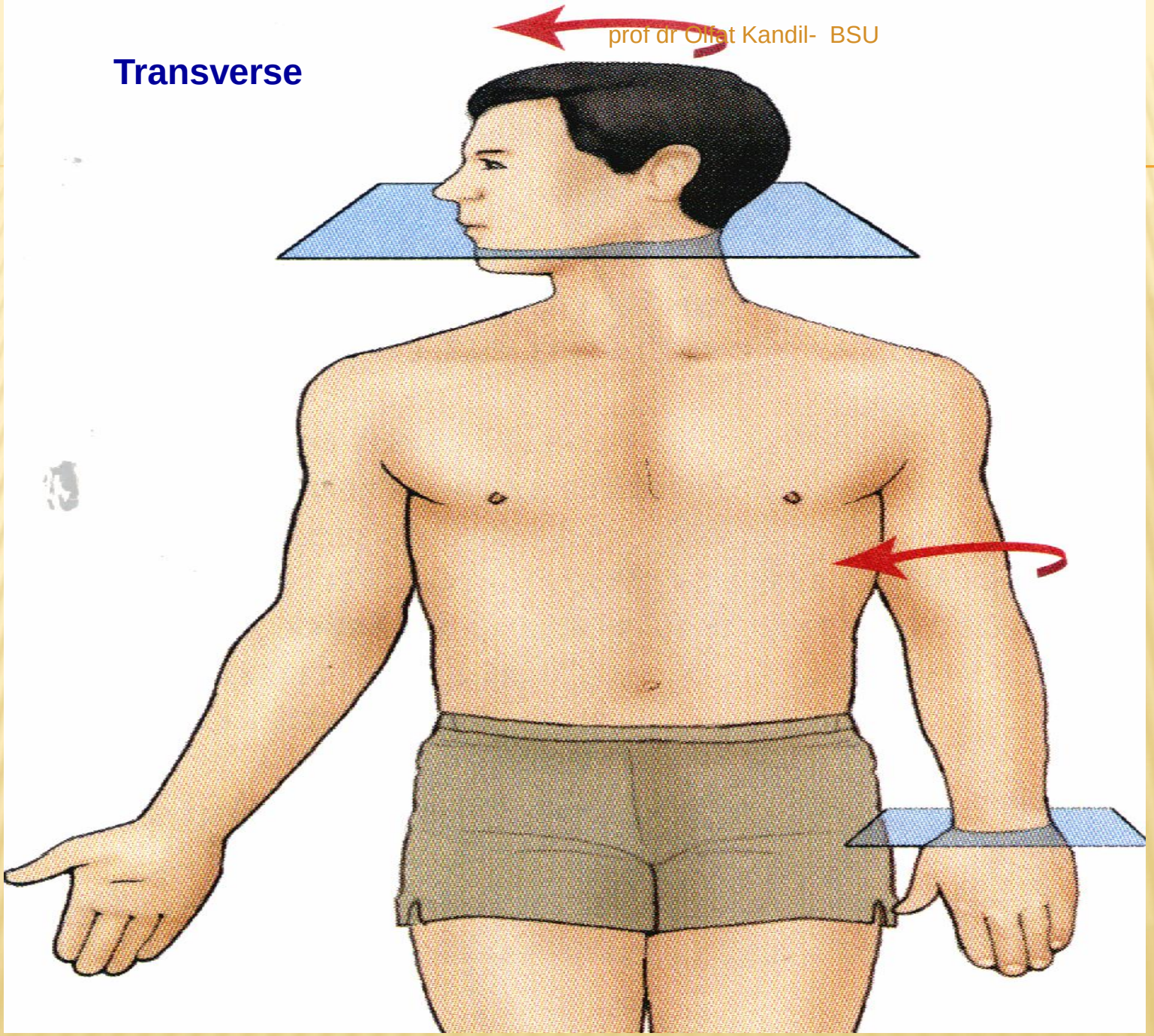
C-OBLIQUE PLANES

When movements occur in any plane .

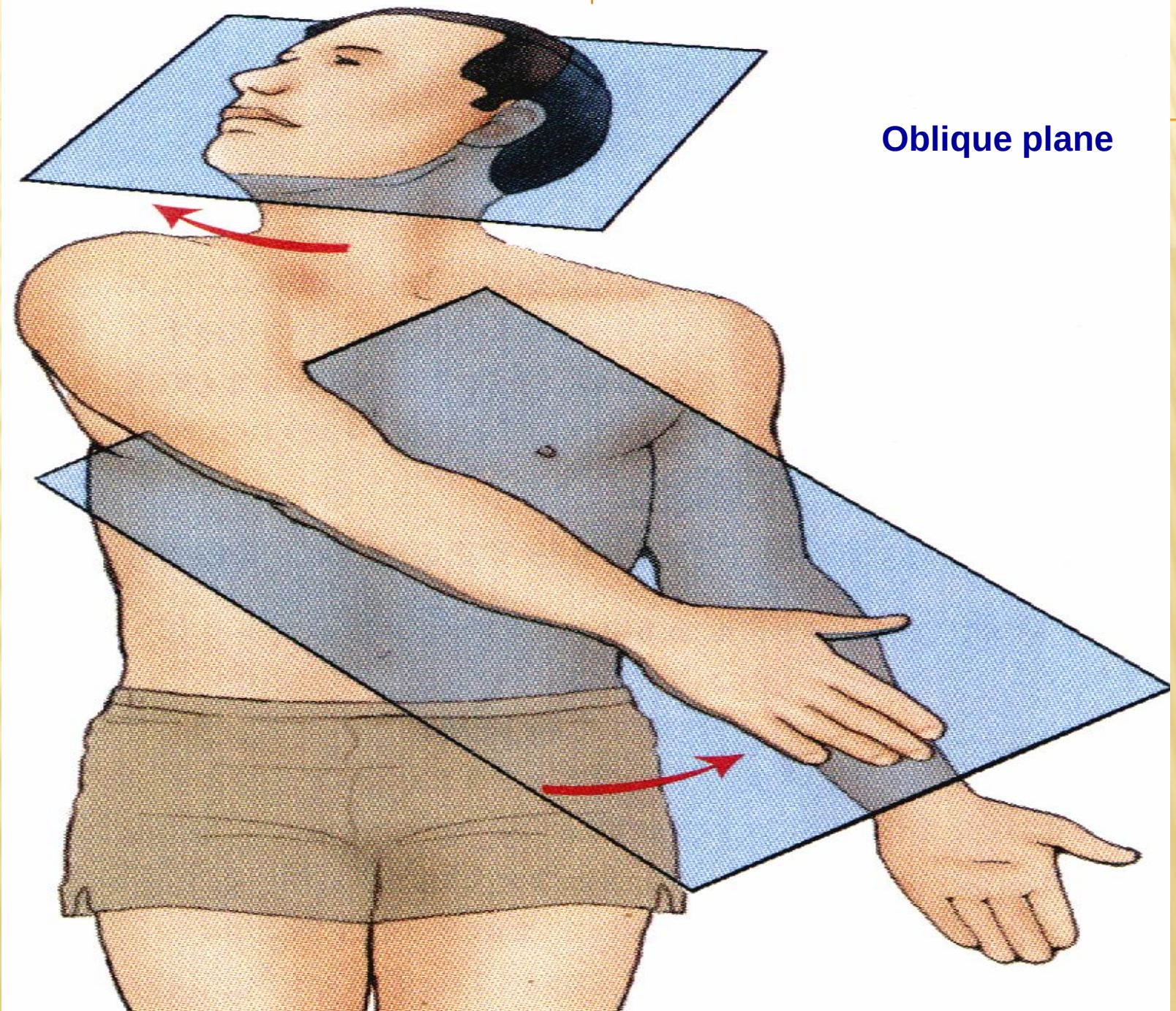
- is not cardinal
- not purely sagittal, frontal, or transverse is called an oblique plane.
- e.g. raising the arm between straight forward and straight sideward).


A
B

Transverse



Oblique plane



KINESIOLOGICAL AXES

- An axis is an imaginary line around which a body part moves
- An axis is often called a mechanical axis.
- Movement around an axis is called **axial movement**
- when body part moves around an axis, it does so in a circular fashion.

SPECIFYING PLANES AND THEIR CORRESPONDING AXES:

- For each one of the three cardinal planes of the body, a corresponding cardinal axis exists; hence, three cardinal axes exist

- For every motion that occurs within an oblique or parallel plane, a corresponding oblique or parallel axis exists therefore an infinite number of oblique axes exist, one for each possible oblique plane.

- Naming an axis is straight forward simply describe its orientation.
- The three cardinal axes are:
- Mediolateral,
- Anteroposterior,
- Supereoinferior(vertical).
- The axis around which movement occur is always perpendicular to the plane in which the movement is occurring.

FRONTAL (MEDIOLATERAL) AXIS:

- A **frontal axis** is an imaginary transverse line that runs from medial to lateral or lateral to medial

- Movements that occur in the sagittal plane move around a frontal axis.

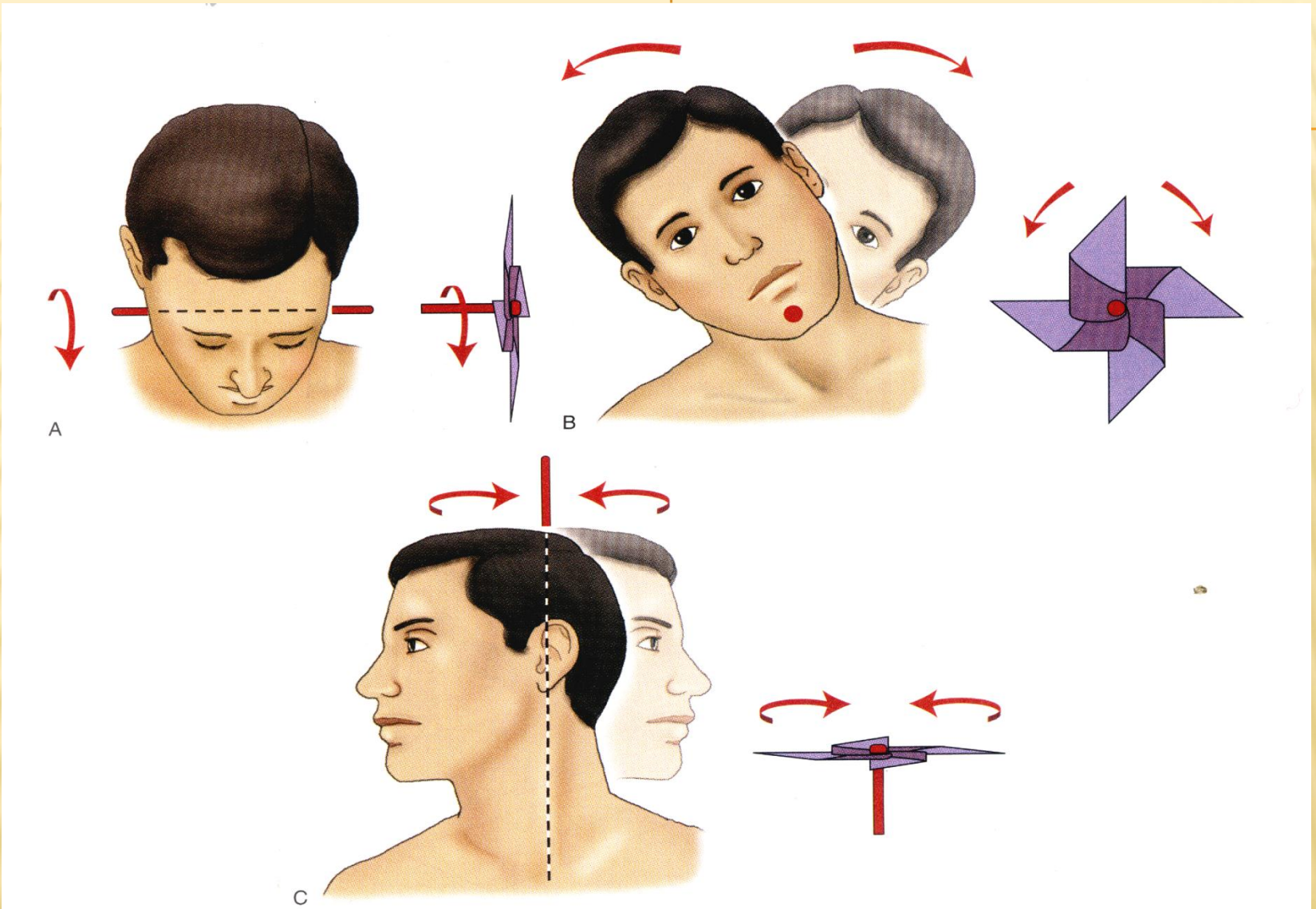
:SAGITTAL (ANTEROPOSTERIOR) AXIS

- Is an imaginary transverse line that runs from anterior to posterior (or posterior to anterior) in direction
- Movements that occur in the frontal plane move around sagittal axis.
- The anteroposterior axis is also known as the **sagittal-horizontal axis** because it runs horizontally and is located within the sagittal plane.

A LONGITUDINAL (SUPEROINFERIOR) AXIS

- A **longitudinal axis** is an imaginary vertical line that runs from superior to inferior (or inferior to superior) in direction

- Movements that occur in a transverse plane move around a **longitudinal** axis.



The three axes around which Movement of the neck occurs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