GKT School of Medical Education

KING'S College LONDON

Topic: FAH Anatomical Terminology

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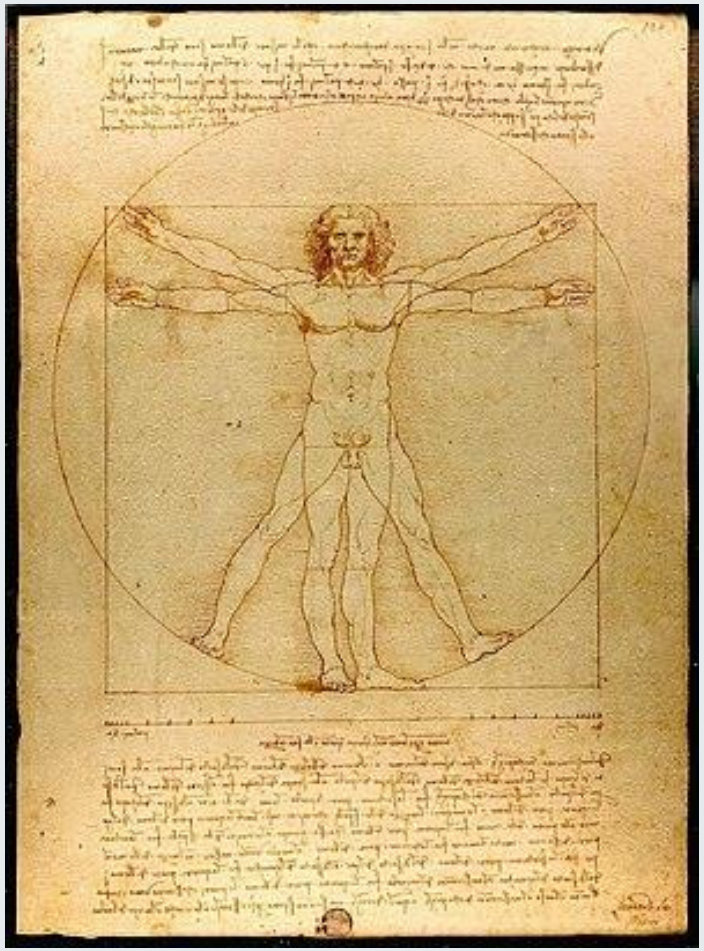
Teaching Objectives

Define and demonstrate terms relative to anatomical positions and planes.

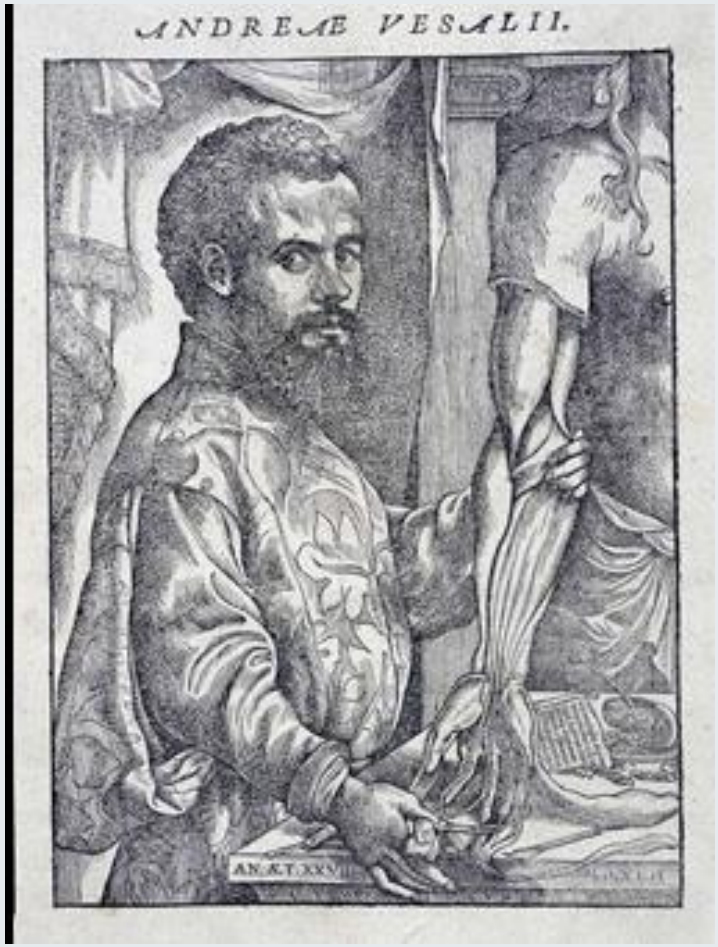
Define and demonstrate terms used to describe the anatomical movements.

History of Human Anatomy

Galen, Leonardo da Vinci, Vesalius



Vitruvian Man by the Italian polymath Leonardo da Vinci (in 1492) representing ideal human body proportions.



De Humani Corporis Fabrica, is the only known first-hand portrait of Vesalius, shown with a partly dissected corpse. It is conceived and written by 28-year-old Andreas Vesalius (c.1514-1564), a professor at the University of Padua.

Ways to explore Anatomy

Ways to explore anatomy	Study of the structures of the body, their relationships and function
Regional anatomy	Head and neck, thorax, abdomen and pelvis, trunk, upper limbs and lower limbs
Systemic anatomy	Integumentary, nervous, circulatory, muscular, skeletal, lymphatic, endocrine, respiratory, digestive, reproductive systems
Microscopic anatomy	Microscopic structure of tissues and organs

WHY? Keep asking yourself: Why am I learning this ? How can I apply this ?	Clinical and applied anatomy Medical imaging ……And beyond its confines - in arts, science fiction, bioengineering, 3D printing - Synthetic anatomy !

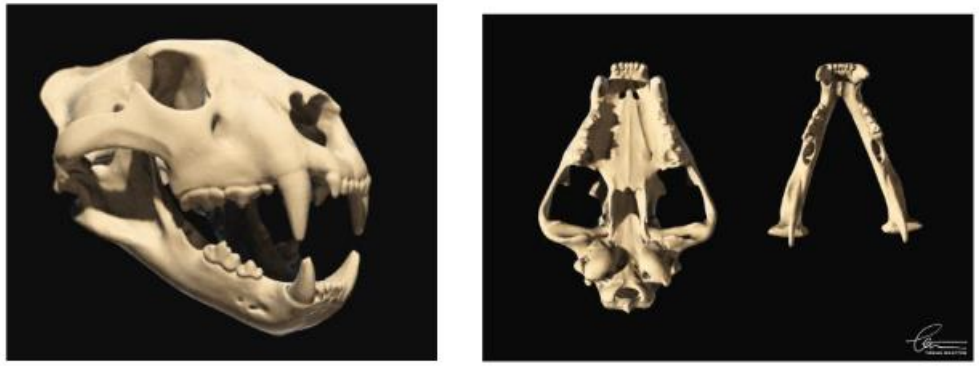
Anatomy beyond its confines

Theo Jansen’s wind propelling moving animal sculptures - Strandbeest evolution 2017

Valentino Braitenburg’s vehicle

Anatomy beyond its confines at King's College

Digital model of a lion's skull (Museum of Life Science collection) constructed from CT scans by Tobias Whetton (second year Biomedical Engineering undergraduate)



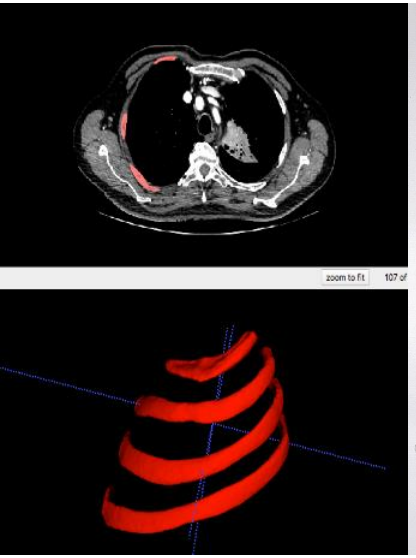
Replacement 3D printed bones for a damaged chimpanzee skeleton generated form 3D scans by summer scholar Lois Zac-Williams (EMDP1a undergraduate)

Synthetic Anatomy module

Anatomical Education and Innovation award 2023

Impact – bone replacement for lung cancer patients

Pontiki et al. 2021, ATS
BBC Click Feb 2023



CT →
3D Model

Low-cost
PLA Print

Low-cost
Silicone Mould (filled with methyl methacrylate to create customised prothesis)
Versus titanium implants

Implant

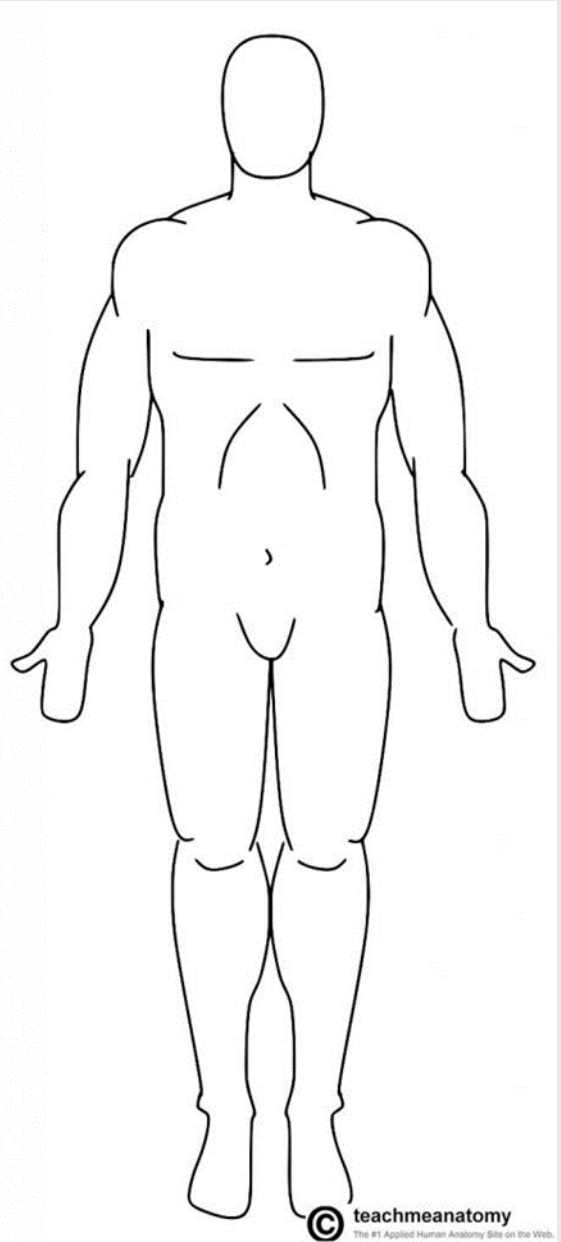
- Around 20 Patients implanted so far
- No complications (evaluation assessment and postoperative tracking of patients' chest motion, using infrared markers)
- Better respiratory mechanics & improved aesthetics

Lets start with the central concept of ‘The Anatomical Position’

A concept used for all description of location within the body.

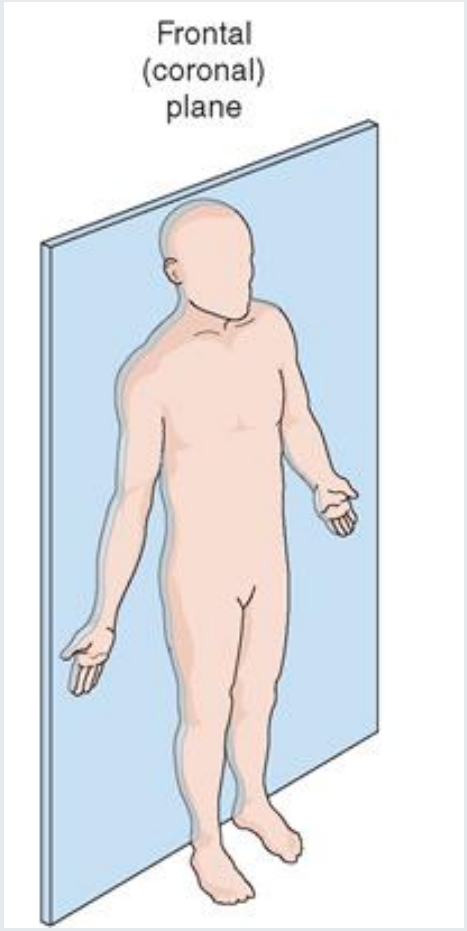
General description is:

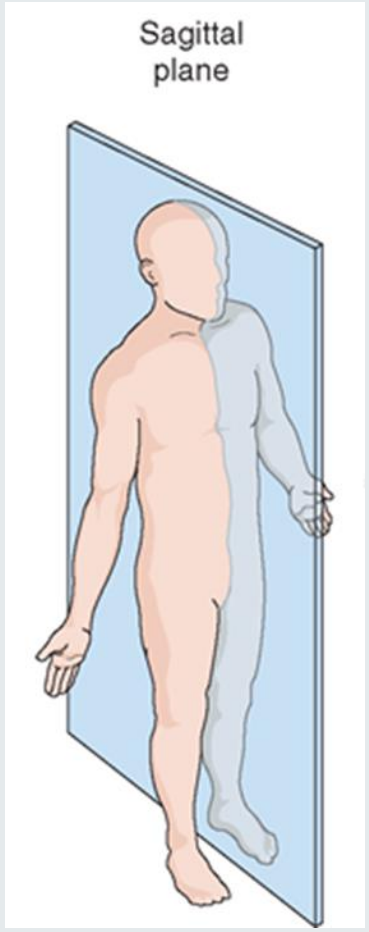
- A person standing upright, facing forward.
- Arms straight and hands held by the hips, palms facing forward.
- Feet parallel and toes pointing forward.

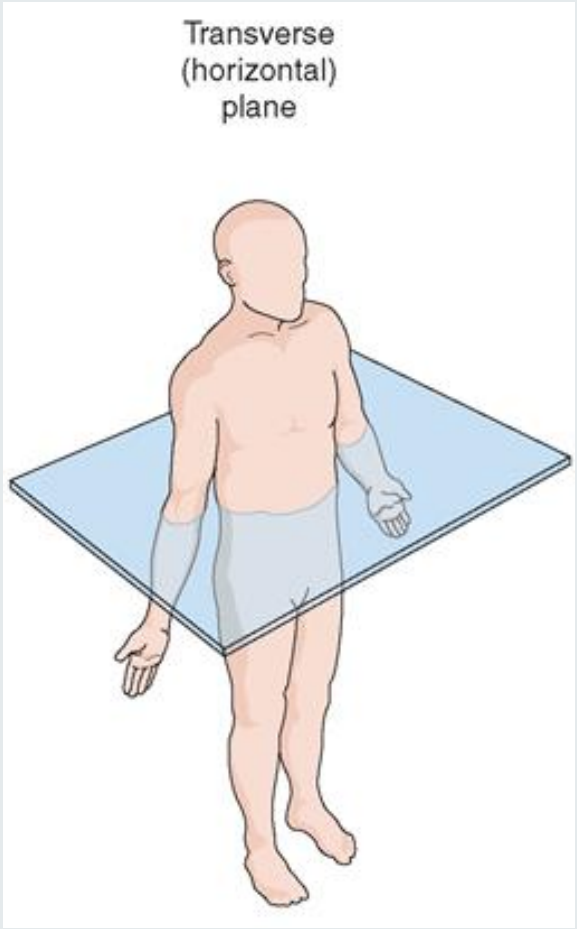


Anatomical Planes

- The anatomical planes are lines used to divide the human body which are very useful to understand cross-sections and medical imaging.
- 3 planes commonly used are: coronal, sagittal and transverse plane.







Anatomical Terms of location

Anterior

Posterior

Superior

Inferior

Medial

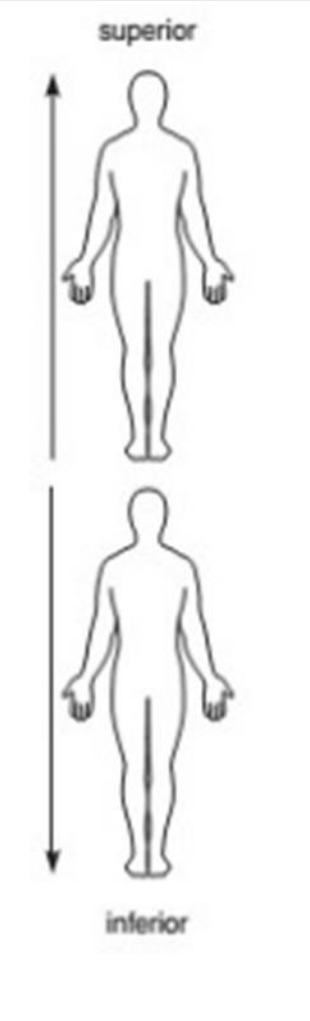
Lateral

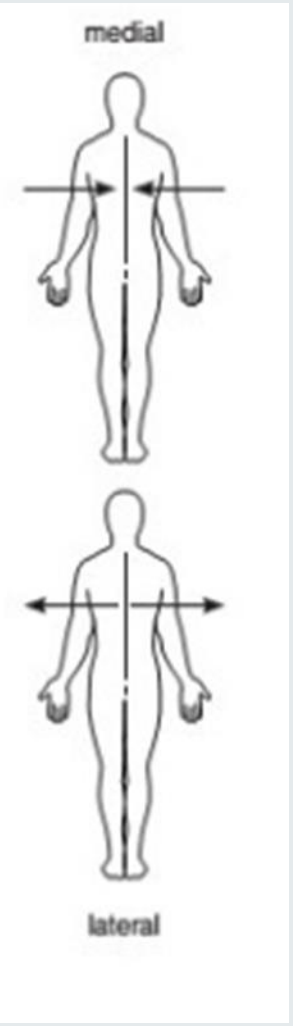
Proximal

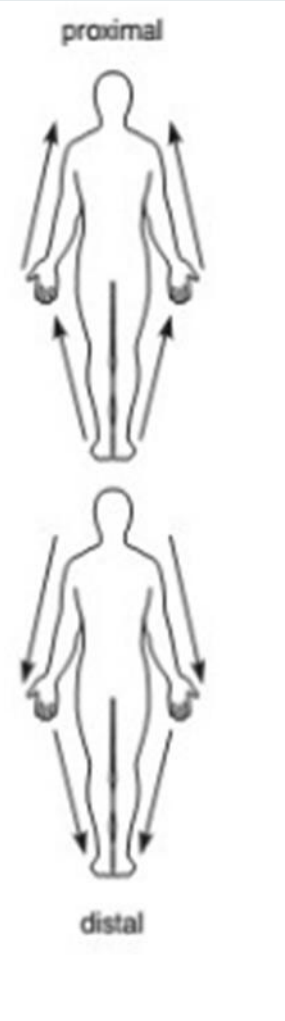
Distal

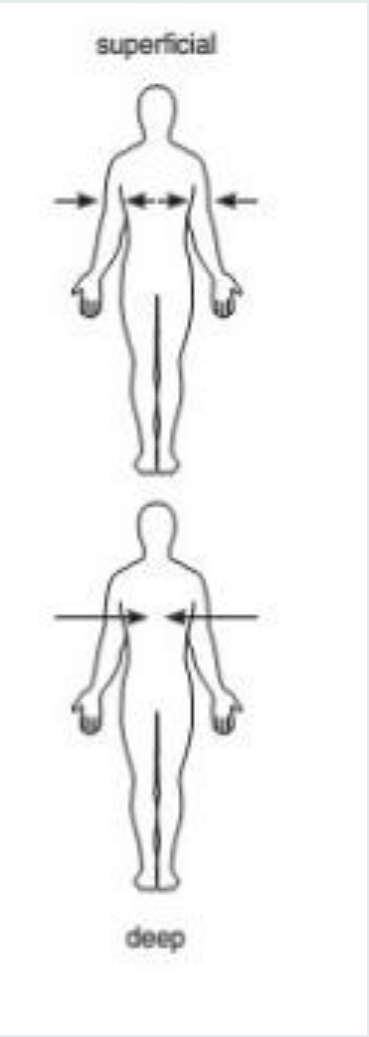
Superficial

Deep





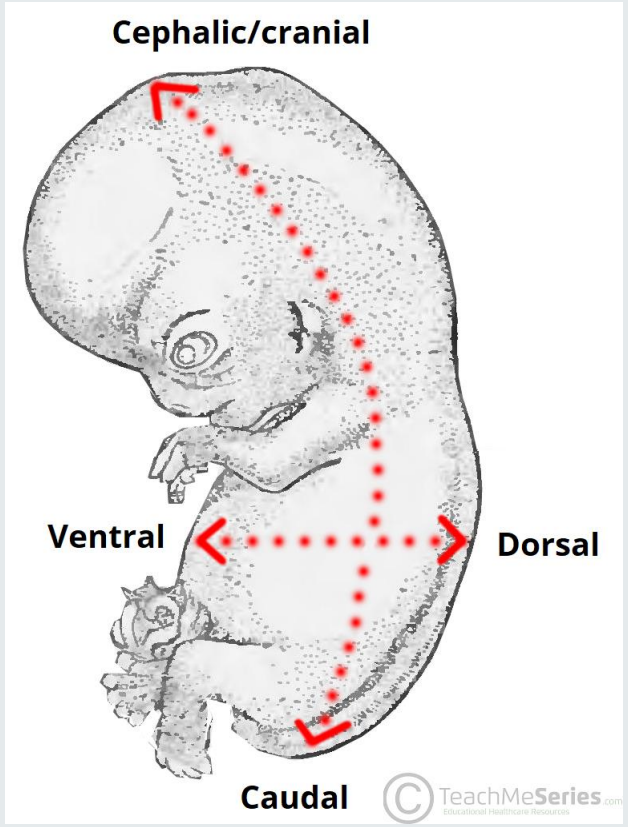


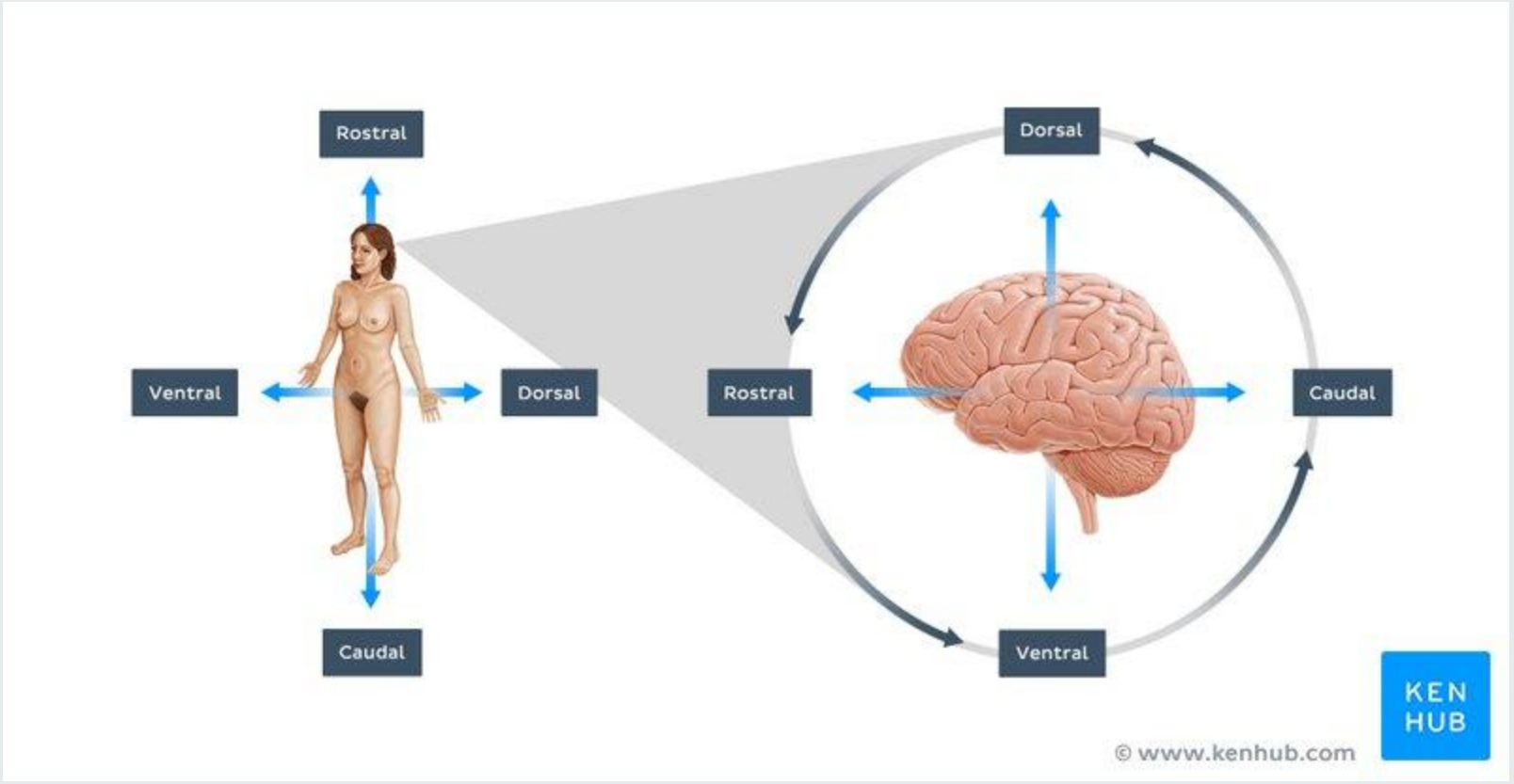


Q: In the anatomical position is your shoulder proximal or distal to your elbow ?

Q: Is your thumb medial or lateral to your palm?

Terms of location in embryology and neuroanatomy

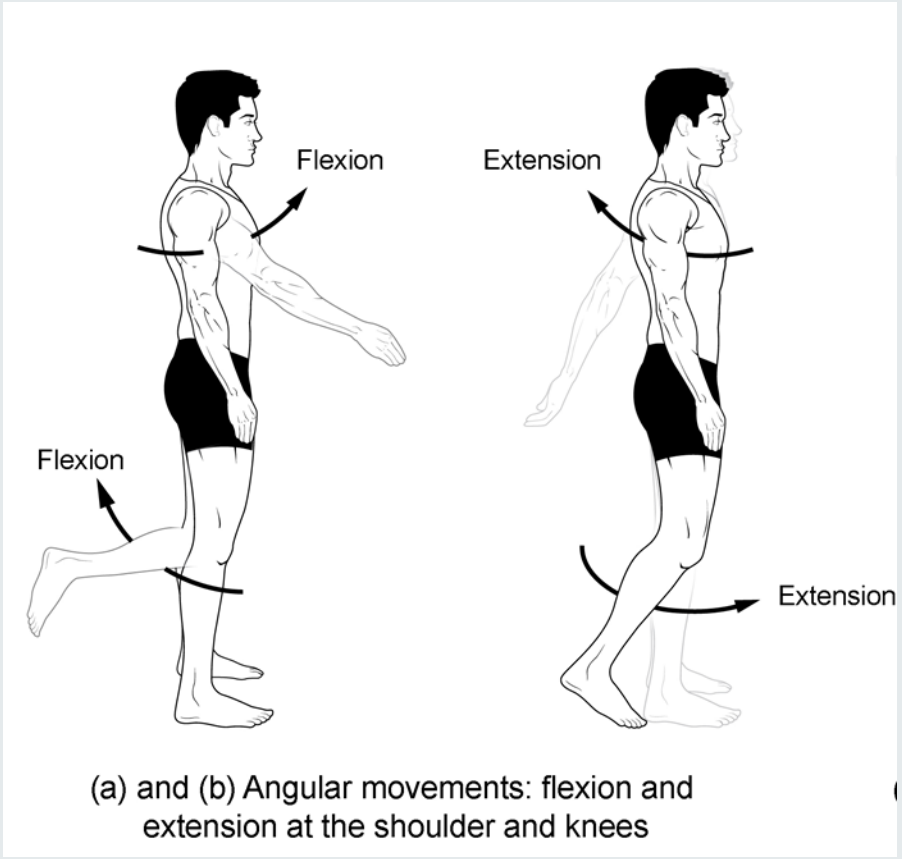




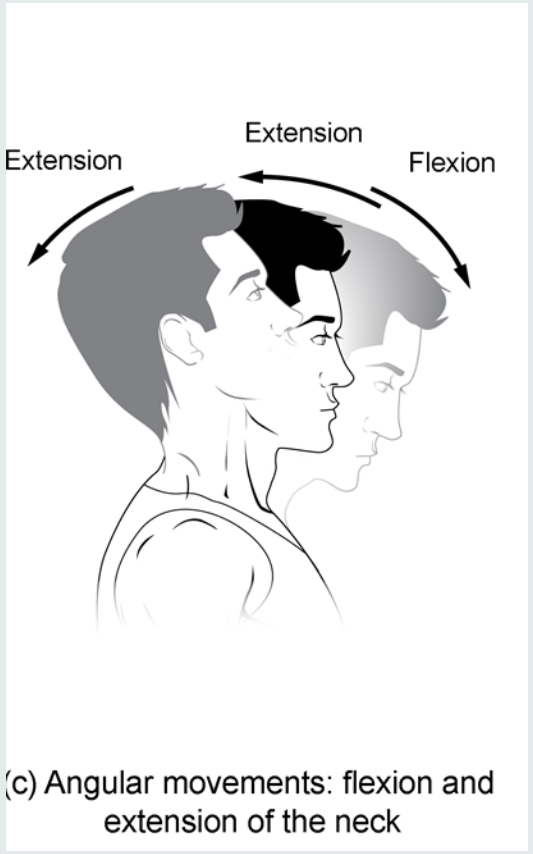
Anatomical Terms of movement – the only to learn is by getting involved!

As the body moves the brain grooves!!

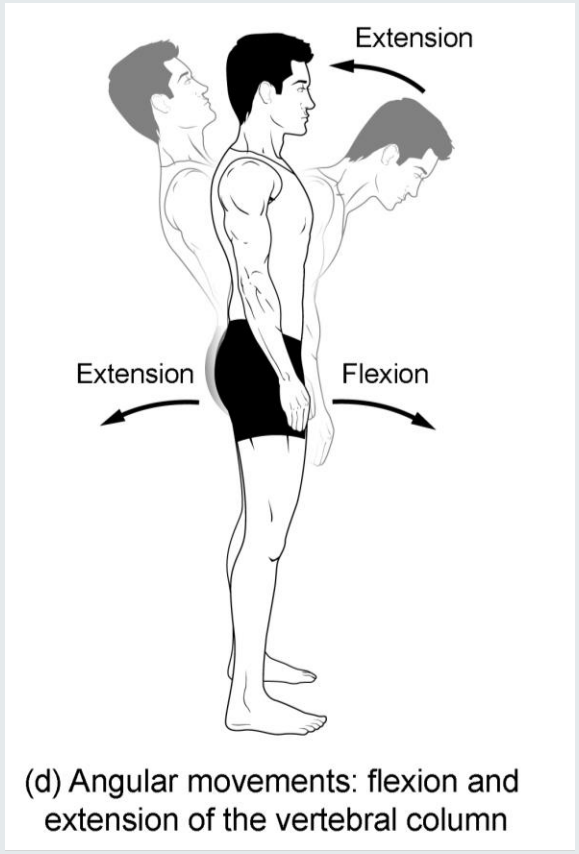
Flexion	movement that decreases the angle between two body parts with respect to anatomical position OR Bending towards the embryological front of the body
Extension	movement that increases the angle between two body parts with respect to anatomical position OR Straightening or bending to the embryological back of the body



(a) and (b) Angular movements: flexion and extension at the shoulder and knees



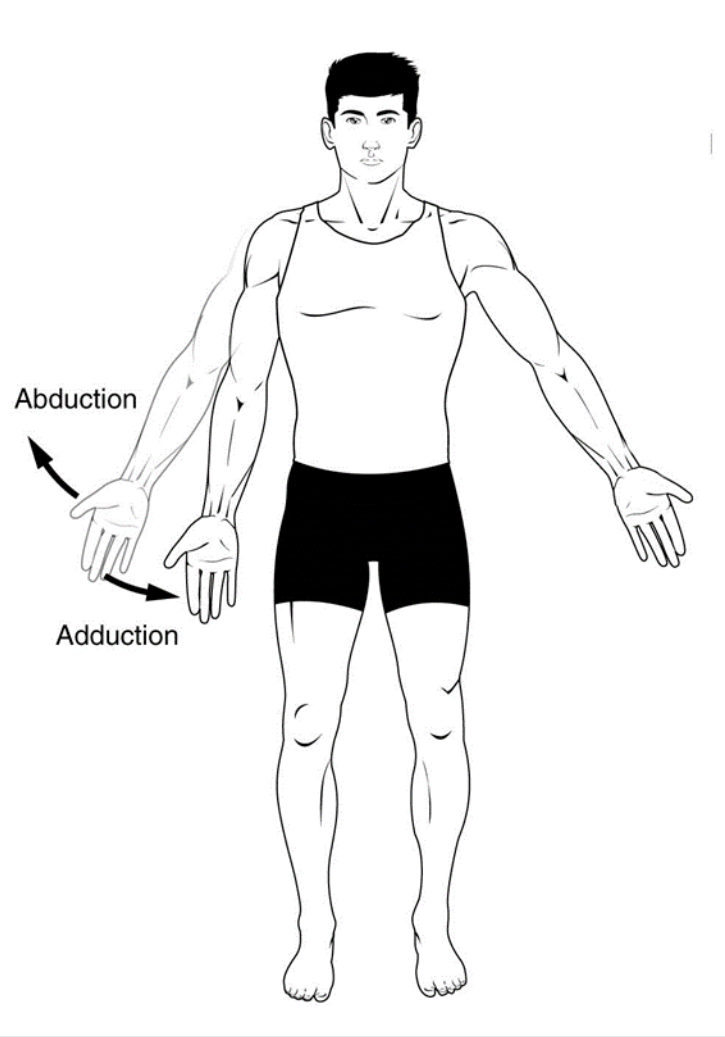
(c) Angular movements: flexion and extension of the neck

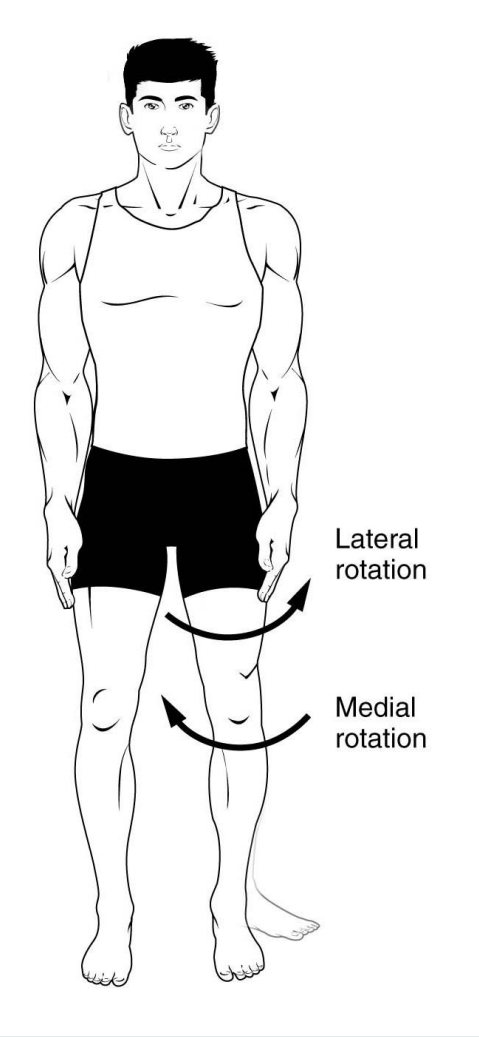


(d) Angular movements: flexion and extension of the vertebral column

Anatomical Terms of movement.

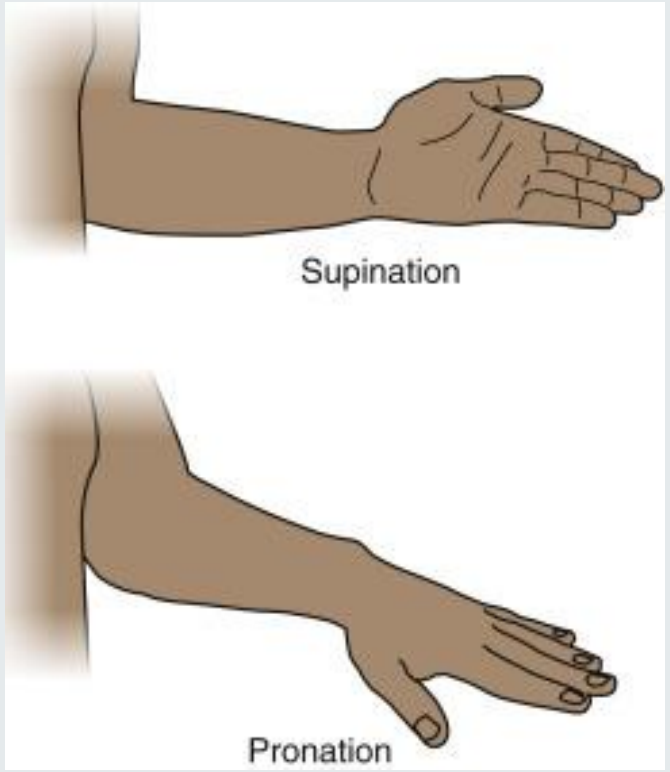
Abduction	movement away from the midline
Adduction	movement towards the midline
Medial rotation	rotating movement towards the midline
Lateral rotation	rotating movement away from the midline





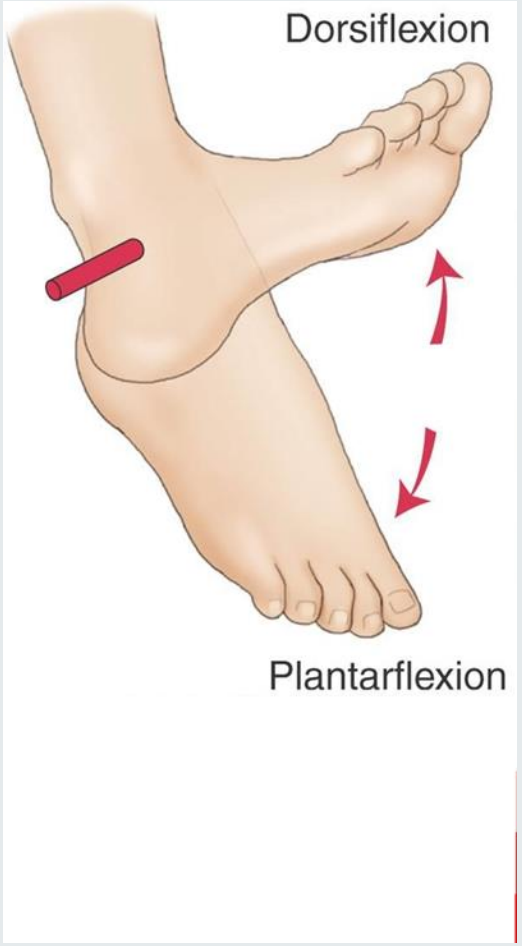
Anatomical Terms of movement..

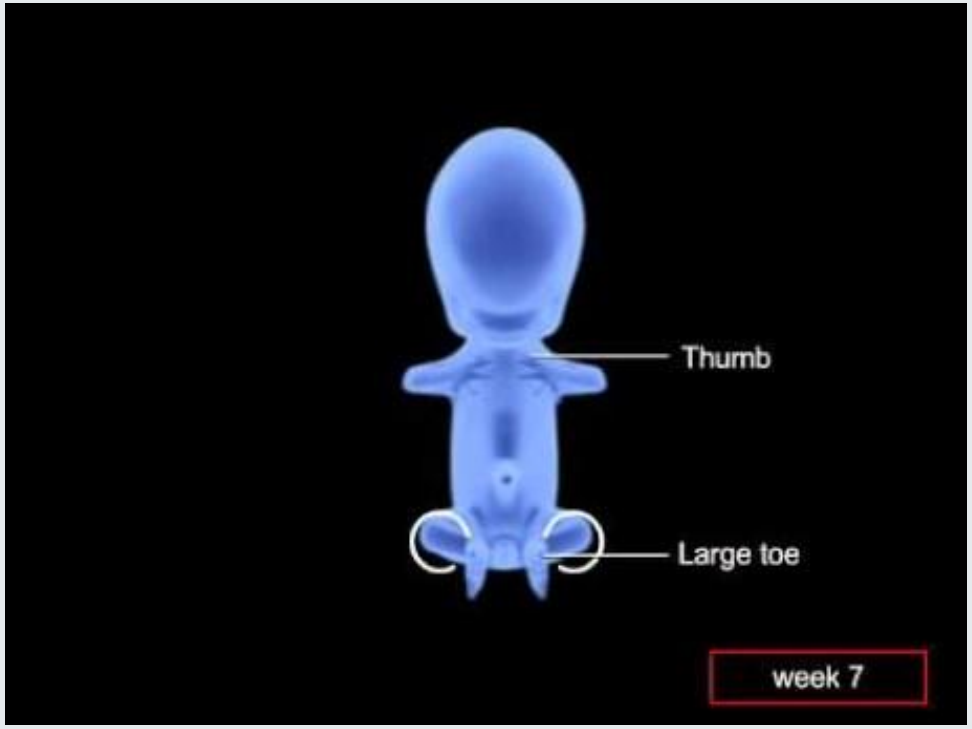
Supination	keeping the elbow and shoulder still, flip your hand with palm facing up
Pronation	flip your hand with palm facing down



Anatomical Terms of movement…

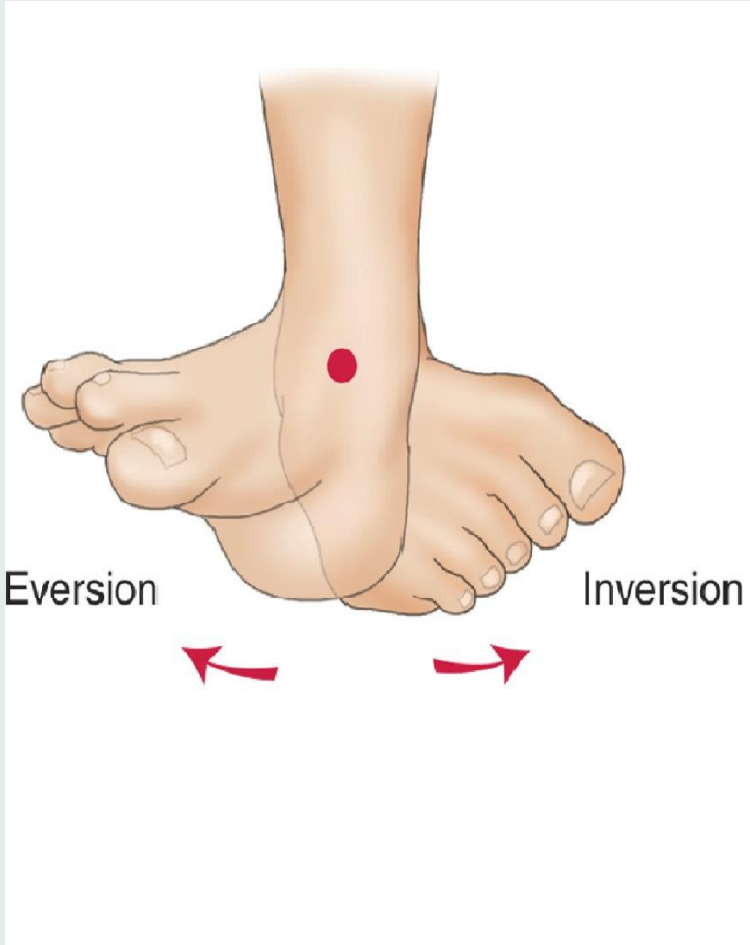
Dorsiflexion	It refers to decreasing the angle with regard to the anatomical position, so that the foot points more superiorly. Embryologically it is an extension at the ankle joint
Plantarflexion	It refers to increasing the angle with regard to the anatomical position, so that the foot points inferiorly. Embryologically it is a flexion at the ankle joint





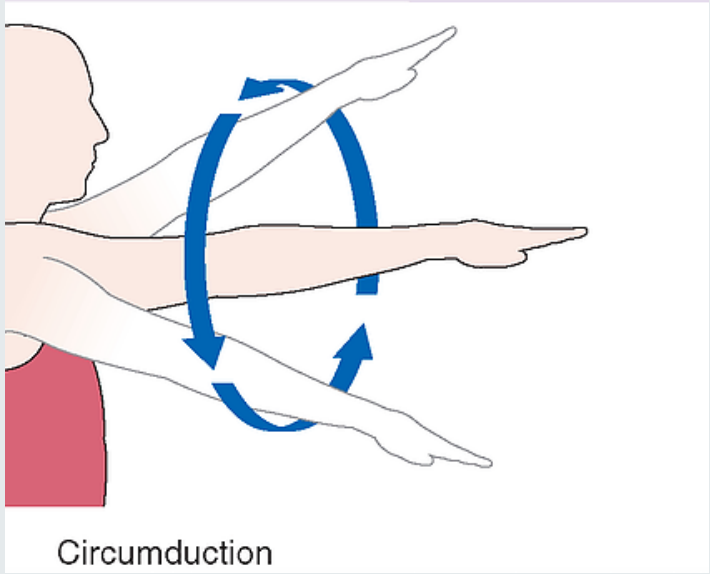
Anatomical Terms of movement…

Inversion	movement of the sole towards the median plane
Eversion	movement of the sole away from the median plane

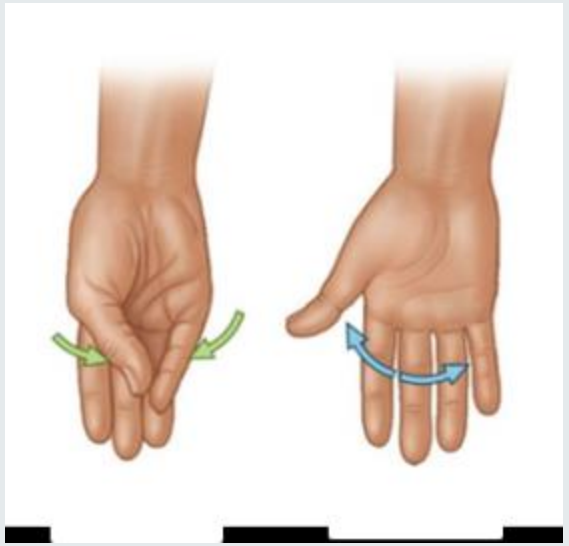


Anatomical Terms of movement….

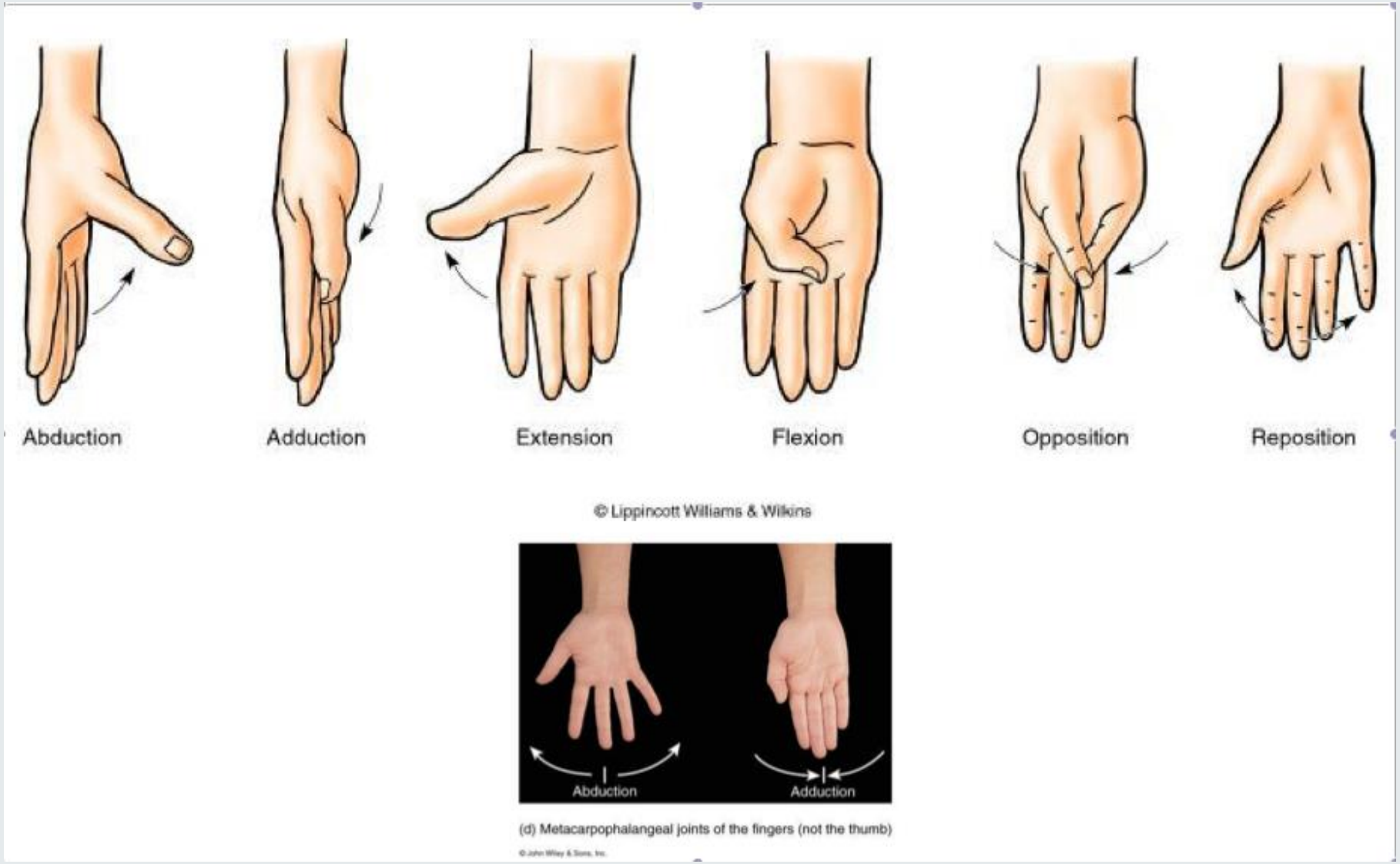
Circumduction	conical movement of a limb extending from the joint at which the movement is controlled


Circumduction

Opposition	movement that brings the thumb and little finger together
Reposition	movement that moves the thumb and the little finger away from each other, effectively reversing opposition

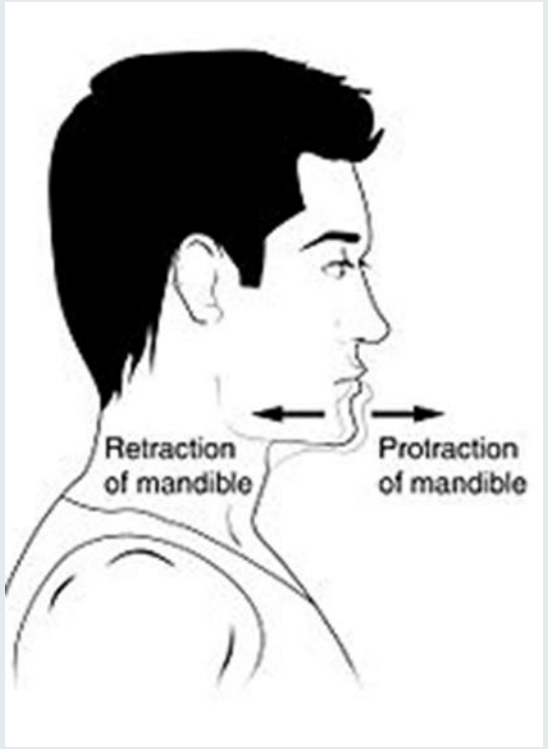


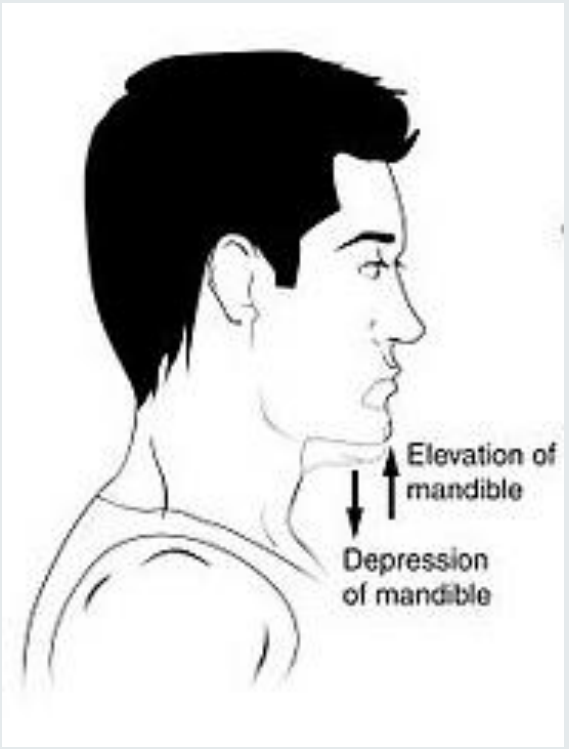
Hand movements



Anatomical Terms of movement…..

Protraction	movement of protruding or ‘reaching out’ to something
Retraction	Movement of retracting or picking something up

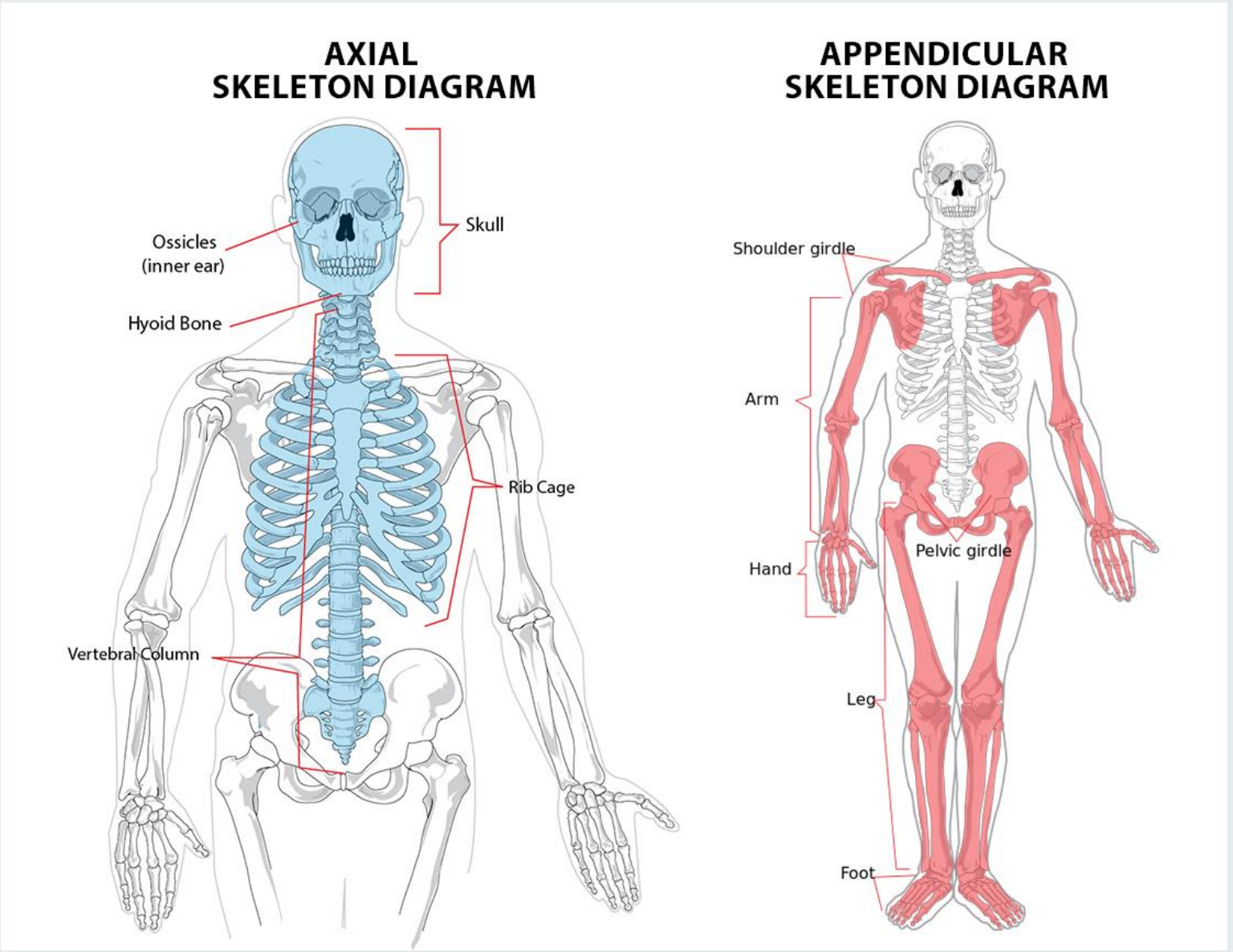




Elevation	movement in a superior direction
Depression	movement in an inferior direction

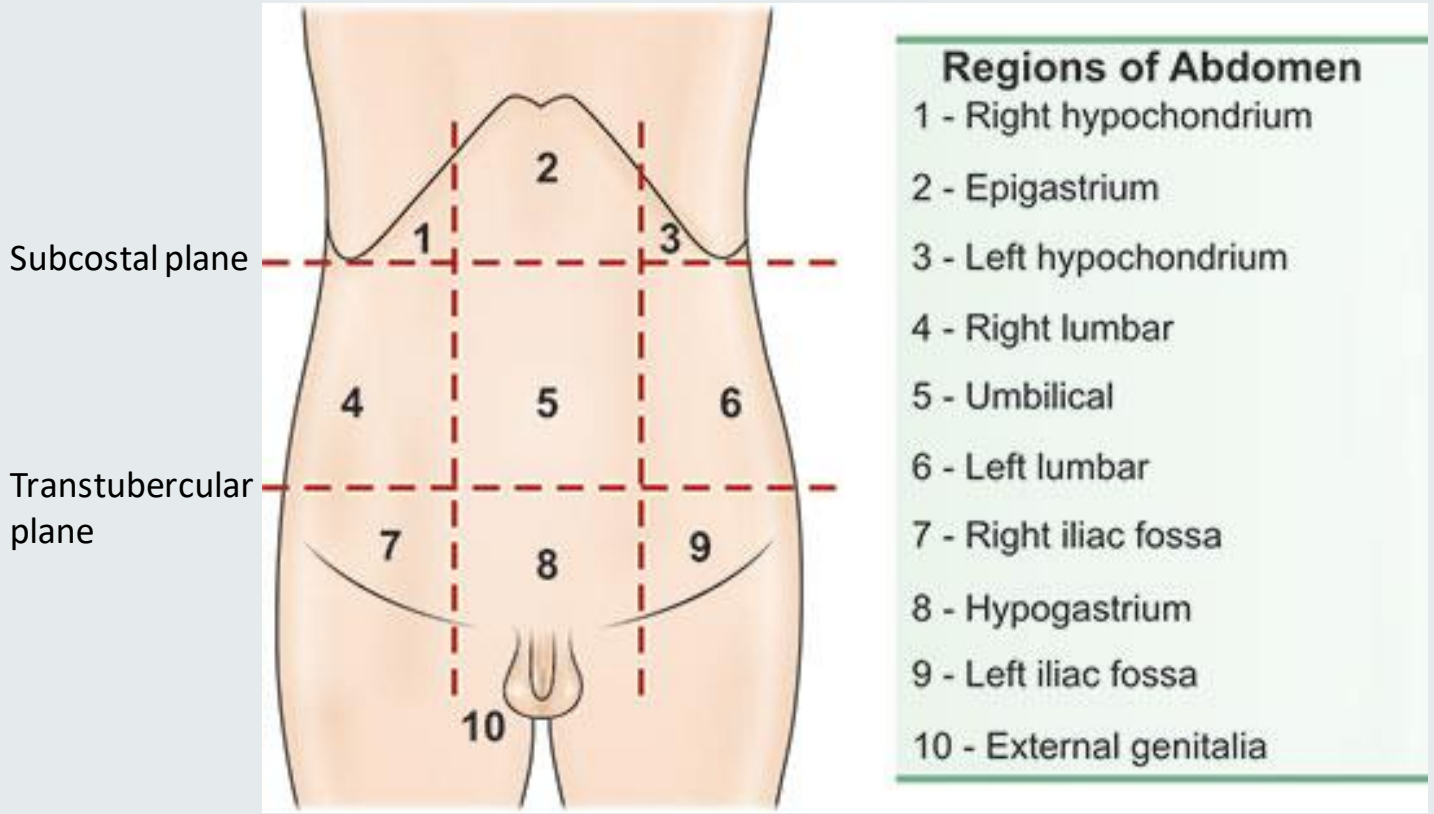
Body sections and parts

- **Axial skeleton**
  - Cephalic region
  - Cervical region
  - Thoracic region
  - Abdominal region
  - Pelvic region
- **Appendicular skeleton**
  - Upper appendicular region
  - Lower appendicular region



Body quadrants and regions

- Quadrants
  - Upper right
  - Lower right
  - Upper left
  - Lower left



Why am I learning this?
Homework ☺ - To find out the answer - google 'appendicitis - NHS' and 'Acute cholecystitis - NHS'. We are looking for any relation between these regions above and symptoms. Lets see if we can figure this out.

Summary

- The anatomical position, planes and movements
- Body sections, parts, quadrant and regions

Take the quiz to test your knowledge

https://forms.office.com/e/J5W7rR6EuQ

Scan the QR code to vote
or go to
https://forms.office.com/e
/J5W7rR6EuQ

Reference List

- Essential Clinical anatomy by Keith L. Moore, Anne M.R. Agur and Arthur F. Dalley
- Gray's Anatomy for Students by Susan Standring
- Acland's Video Atlas of Human Anatomy
- http://teachmeanatomy.info
- Emedicine.medscape.com

Thank you

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