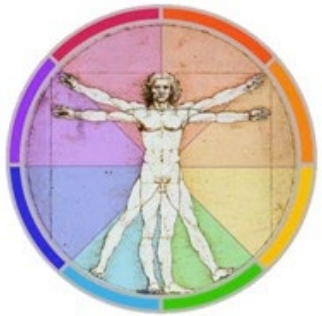
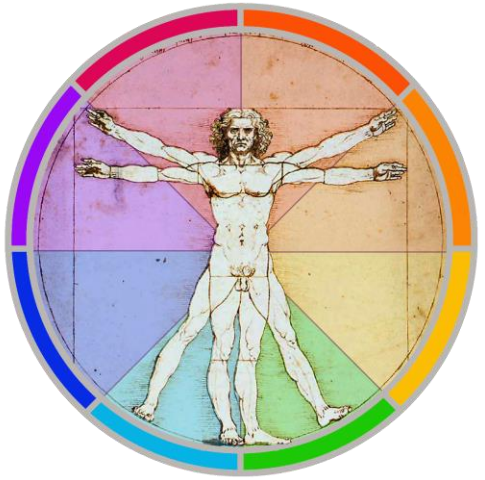
HUBS 191 Lecture Material

This pre-lecture material is to help you prepare for the lecture and to assist your note-taking within the lecture,
it is NOT a substitute for the lecture !



Please note that although every effort is made to ensure this pre-lecture material corresponds to the live-lecture there may be differences / additions.

Human Body Systems (HUBS) 191



Terminology

Dr Charlotte King

Department of Anatomy

University of Otago
ŌTĀKOU WHAKAIHU WAKA

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Objectives

By the end of this lecture you should be able to:

- Explain the concept of homeostasis
- Explain the ‘Anatomical Position’
- Define the terms used to describe spatial and positional relationships of structures
- Define and demonstrate terms of movements as related to joints

Why is terminology important?

- Effective communication
- Avoids vague descriptions or directions
- Look up words you don't know the meaning of
- Google the word + etymology (study of the origin of words)
- For example:
  - Homeostasis
    - homeo- the same
    - stasis- stopping, staying
    - Therefore 'staying the same'

Homeostasis

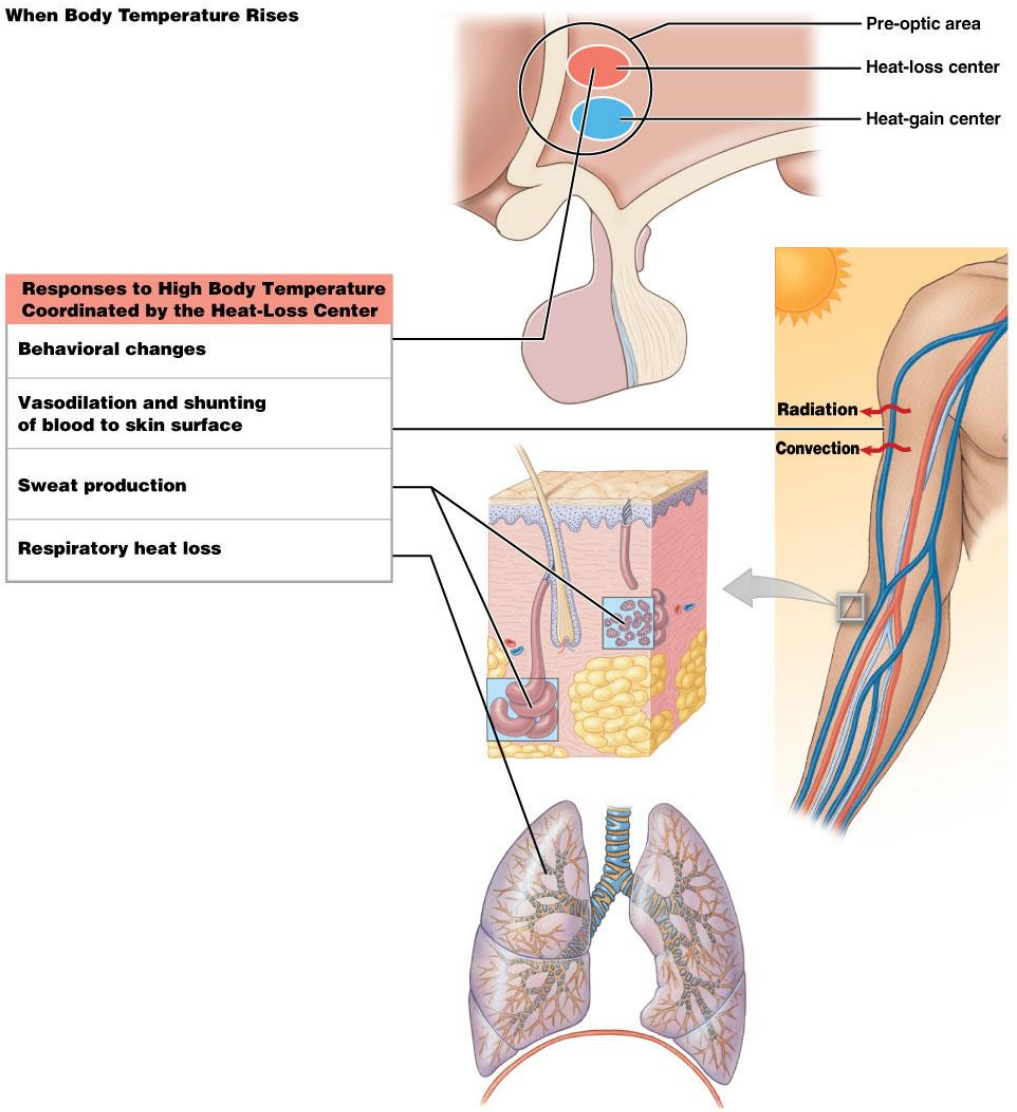
- Underpins normal function of the systems of the human body
- Maintain conditions in the internal environment
- Homeostasis relies on regulatory mechanisms to ensure that controlled variables do not move too far from the set-point which is “normal"
  - Temperature
  - Ion concentrations (calcium, potassium, sodium)
  - Blood sugar levels
  - Fluid balance
  - …and many more

Homeostasis

- Feedback
  - When the controlled variable moves too far from the set point and responses from the body attempt to move the variable back to “normal”
    - E.g. If you get very cold, your body will reduce blood flow to the skin to reduce heat loss, and you might also start shivering to produce heat.
- Feedforward
  - Usually when there is an anticipation of an event that will alter a controlled variable, so you may do something to minimize the effect
    - You look outside and see it is snowing. You know that if you go outside in shorts and a t-shirt, your temperature will drop, so you dress in warm clothing before you go outside
- You will explore these concepts further in HUBS 191 and 192 later!

Homeostasis

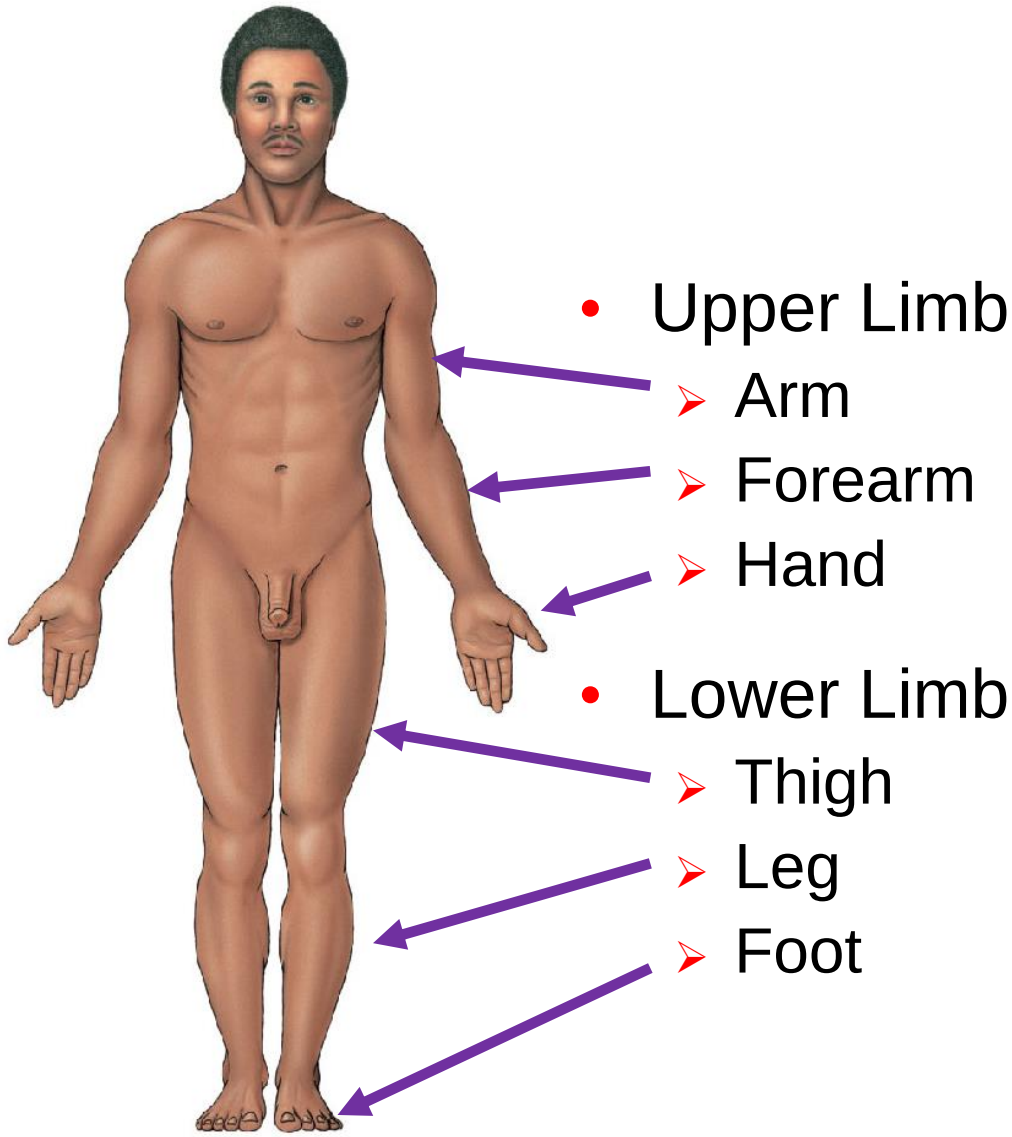
- Think about what happens when your body temperature rises
- What does your body do to correct the temperature increase?
- What behaviours do you consciously do to correct the temperature increase?
- We will talk more about homeostasis in later modules, but for now, think about how the external environment affects your body, and what your response is.



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.966

Anatomical terminology

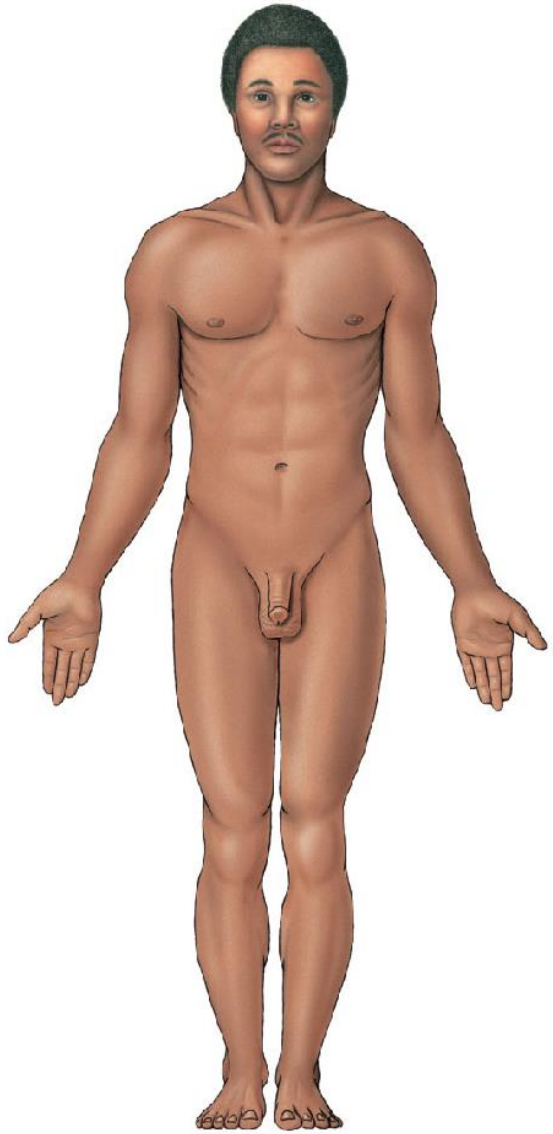
- We use specific terminology to refer to:
  - Body parts
  - Directions
  - Movements
- Different to what you might say in casual conversation



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.80

Anatomical position

- Upright
- Face forwards
- Feet together
- Palms face forwards
- Remains the same regardless of movement



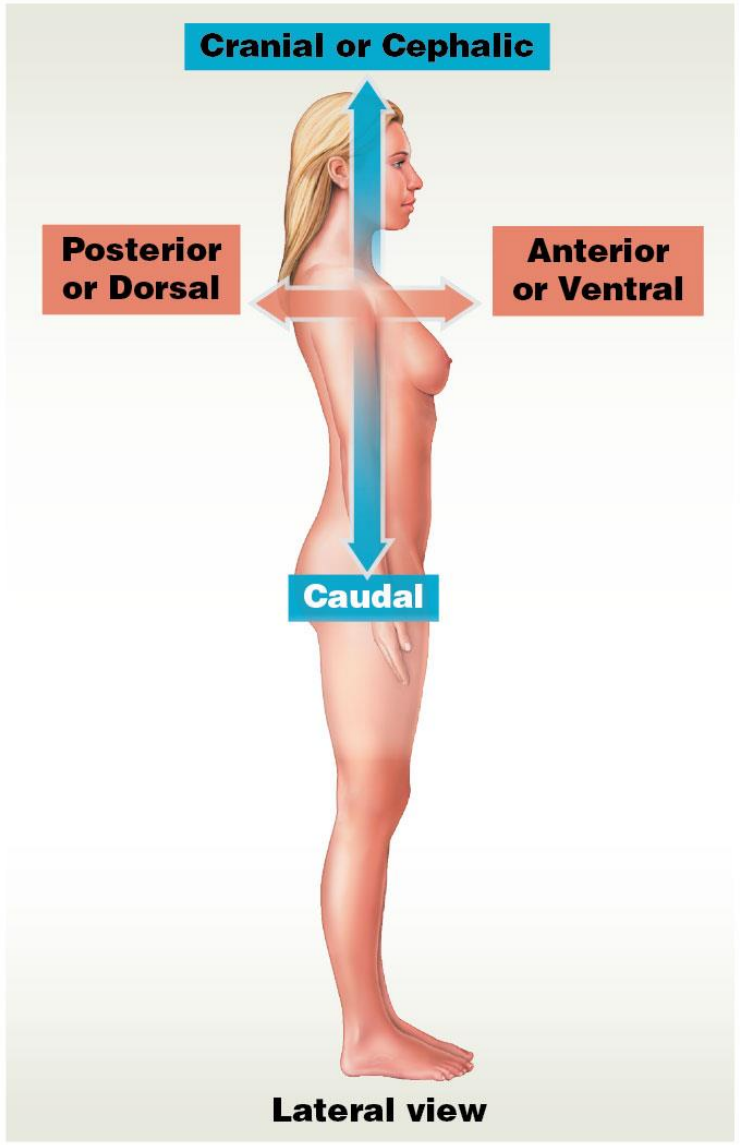
Why do you think this is important?

Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.80

Terms of direction

We use these to describe body parts in relation to other parts

- Anterior
- Posterior

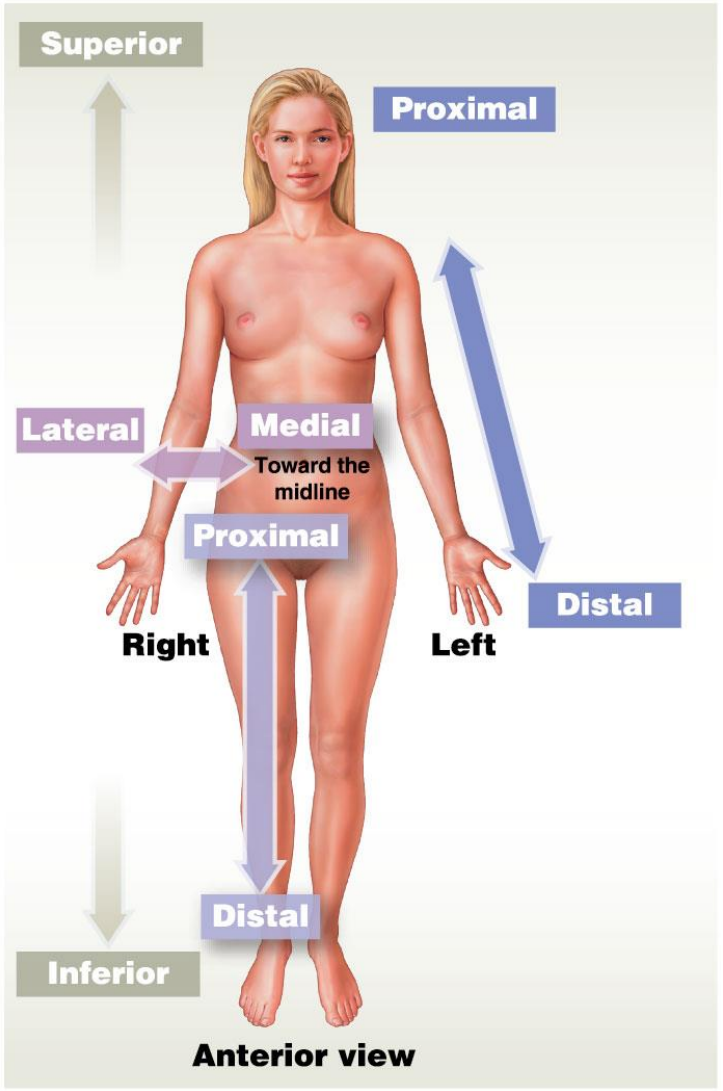


Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.82

Terms of direction

We use these to describe body parts in relation to other parts

- Superior
- Inferior
- Medial
- Lateral
- Proximal
- Distal



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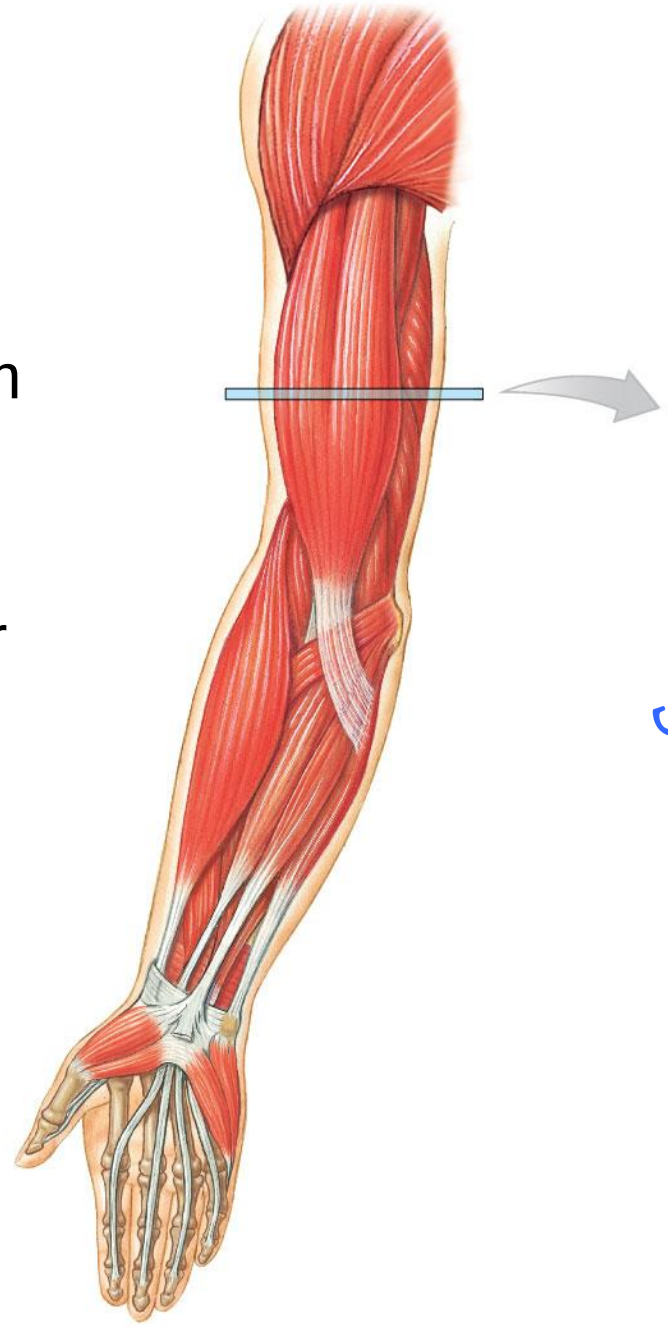
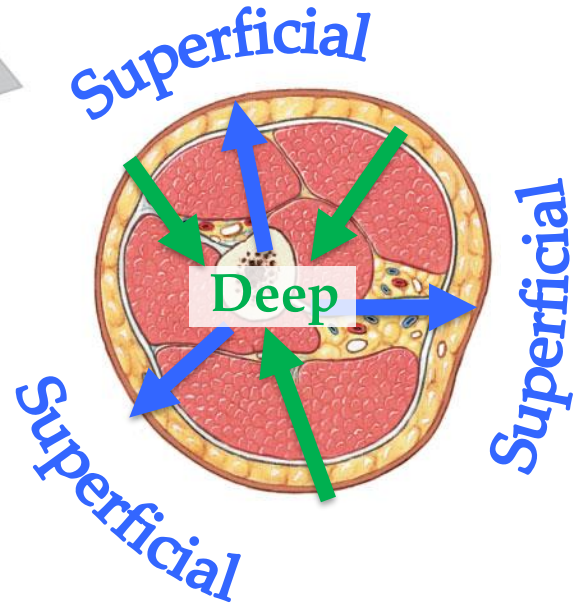
NT
tb

- Deep – further from the surface
- Superficial – closer to the surface



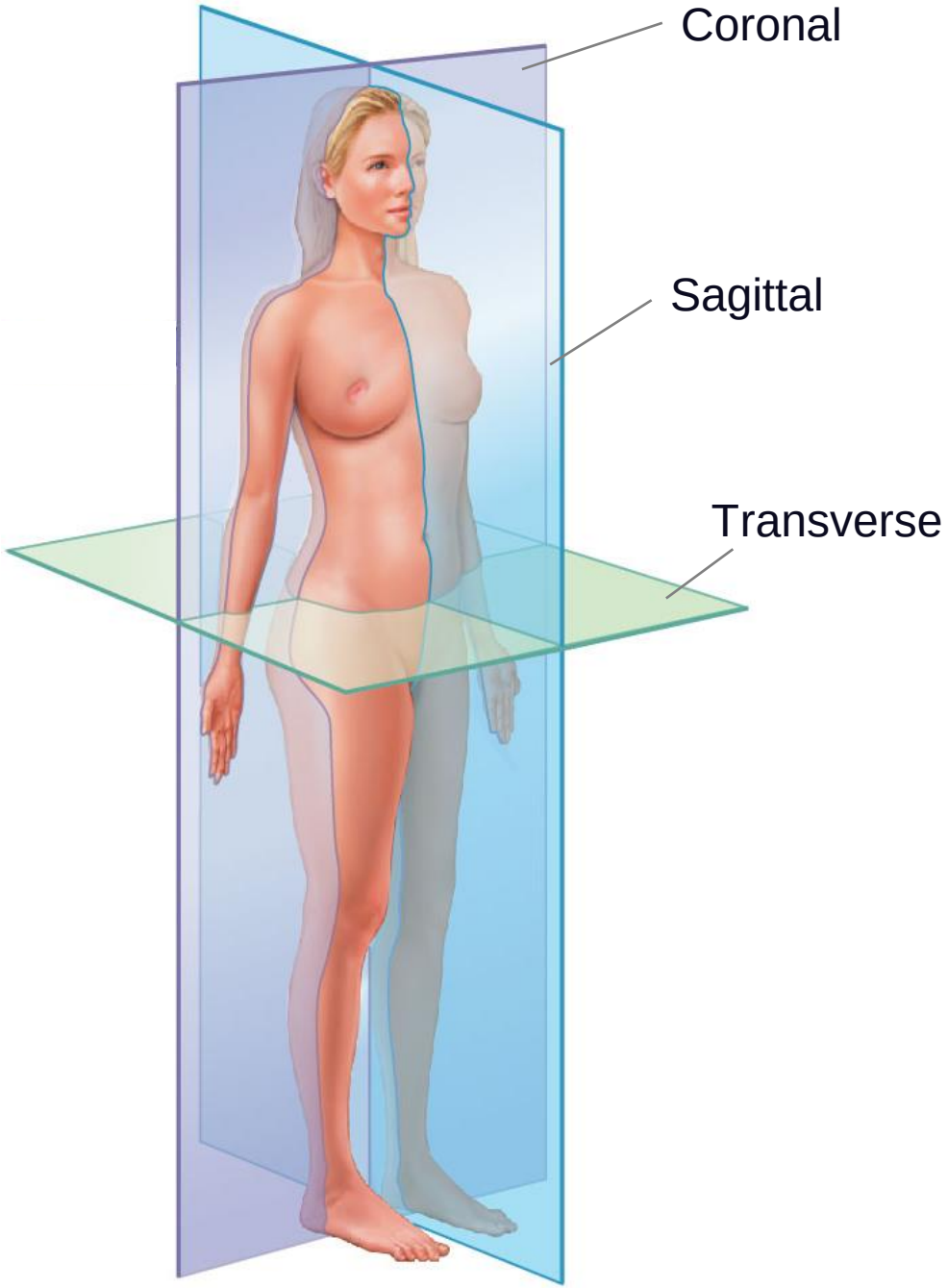
e.g. skin is superficial to muscle



e.g. bone is deep to muscle

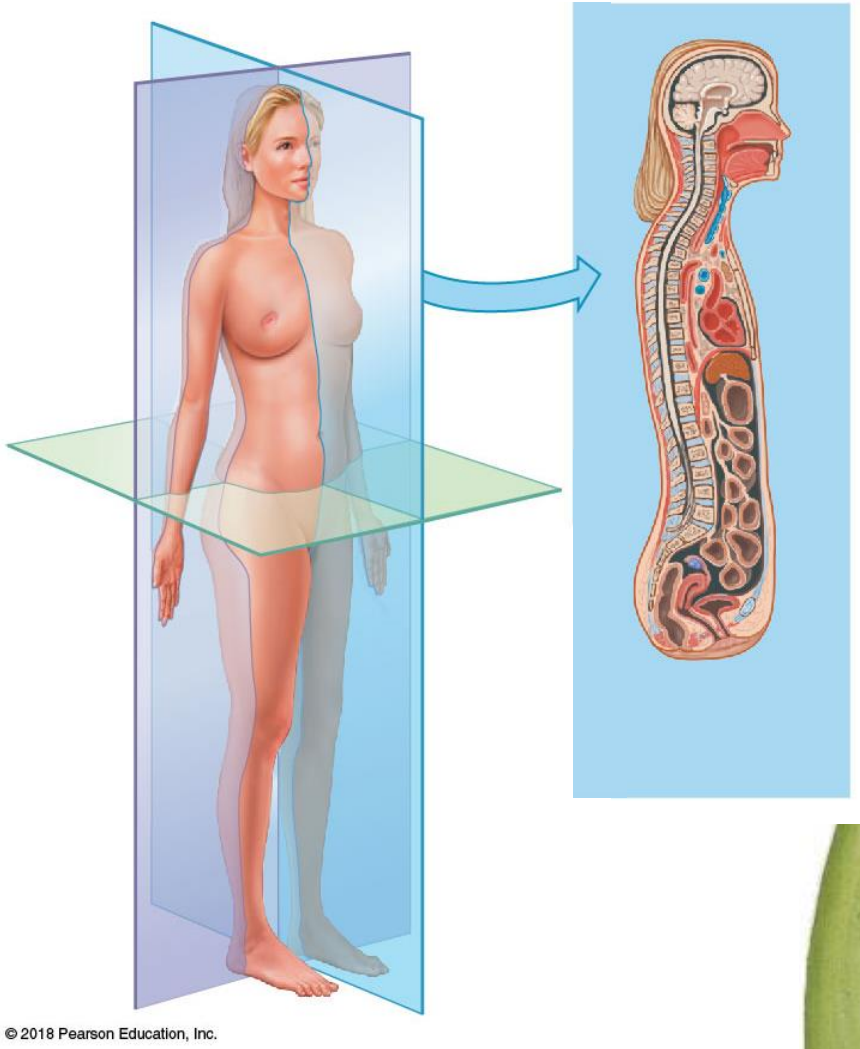
Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.436

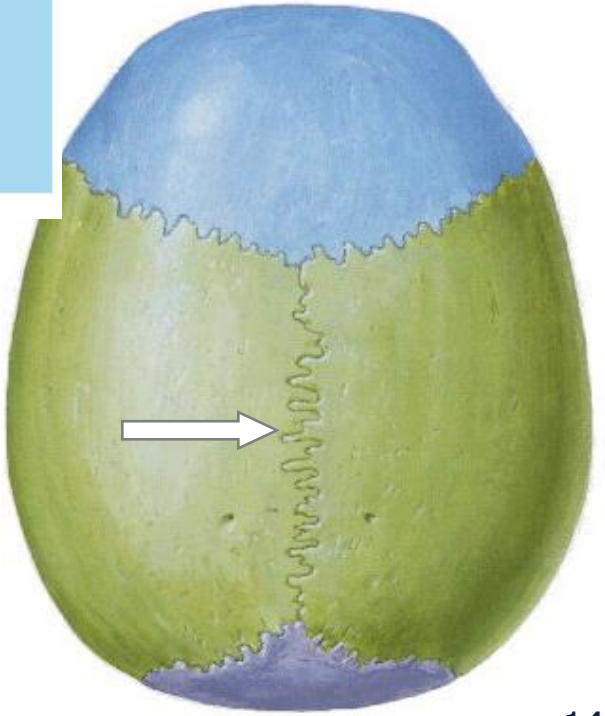
Division of body- planes



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

- Sagittal
  - divides the body into left and right pieces
  - Midsagittal or median plane
    - divides body into mirror image left and right halves

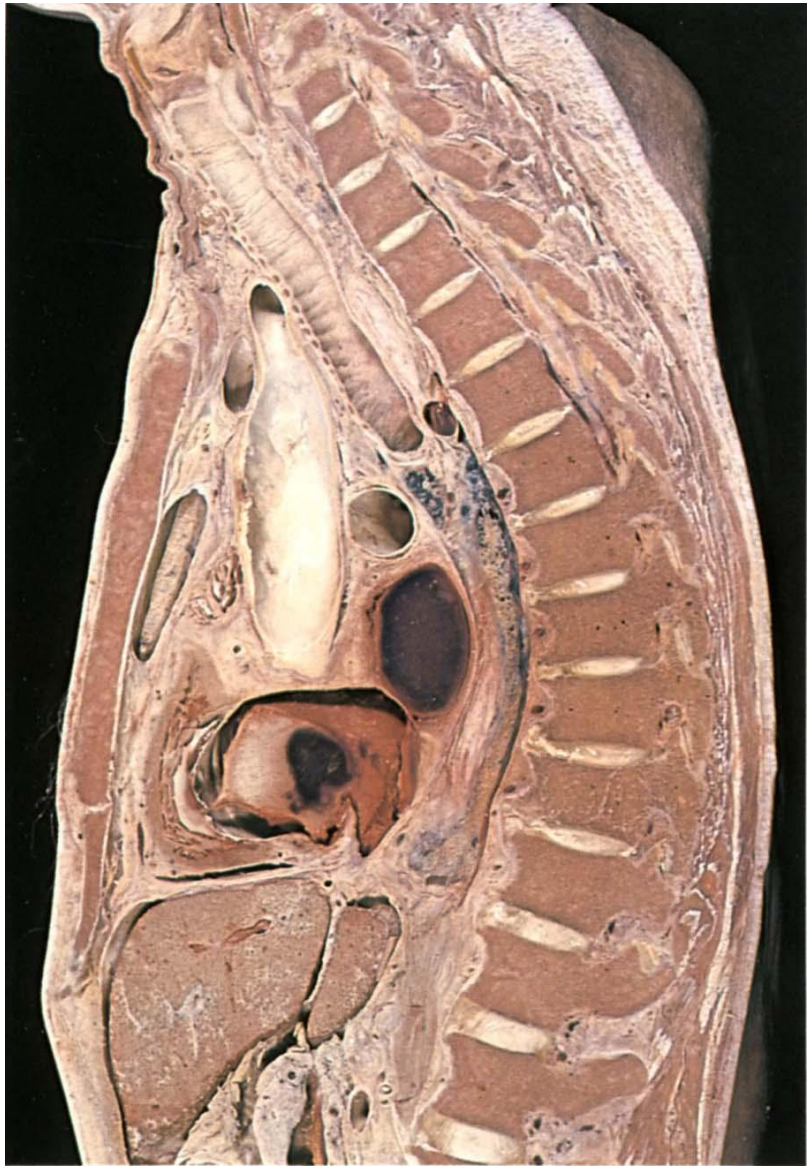




Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

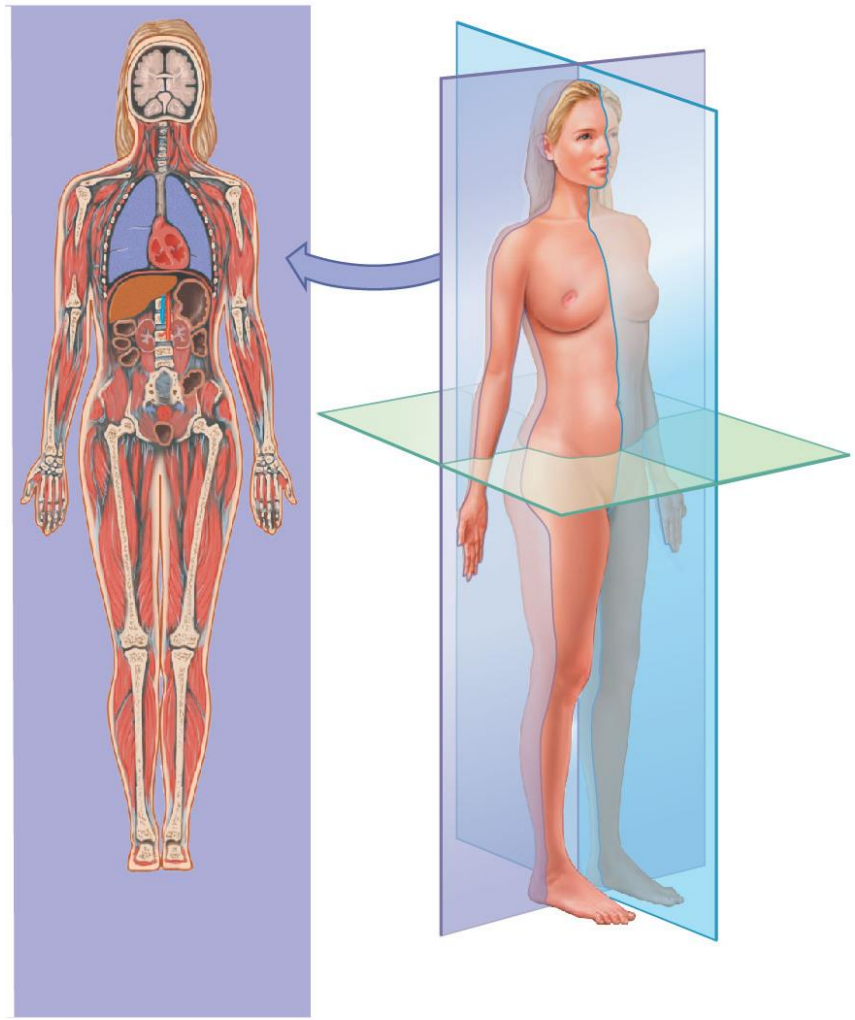
- Sagittal

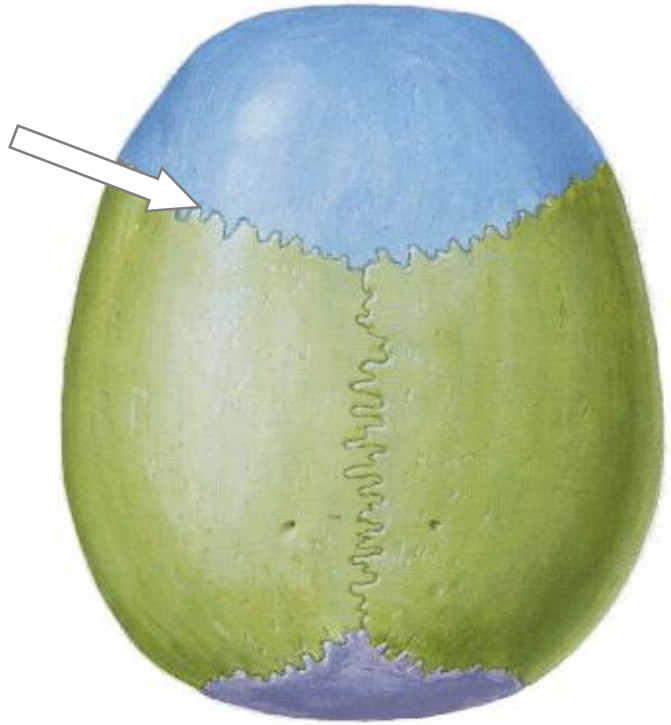
Anatomy Teaching Resources, University of Otago, 2018



Gosling *et al*, *Atlas of Human Anatomy*, 1985

- Coronal
  - divides the body into front and back sections

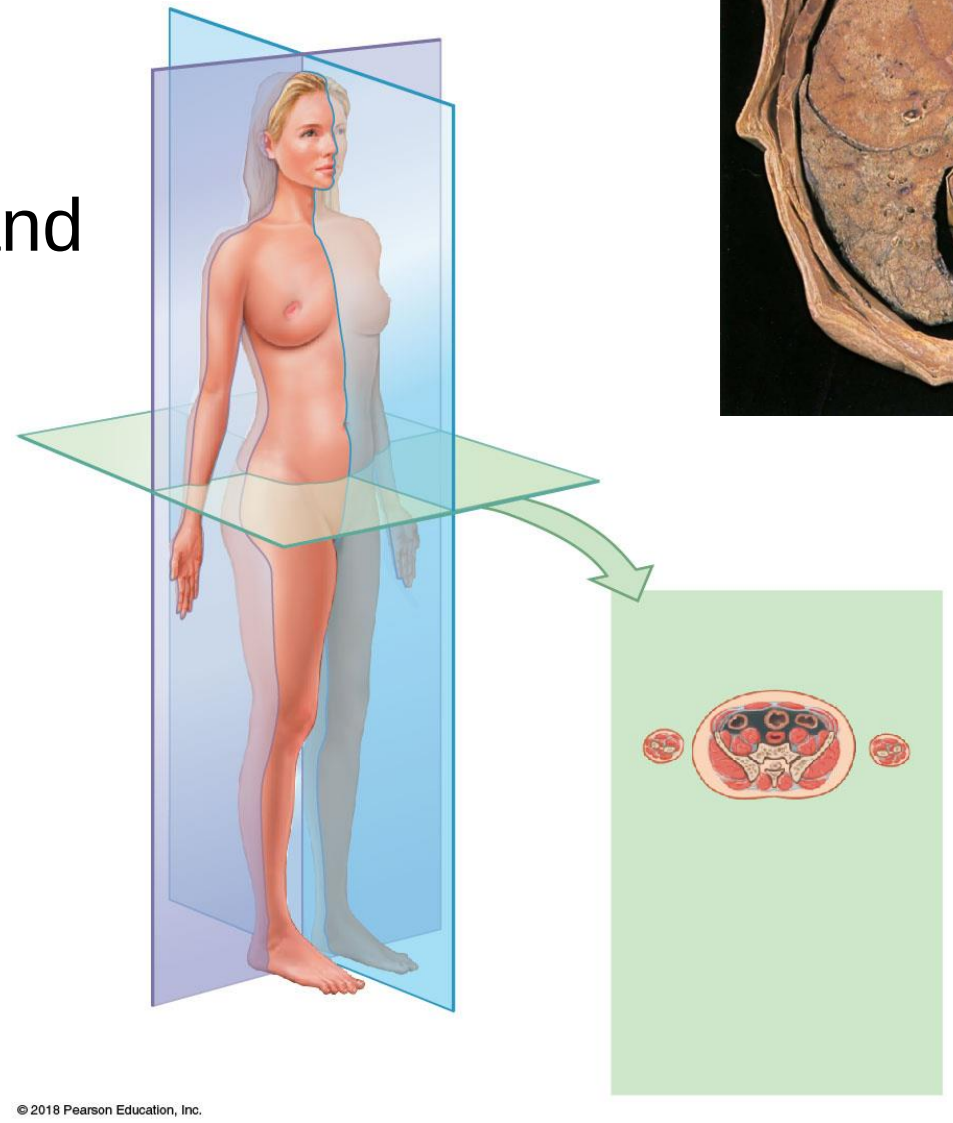




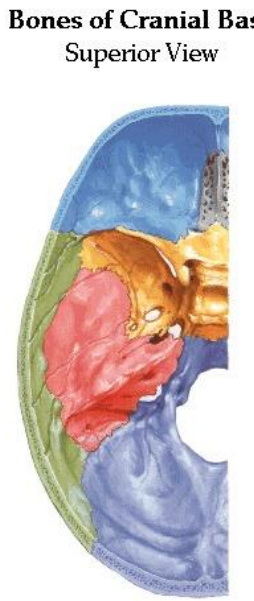
Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

- Transverse
  - divides the body into top and bottom sections

Gosling *et al*, *Atlas of Human Anatomy*, 1985



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83



Netter, *Atlas of Human Anatomy*, 2004

Planes, summarized:

Coronal

Sagittal

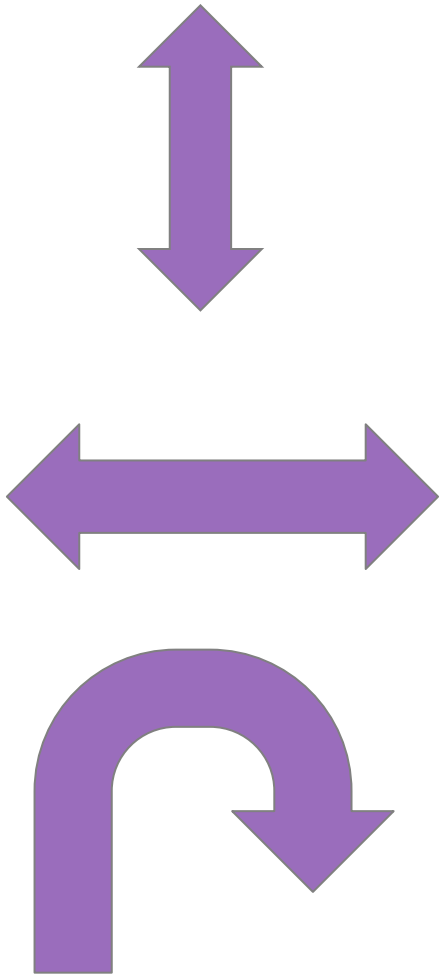
Transverse

Movement

Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018

Movement occurs in planes

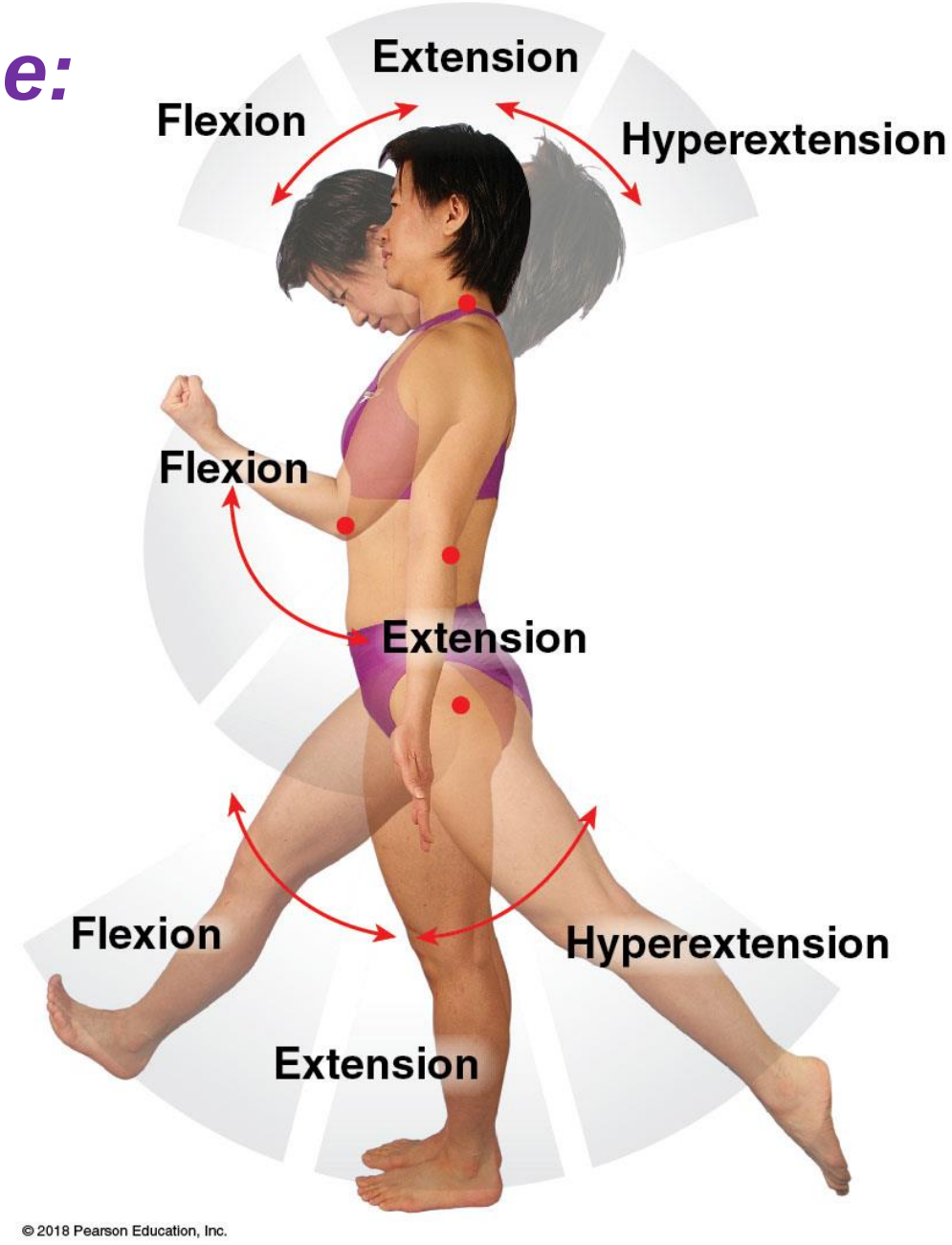
- Sagittal
  - back and forward movements
- Coronal
  - side to side movements
- Transverse
  - rotating movements



Movement in the sagittal plane: Flexion/extension

Angular movements

- Flexion
  - Decreases angle
  - Fleshy parts of limb brought closer together



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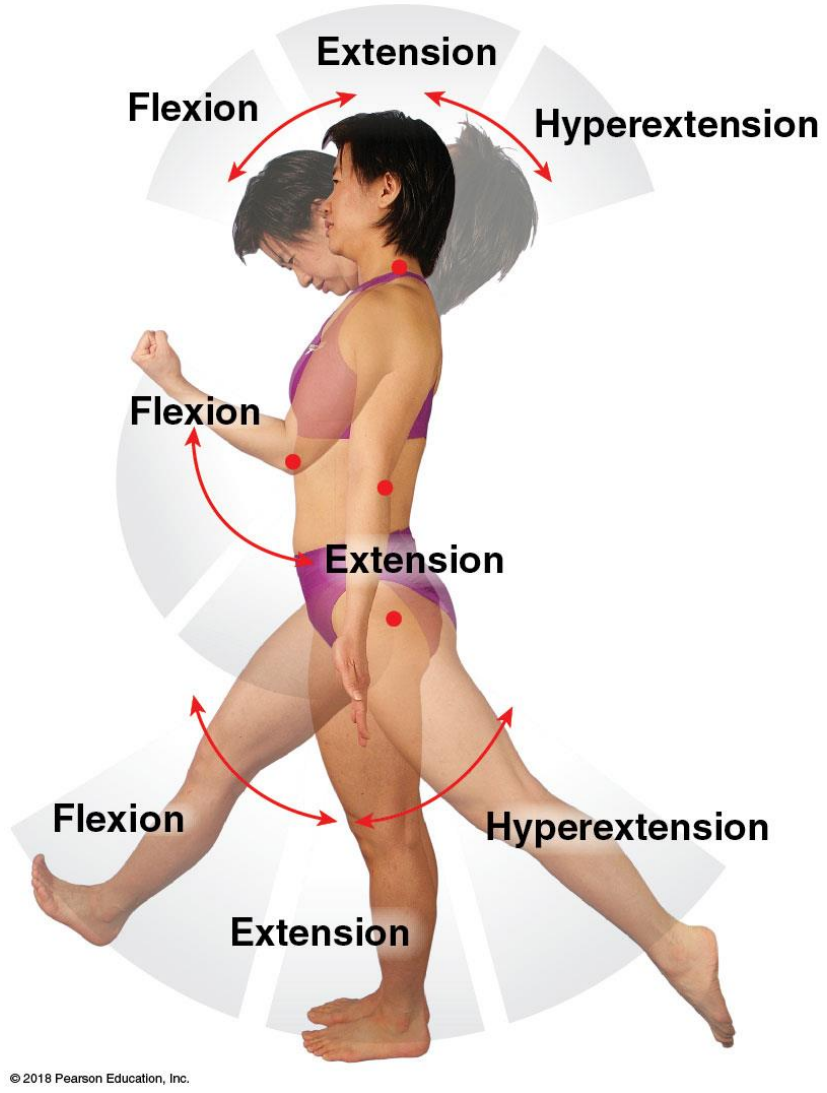
Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

Extension

- Increases angle



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

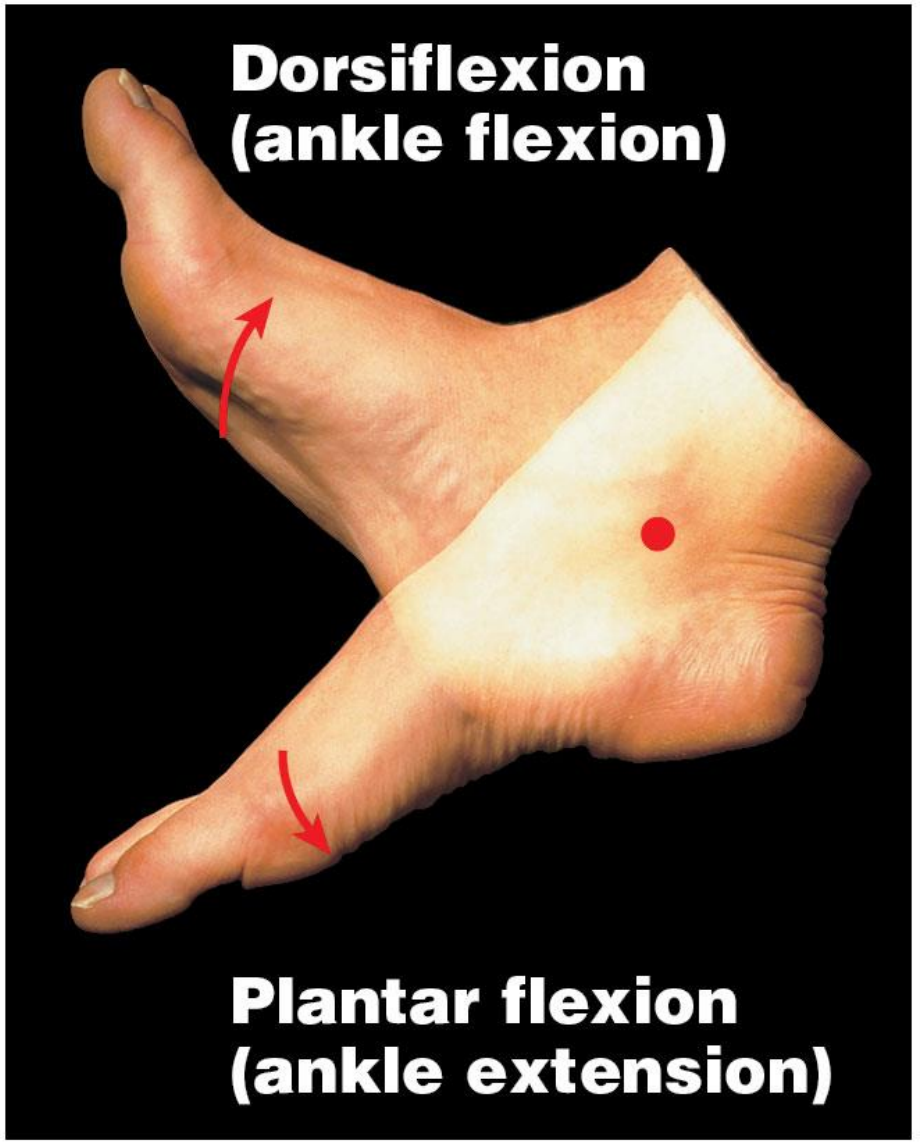
Foot movement in the sagittal plane:

Dorsiflexion

- Toes brought up towards face

Plantarflexion

- Toes pointing towards ground



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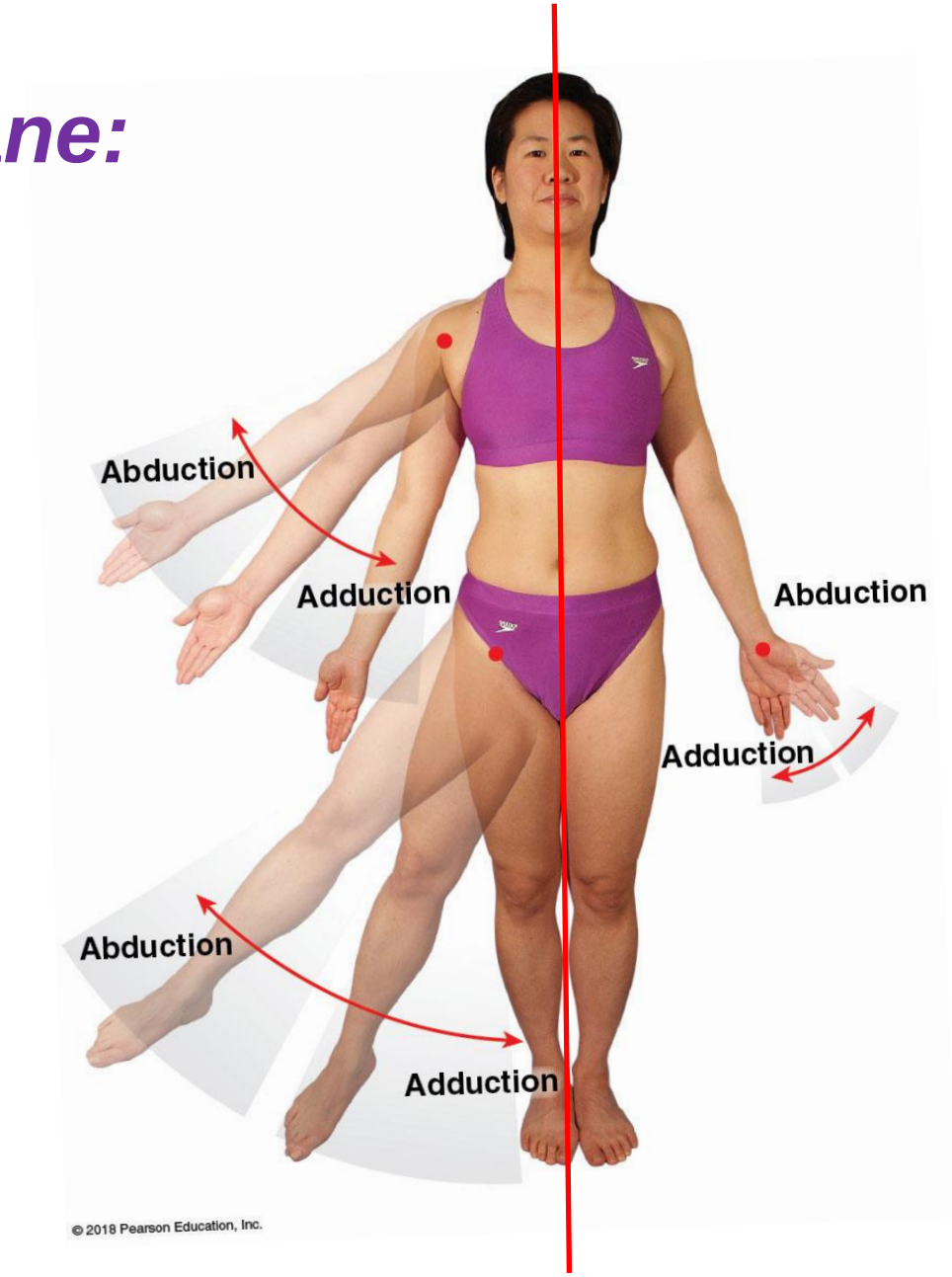
Movement in the coronal plane:

Abduction

- Movement **at joint** moves limb away from midline

Adduction

- Movement **at joint** moves limb towards midline



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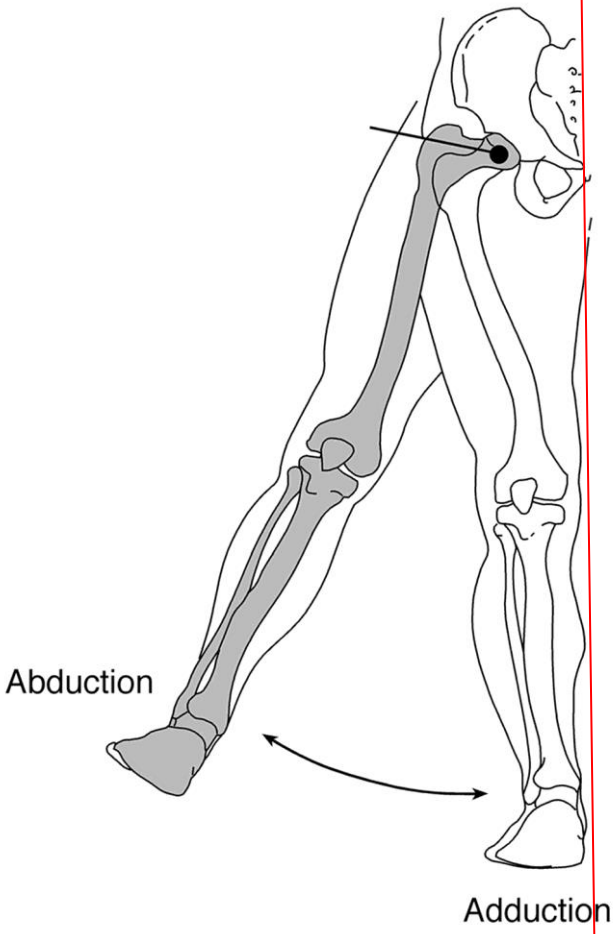
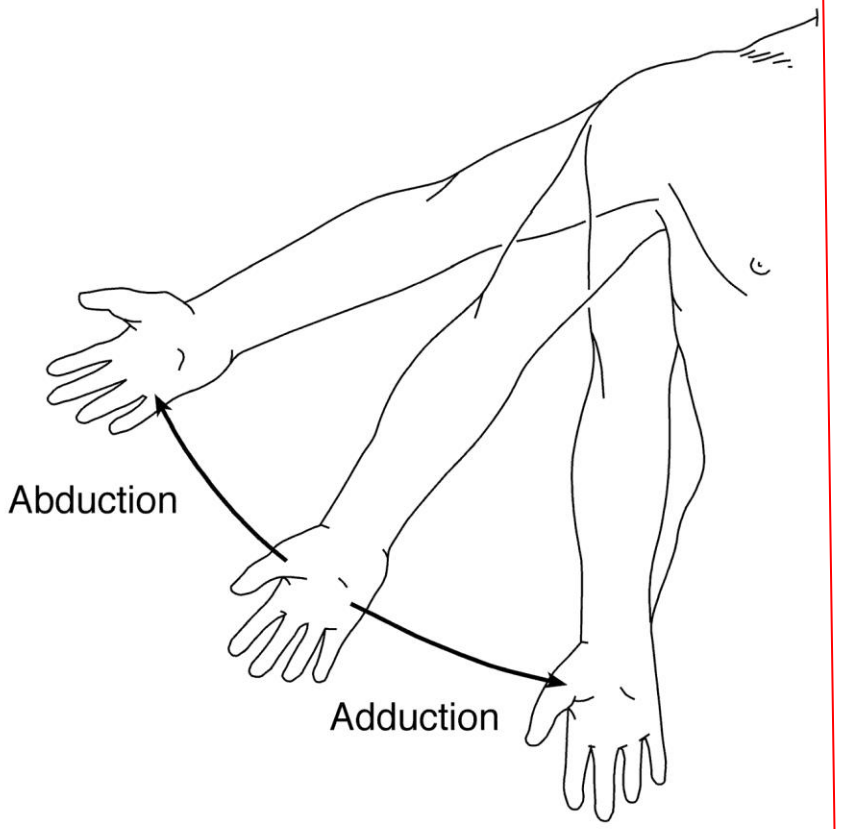




The movements of abduction and adduction

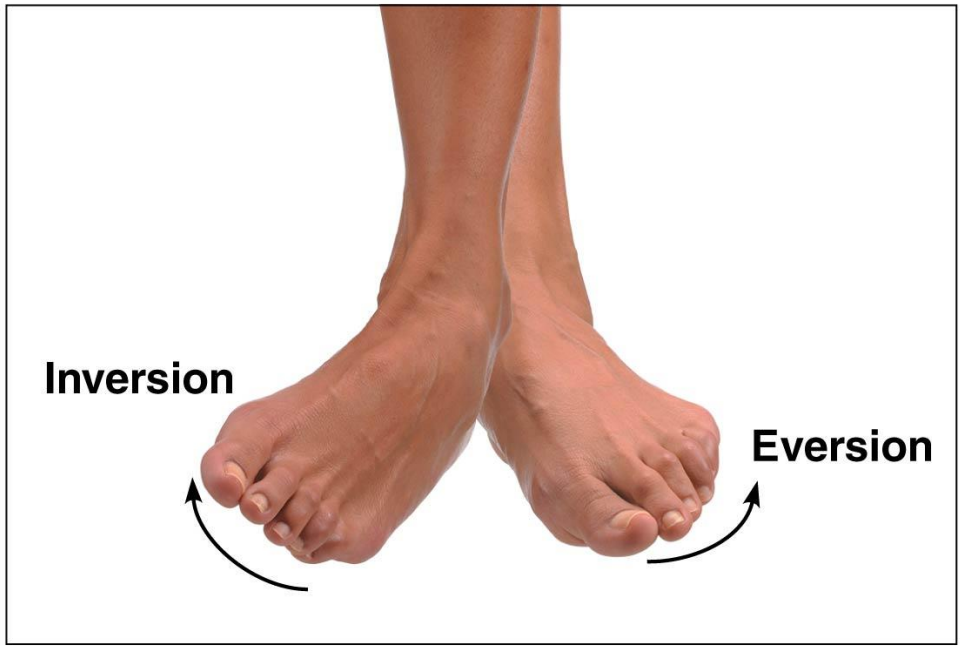
Foot movement in the coronal plane:

Inversion

- Sole of foot faces towards midline

Eversion

- Sole of foot turns away from midline

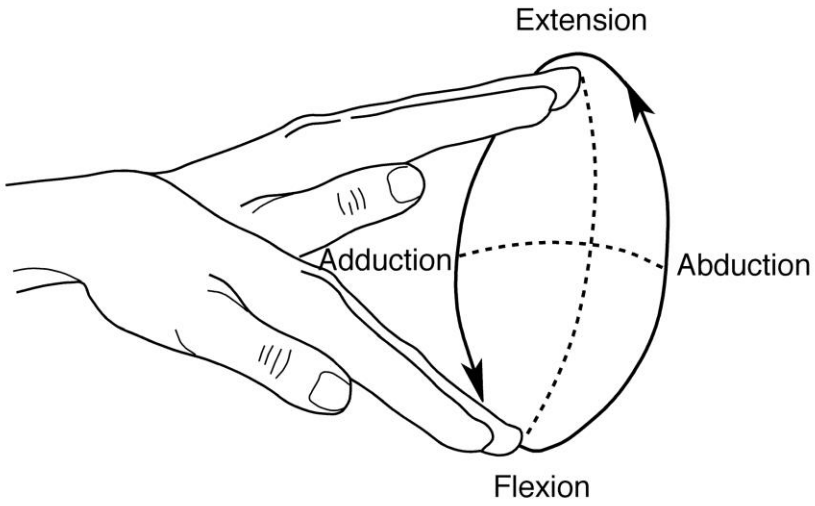


Marieb & Hoehn, *Human Anatomy & Physiology*, 10th Edn, 2018

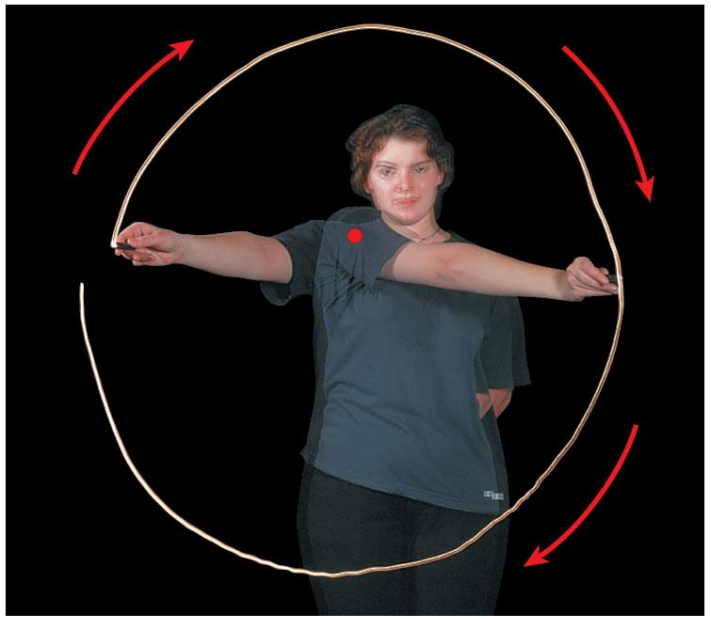
A less obvious example of abduction…

Circumduction

- **Combination** of four movements
- Flexion/abduction/extension/adduction
- **NO** rotation



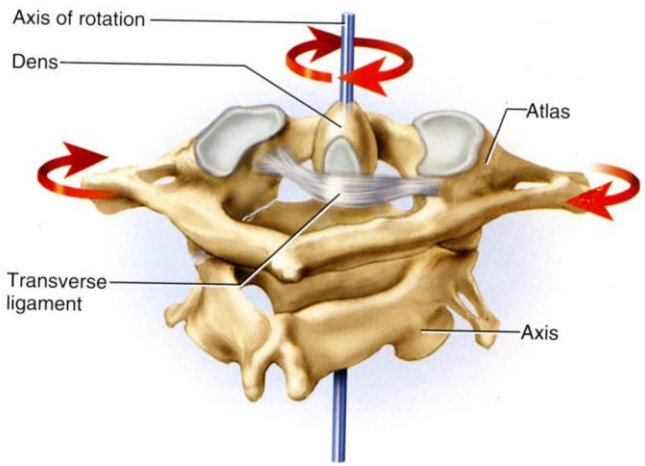
Anatomy Teaching Resources, University of Otago, 2011



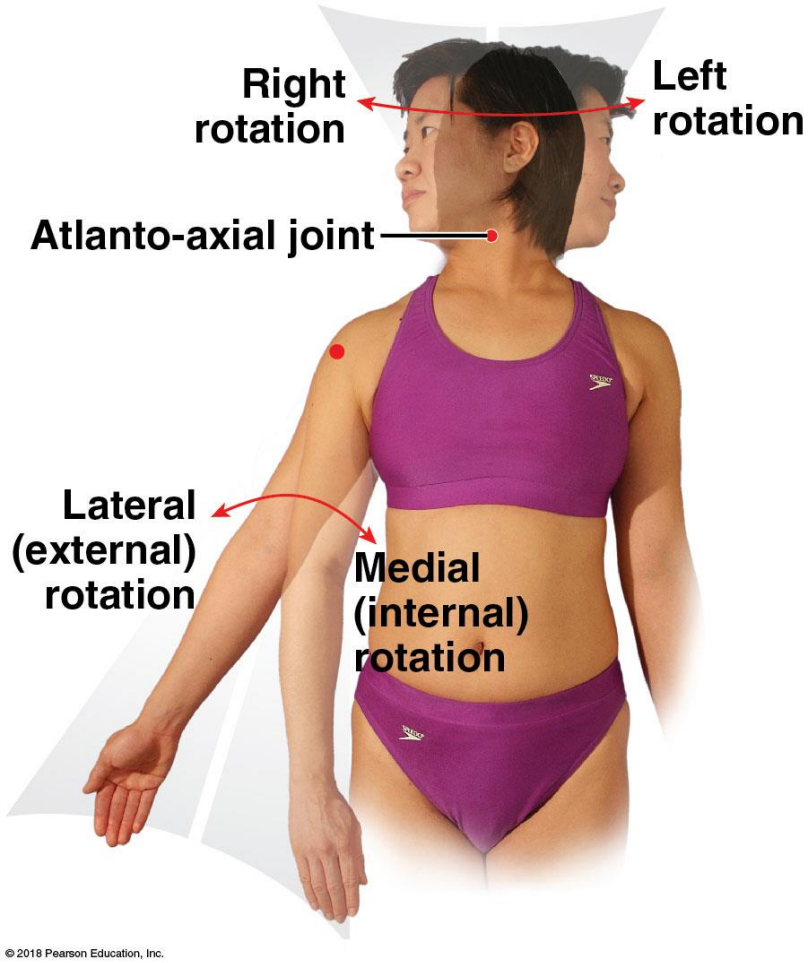
Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

Rotation

- Rotation around the long axis of a joint



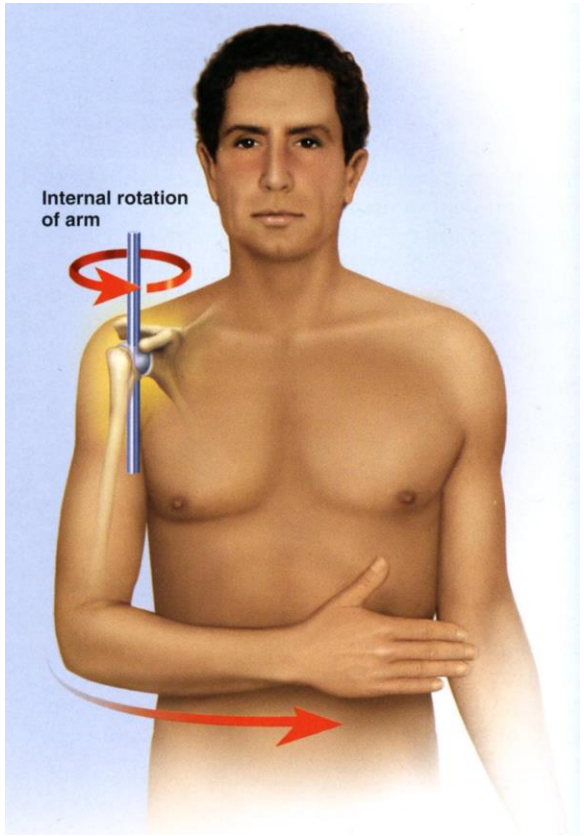
Saladin, *Anatomy & Physiology*, 4th Edn, 2007



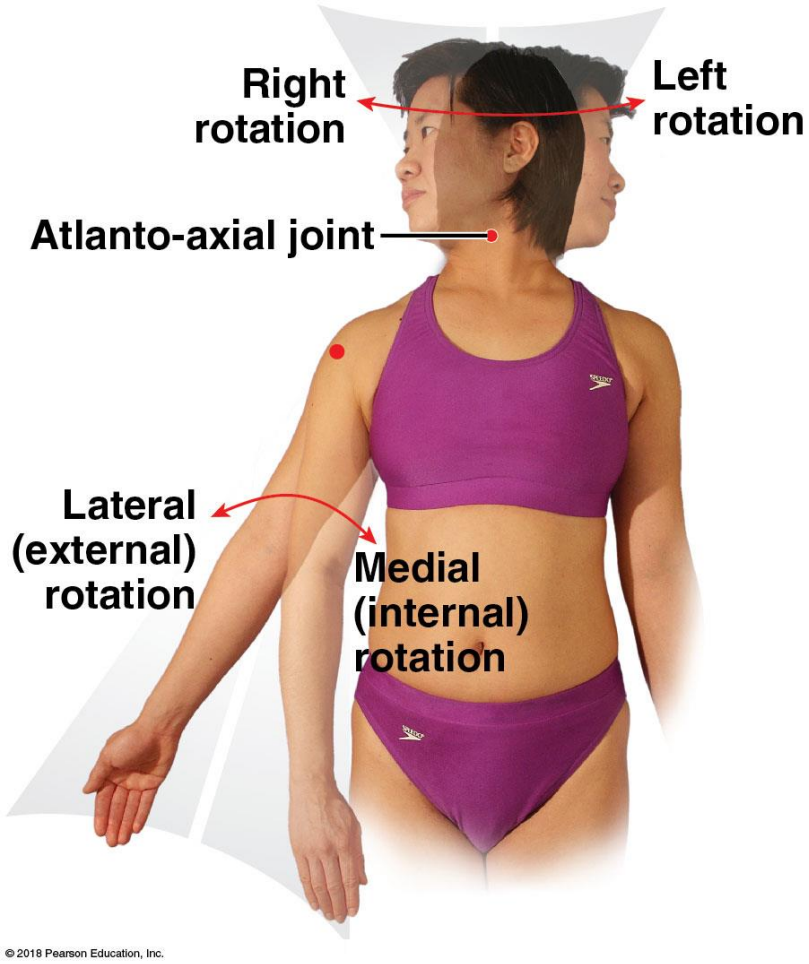
Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

Rotation

- Lateral (external)
- Medial (internal)



Saladin, *Anatomy & Physiology*, 4th Edn, 2007



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

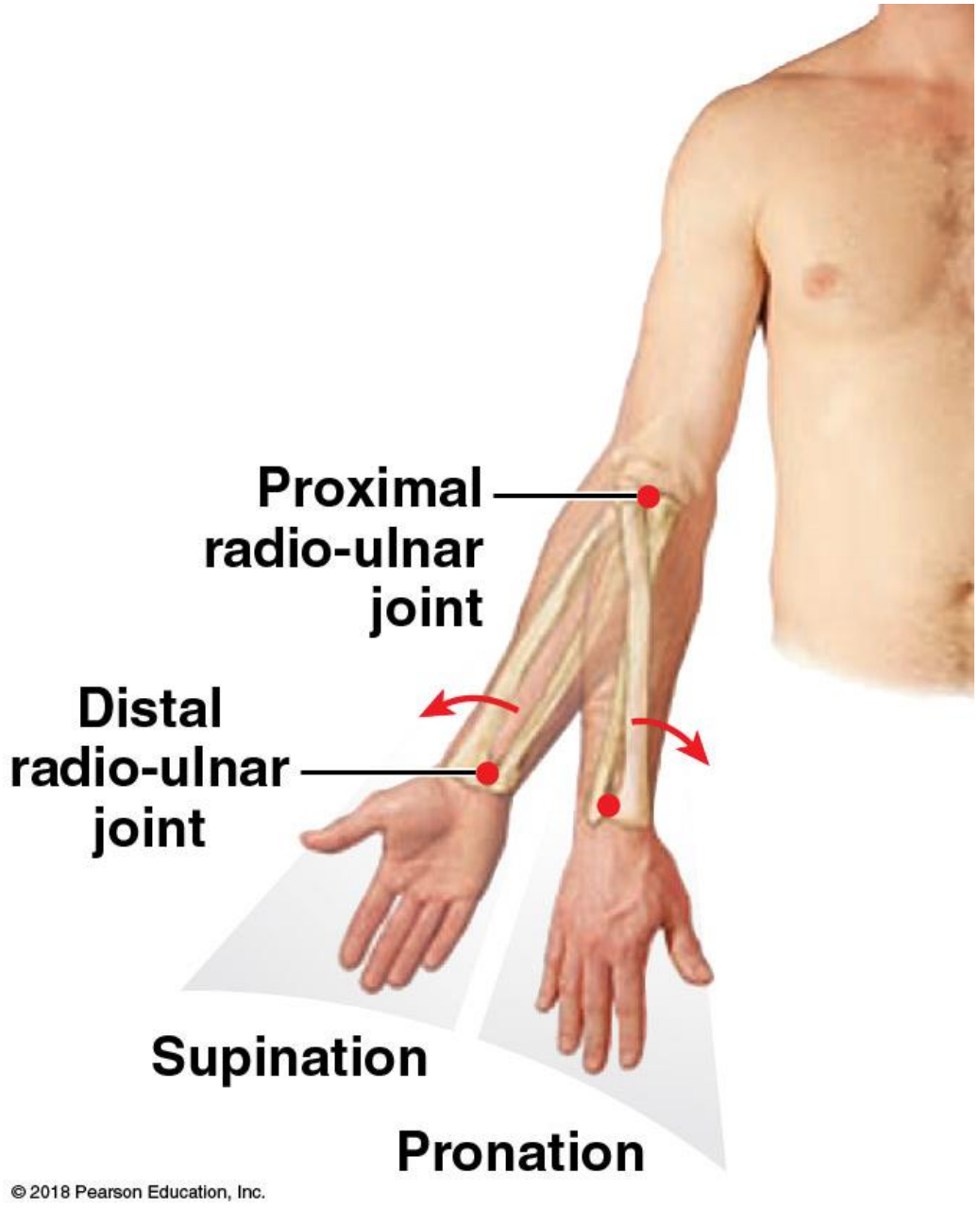
Specialised movements

Pronation

- Palm faces posterior

Supination

- Palm faces anterior and forearm bones parallel



Martini *et al*, *Visual Anatomy & Physiology*, 3rd Edn, 2018, p.83

Some homework:

- Practice using these new terminologies
  - Get into the habit of using scientific names for body parts/regions
- Practice the movements
- Write your own questions to test knowledge e.g.
  - The arm is _____ to the hand

a) Superior

b) Distal

c) Proximal

d) Lateral

Summary:

- Main concepts:
  - ***Homeostasis*** is the maintenance of “normal” set points of bodily functions
    - You will explore examples of these in later HUBS 191 lectures and laboratories
  - The ***anatomical position*** is a defined reference point for anatomy
  - The body can be ***sectioned*** in different ***planes***
  - Description of anatomical location is usually in ***relation*** to another structure for reference
    - i.e. nose is superior to chin; thumb is lateral to index finger
  - ***Movement*** of the body is defined by specific terminology
    - You will explore these terms in more detail in Laboratories 1 and 2

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HUBS191

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