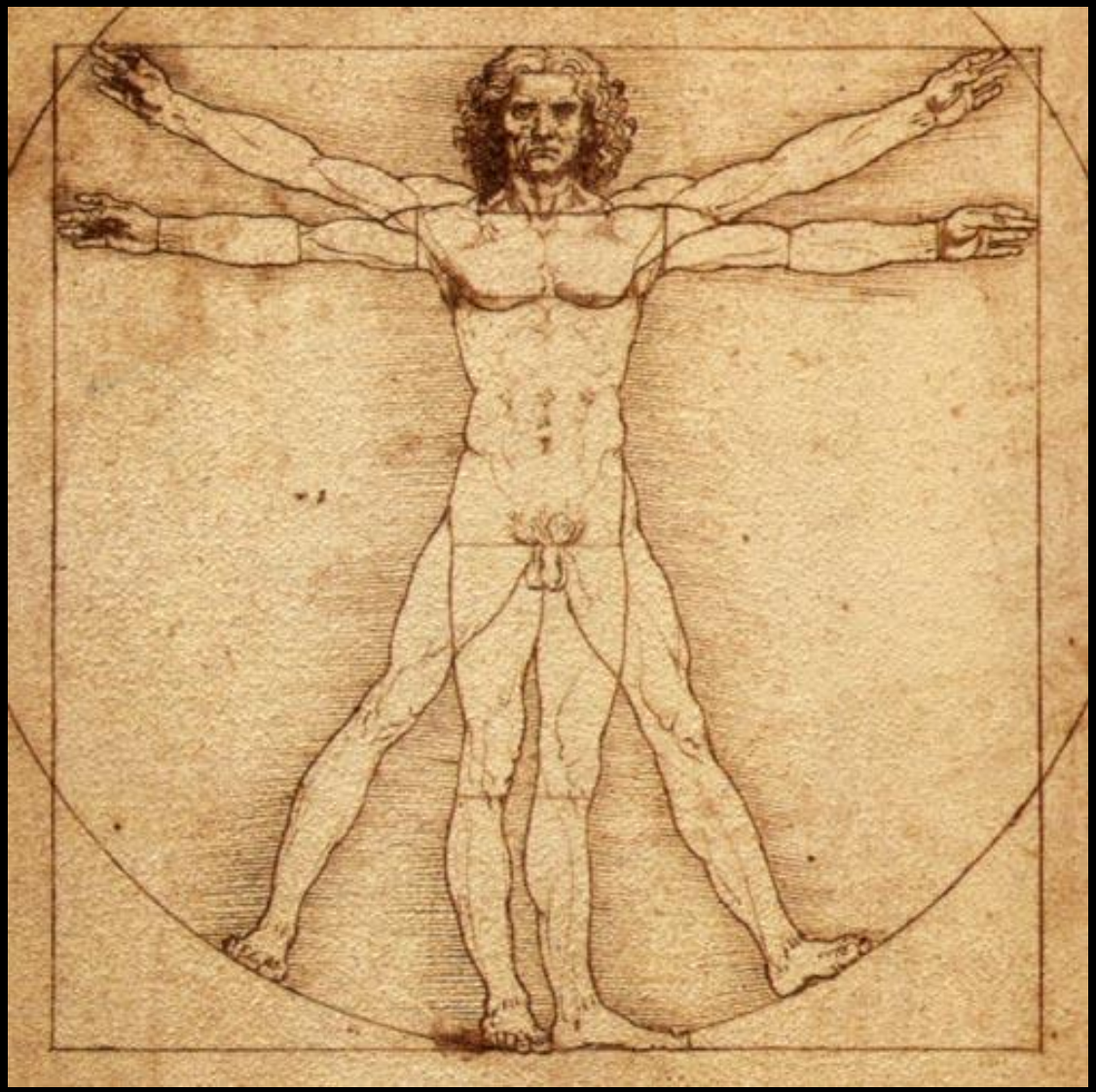
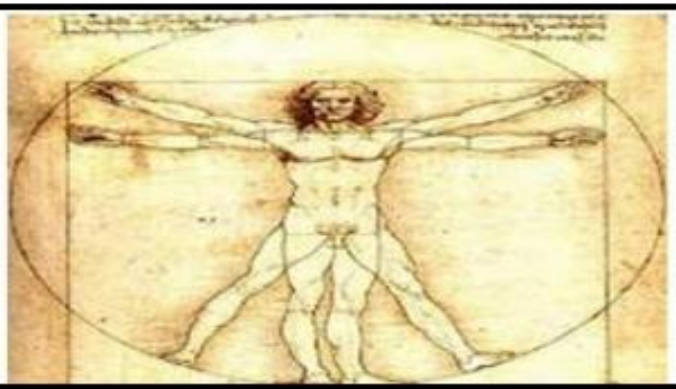
INTRODUCTION TO ANATOMY



Kaan Yücel M.D., Ph.D.

13. September 2013 Friday



Introduction to anatomy & Terminology in anatomy

Posted on September 2, 2013

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DR.KAAN YÜCEL'S AGENDA

Please check my weekly agenda before you ask for an appointment in order to ask your questions by sending an e-mail to yeditepeanatomy@yahoo.com

17.9.2013 Tuesday
14:00-15:50
FHS 121

20.9.2013 Friday
13:00-15:50
PHARMA ANATOMY

Yeditepe Anatomy in Social Media

- 

Easy Anatomy
- 
Yeditepe Anatomy @ Twitter
- 
Yeditepe Anatomy E-Lab
- 

Yeditepe Anatomy YouTube Channel

CONTACT INFORMATION

E-mail:
yeditepeanatomy@yahoo.com
Skype: yeditepeanatomy

Medical Dictionaries- in English & Turkish

- MediLugat
- Merriam Webster Dictionary

On-line Anatomy Atlases

- Get Body Smart
- Inner Body
- Netter Anatomy Atlas

Introduction to anatomy & Terminology in anatomy

Posted on September 2, 2013

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F.A.Q.

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yeditepeanatomy@yahoo.com yeditepeanatomy yeditepeanatomy

PRINTABLE VERSION: F.A.Q. PHARMA ANATOMY

1. What is anatomy? Why is so important for me as a student?

Anatomy is the medical dicipline which teaches you the structures in the body, their relationships at a macroscopic level. If your job is to deal with the illness of the patient, then you should know the "healthy" body well.

2. How do I study for your anatomy class?

Three steps:

1) Read the one-paged Overview at the Word Document ,i.e. the summary. (Do this at least, before the class)

2) Go over the Power Point slides

3) Read the Word Document. I will be using the Word Document while preparing your exam questions

I upload the class notes i.e. Word document and Power Point presentation @ the home page you see above, at least 24 hours before the class. You are responsible from the Word documents. Anatomy is repeating the knowledge.

http://yeditepepharmanatomy.wordpress.com/schedule

13.September.2013 FRIDAY

13:00-15:50 Introduction to anatomy & Terminology in anatomy

20. September.2013 FRIDAY

13:00-15:50 Osteology (Bones)

27.September.2013 FRIDAY

13:00-15:50 Articulations in the body

4. October.2013 FRIDAY

13:00-15:50 Muscles in the body

11.October.2013 FRIDAY

13:00-15:50 Thoracic wall & Anatomy of the Cardiovascular System

25.October.2013 FRIDAY

13:00-15:50 Anatomy of the Respiratory System

1. November.2013 FRIDAY

13:00-15:50 MIDTERM

8.November.2013 FRIDAY

13:00-15:50 Anatomy of the Digestive System

15.November.2013 FRIDAY

13:00-15:50 Anatomy of the Digestive System

22.November.2013 FRIDAY

13:00-15:50 Anatomy of the Exretatory System & Anatomy of the Reproductive System

29. November.2013 FRIDAY

13:00-15:50 Anatomy of the Endocrine System & Anatomy of the Nervous System

6.December.2013 FRIDAY

13:00-15:50 Anatomy of the Nervous System

13.December.2013 FRIDAY

13:00-15:50 Anatomy of the Nervous System & Discussion

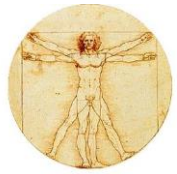
1. INTRODUCTION TO ANATOMY

1.1. DEFINITION OF ANATOMY
1.2. TYPES OF ANATOMY
1.3. THE IMPORTANCE OF LEARNING ANATOMY AS A FUTURE PHARMACIST
1.4. WAYS OF LEARNING ANATOMY
1.5. HISTORY OF ANATOMY
1.5. POPULAR ANATOMY TEXTBOOKS AND ATLASES
1.6. ANATOMICAL POSITION
1.7. ANATOMICAL VARIATIONS

2. TERMINOLOGY IN ANATOMY

2.1. TERMS RELATED TO POSITION
2.2. TERMS OF LATERALITY
2.3. TERMS OF MOVEMENT
2.4. POSITIONS OF THE BODY

DEFINITION OF ANATOMY



"anatomia, anatome"

Latin and Ancient Greek origin.

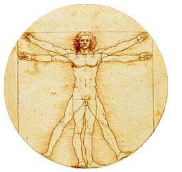
ana-= up

temnein, tome=to cut

Anatomy means "*cutting up, cutting through*".

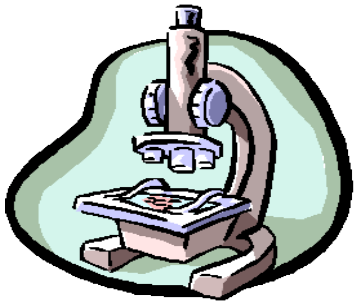
human anatomy

gross anatomy

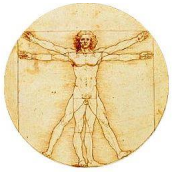


- consideration of the various structures which make up the human organism.
- developed individual
- naked eye

Histology
Embryology

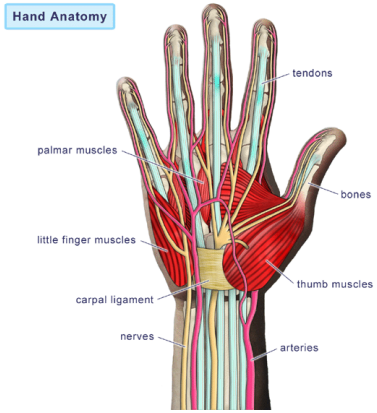


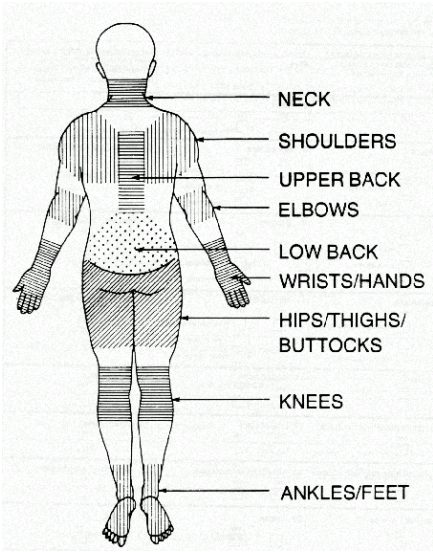
TYPES OF ANATOMY



1) REGIONAL ANATOMY

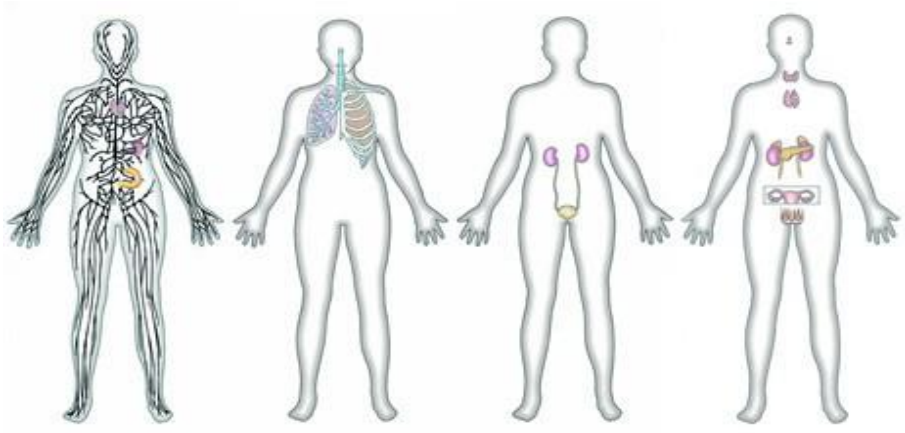
Topographical anatomy





2) SYSTEMATIC ANATOMY

Skeletal system
Joints
Muscular System
Cardiovascular System
Lympathic system
Nervous system



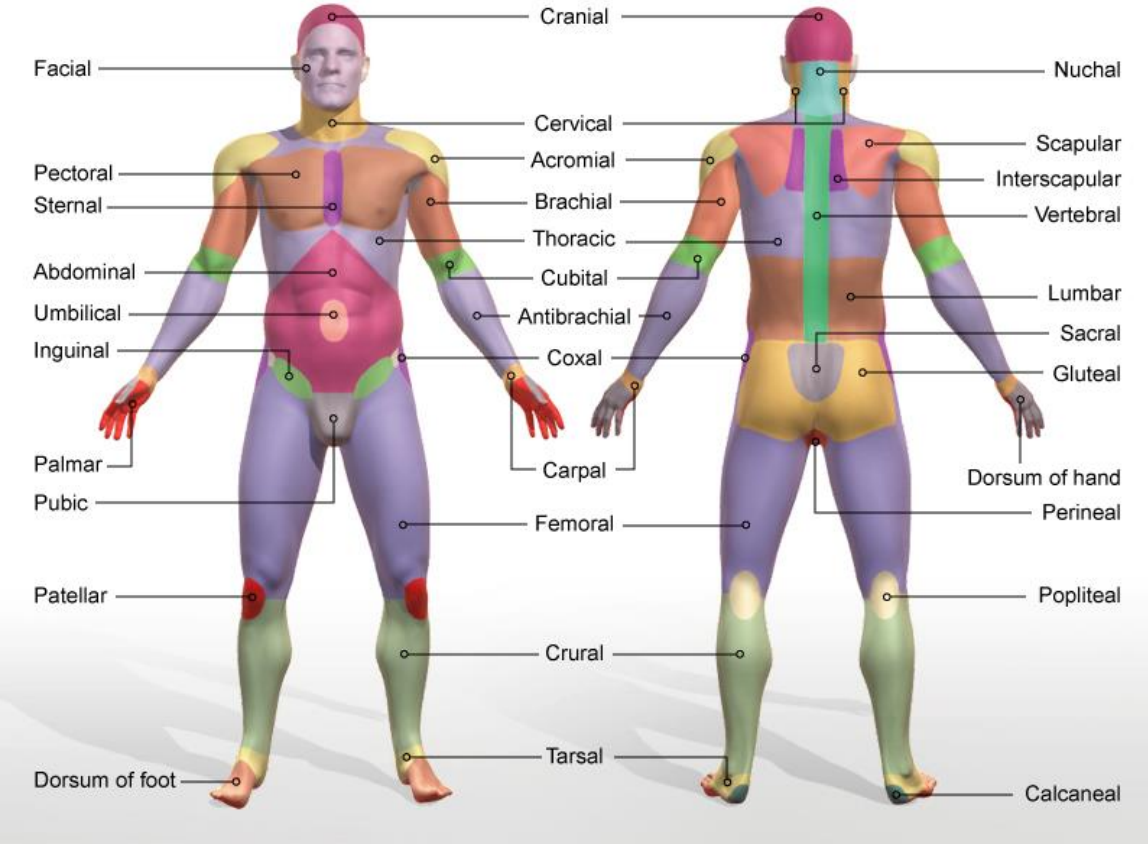
3) CLINICAL ANATOMY

Applied anatomy

REGIONAL ANATOMY

Topographical anatomy

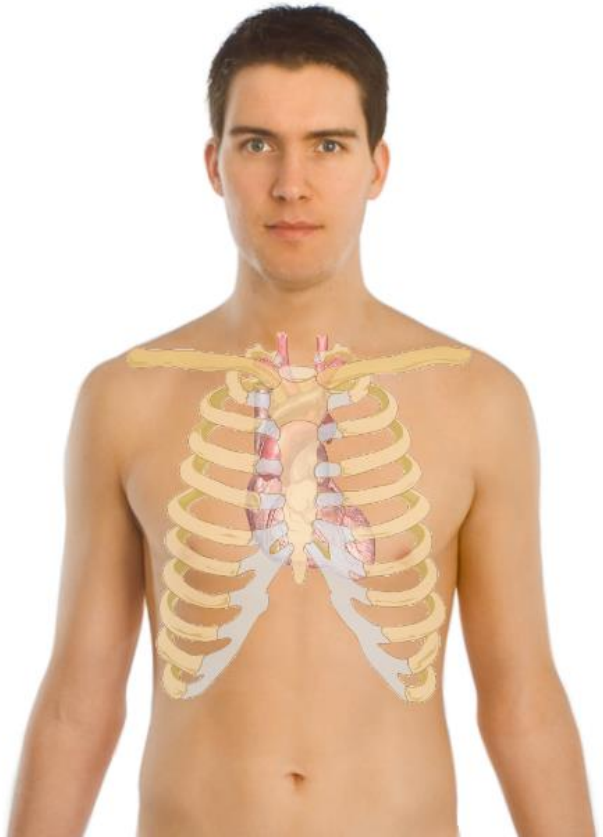
- Organization of the human body as major parts or segments
- Major parts may be further subdivided into areas and region.



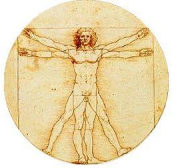
Surface anatomy

part of the regional anatomy

- knowledge of what lies under the skin
- what structures are perceptible to touch (palpable) in the living body at rest and in action.

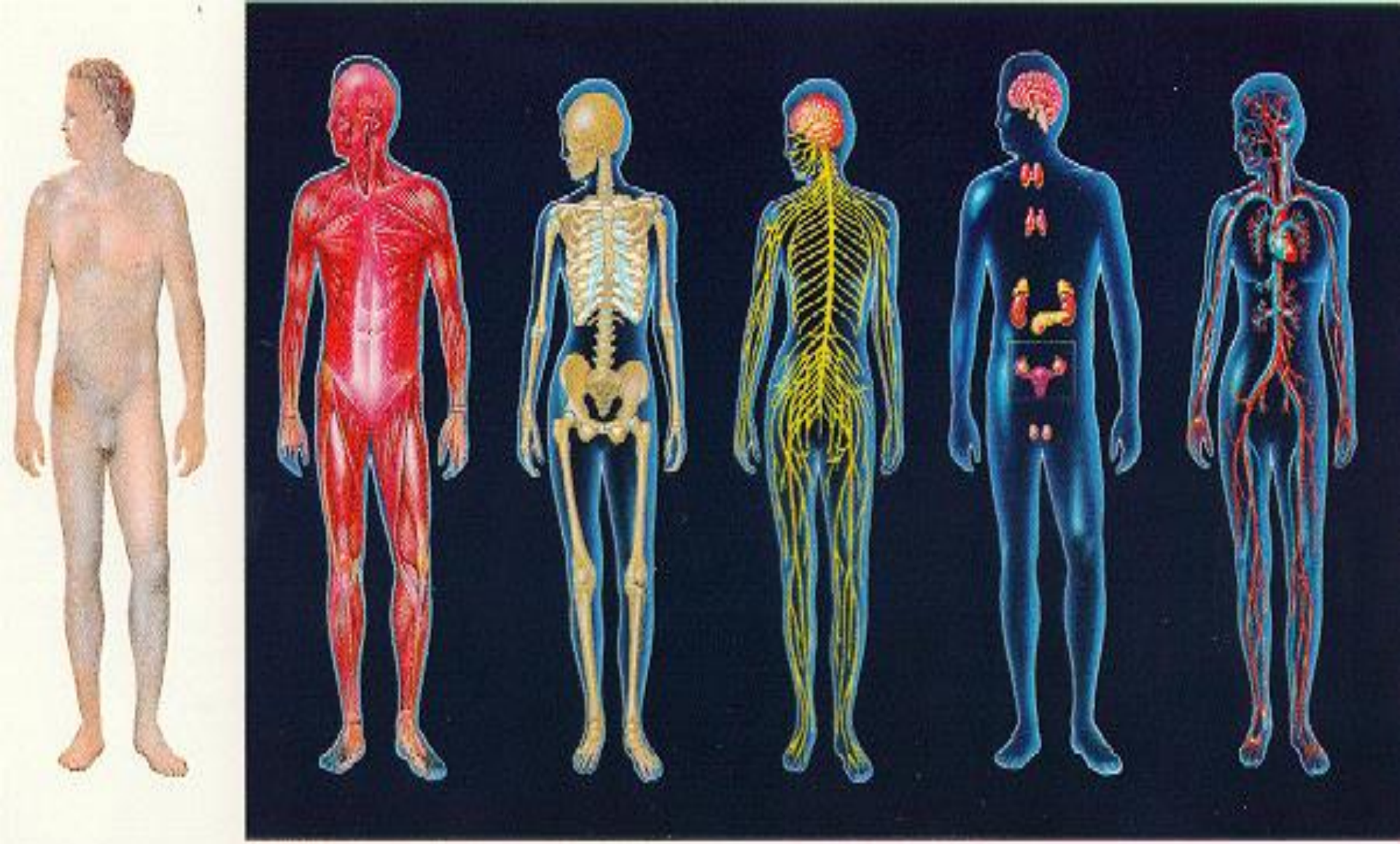


Systematic Anatomy



The various systems of which the human body:

Osteology—the bony system or skeleton.
Syndesmology—the articulations or joints.
Myology—the muscles.
Angiology—the vascular system, comprising the heart, blood vessels, lymphatic vessels, and lymph glands.
Neurology—the nervous system. The organs of sense may be included in this system.
Splanchnology—the visceral system.



Integu-
mentary
System

Muscular
System

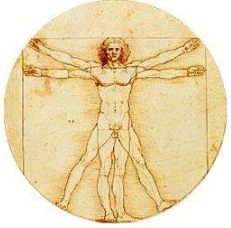
Skeletal
System

Nervous
System

Endocrine
System

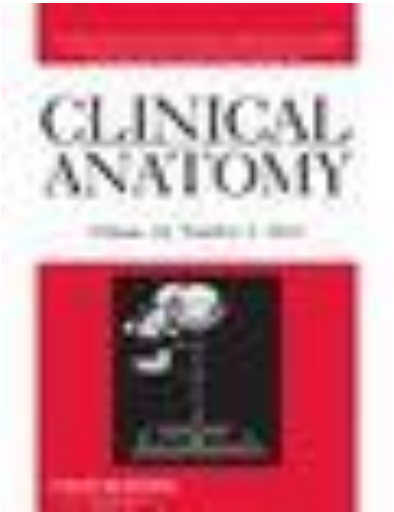
Circulatory
System

Clinical Anatomy

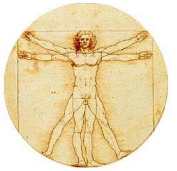


- Clinical (applied) anatomy emphasizes aspects of bodily structure and function important in the practice of medicine, dentistry, and the allied health sciences.

- It incorporates the regional and systemic approaches to studying anatomy and stresses clinical application.



The importance of learning anatomy as a future pharmacist

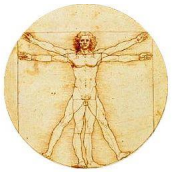


- To understand bodily function and how both structure and function are modified by disease.

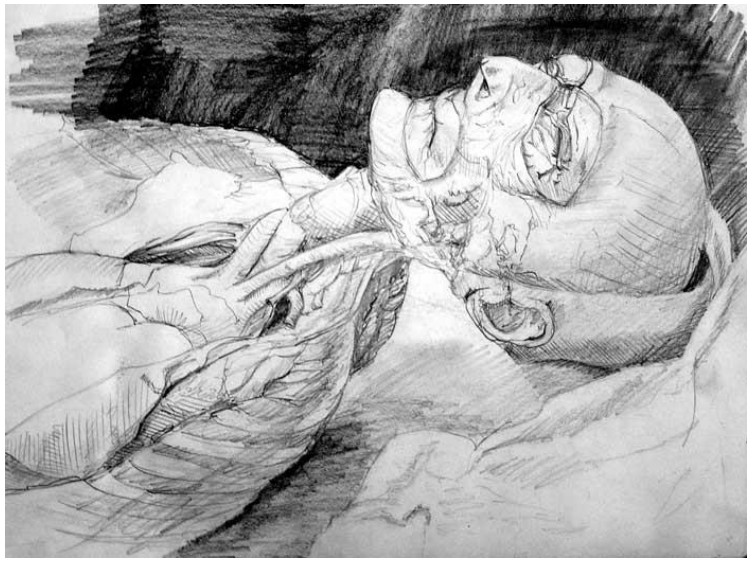
- To understand the pathway for targeting therapy to a specific site

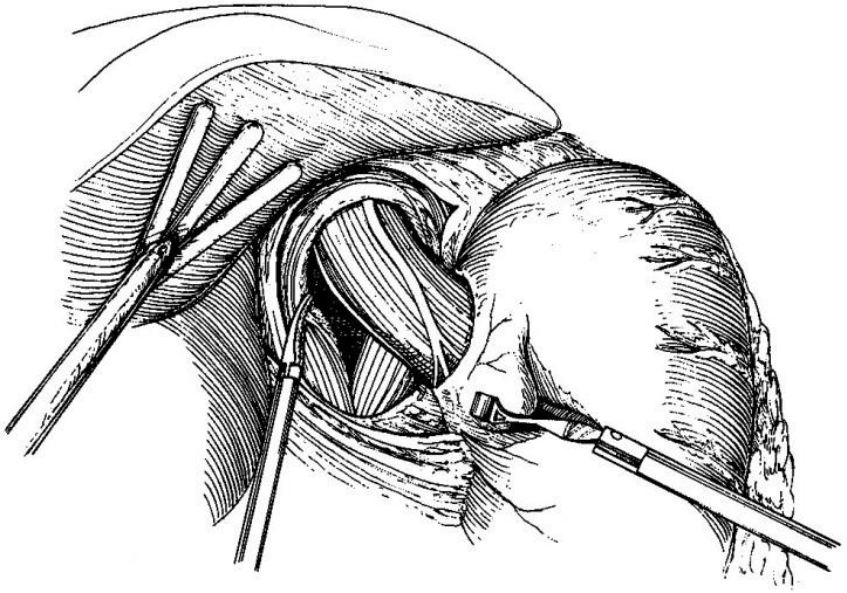
- To communicate with the colleagues properly

How to learn anatomy



Cadaver: (Merriam Webster dictionary) from Latin, from *cadere* 'to fall'. A dead body; *especially* : one intended for dissection.





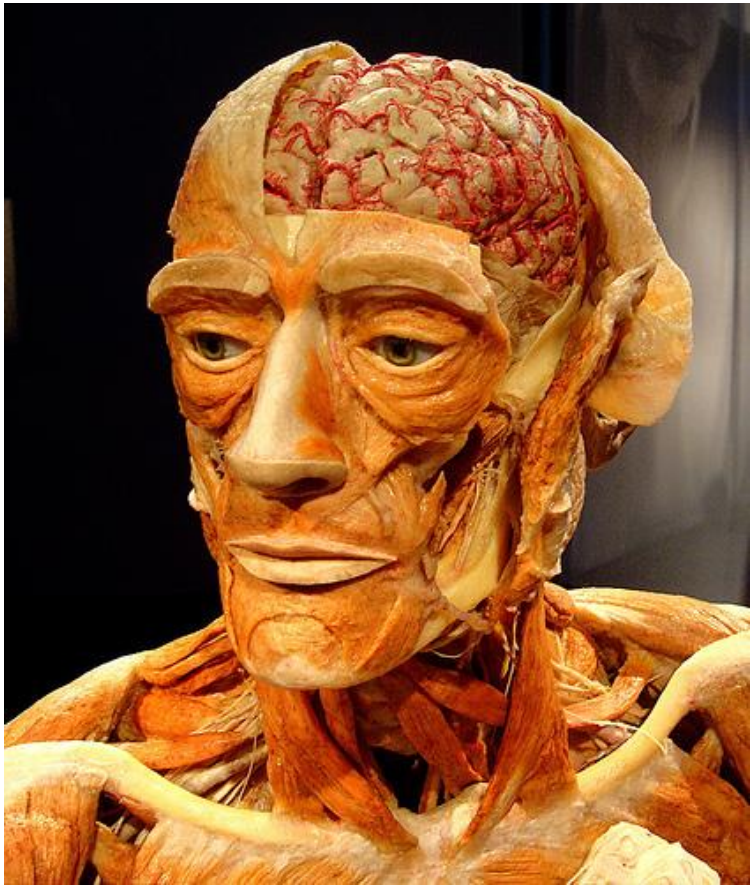
Dissection: (Oxford dictionary) from Latin *dissectus,* past participle of *dissecare* to cut apart, from *dis-* + *secare* to cut. The action of dissecting a body or plant to study its internal parts.

Etymology

c.1500, from L. cadaver "dead body (of men or animals)," probably from a perf. part. of cadere "to fall, sink, settle down, decline, perish«

How to learn anatomy

Prosection: A prosection is the dissection of a cadaver (human or animal) or part of a cadaver by an experienced anatomist in order to demonstrate for students anatomic structure.

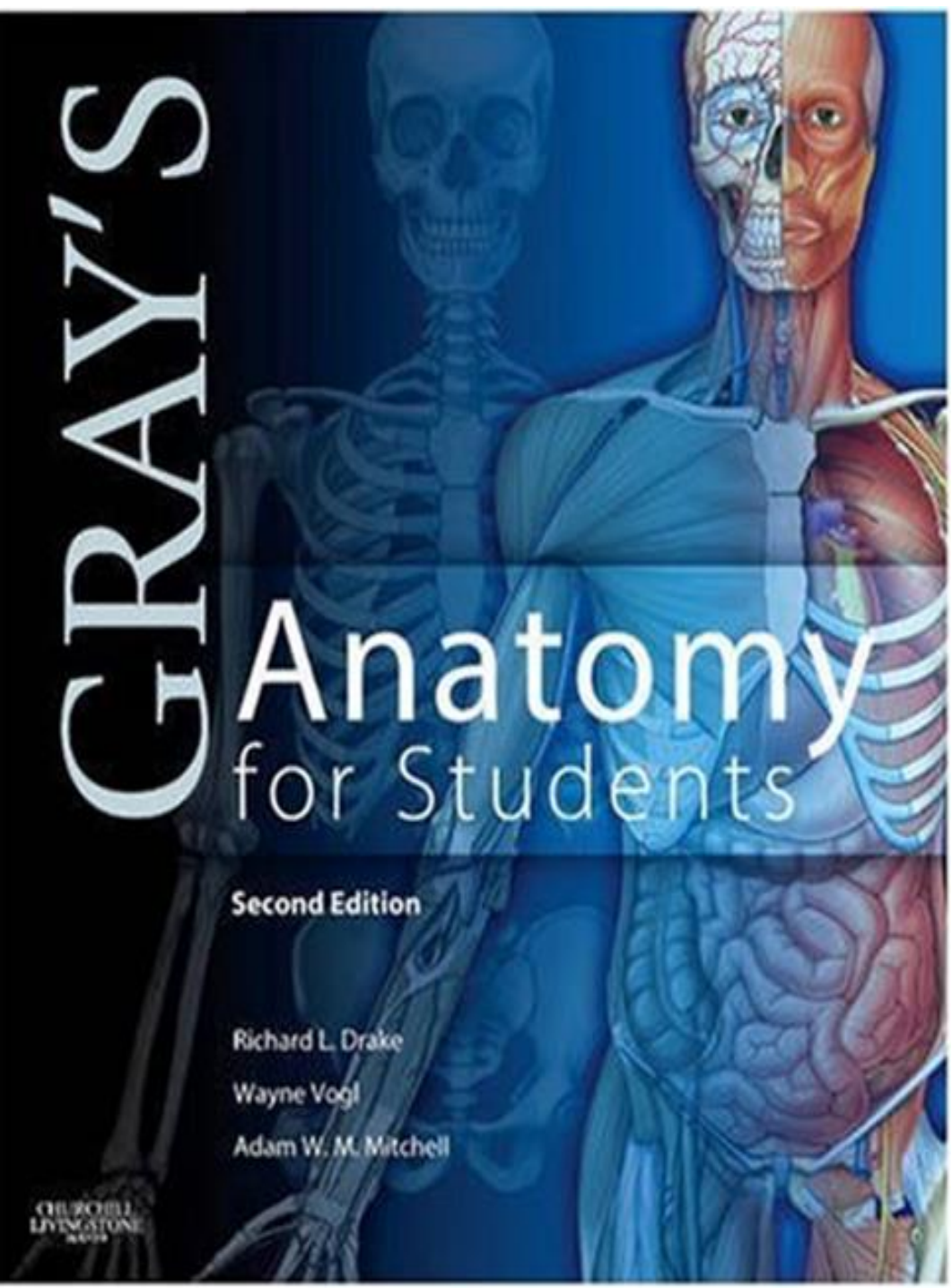


flexor carpi radialis
Palmaris longus
flexor carpi ulnaris

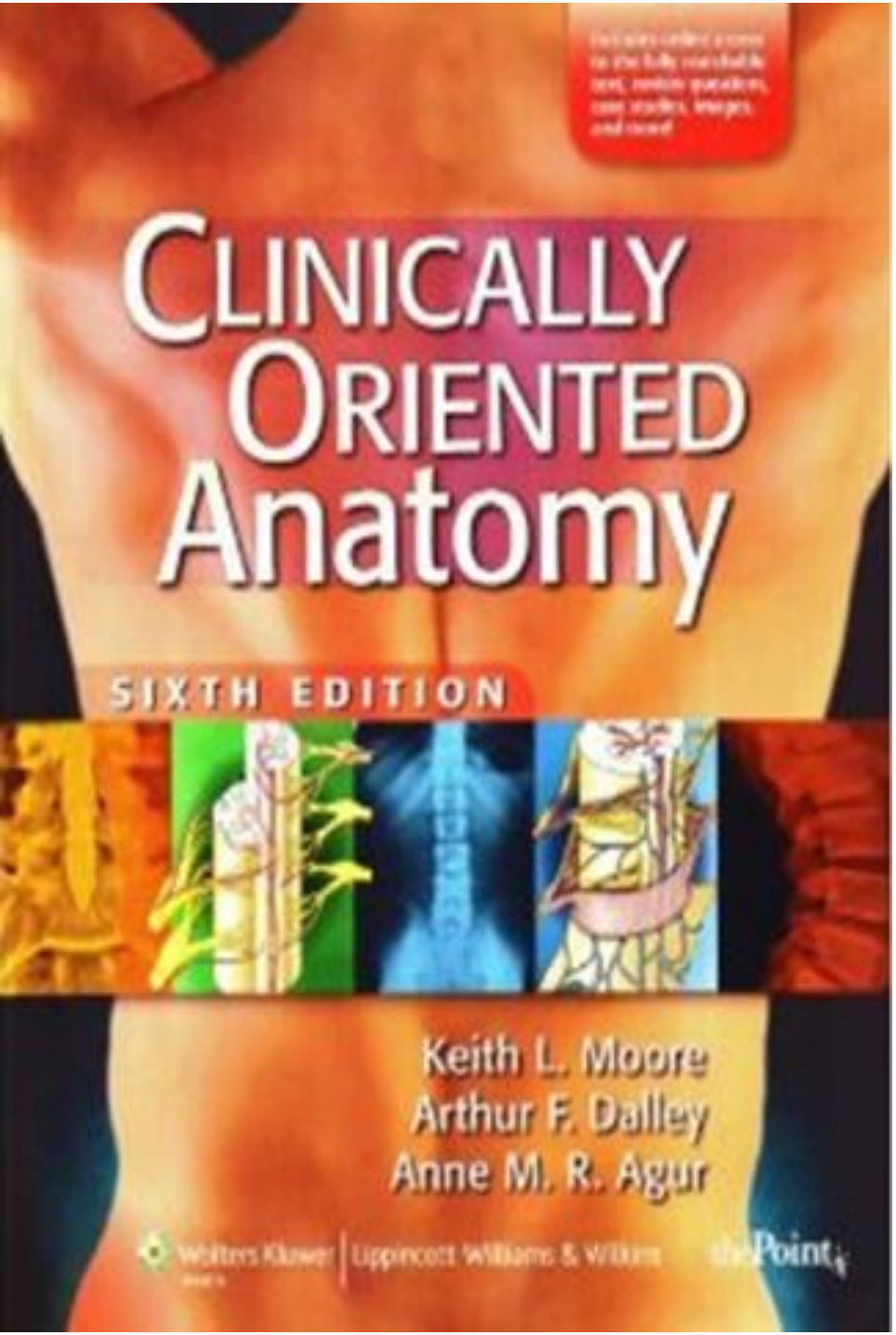
Popular Anatomy Books & Atlases

MOORE
SNELL
GRAY'S ANATOMY

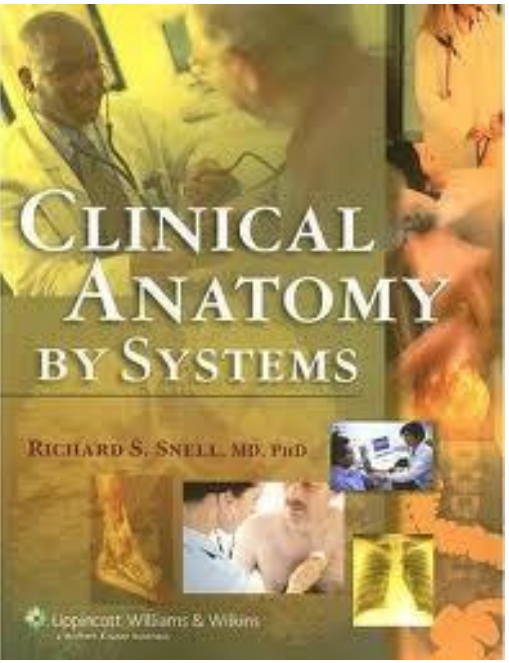
SOBOTTA
NETTER
GRANT



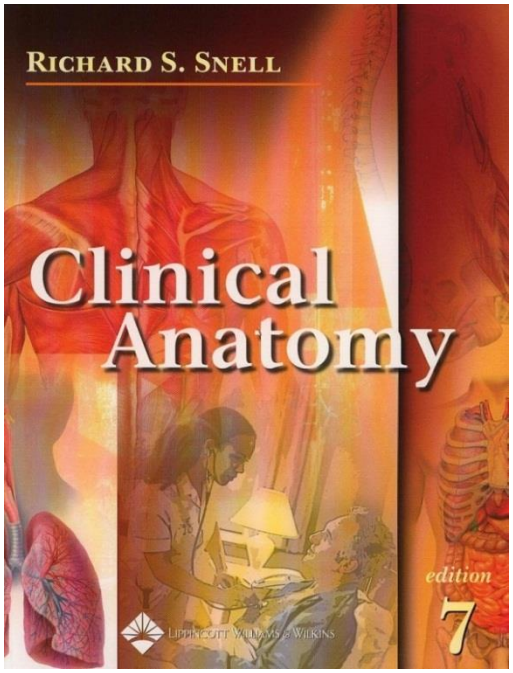
Gray's Anatomy for Students
Richard L. Drake, A. Wayne Vogl, Adam W. M. Mitchell
2nd edition, 2009, Churchill Livingstone, USA



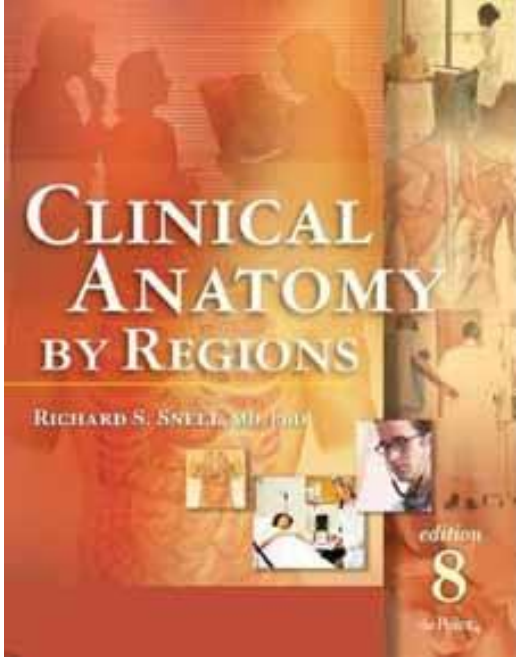
Clinically Oriented Anatomy
Keith L. Moore, Arthur F. Dalley II, Anne M. R. Agur
First Edition, 1980
Sixt (the most recent) Edition, 2010, Lippincott Williams & Wilkins
Philadelphia, USA



Clinical anatomy by systems
Richard S. Snell
2006, Lippincott Williams & Wilkins
Philadelphia, USA



Clinical anatomy for medical students
Richard S. Snell 7th edition, 2000, Lippincott Williams & Wilkins
Philadelphia, USA



Clinical Anatomy by Regions
Richard S. Snell
8th edition, 2007, Lippincott Williams & Wilkins Philadelphia, USA

ANATOMİ

1. Cilt

- Kemikler
- Eklemler
- Kaslar
- İç Organlar

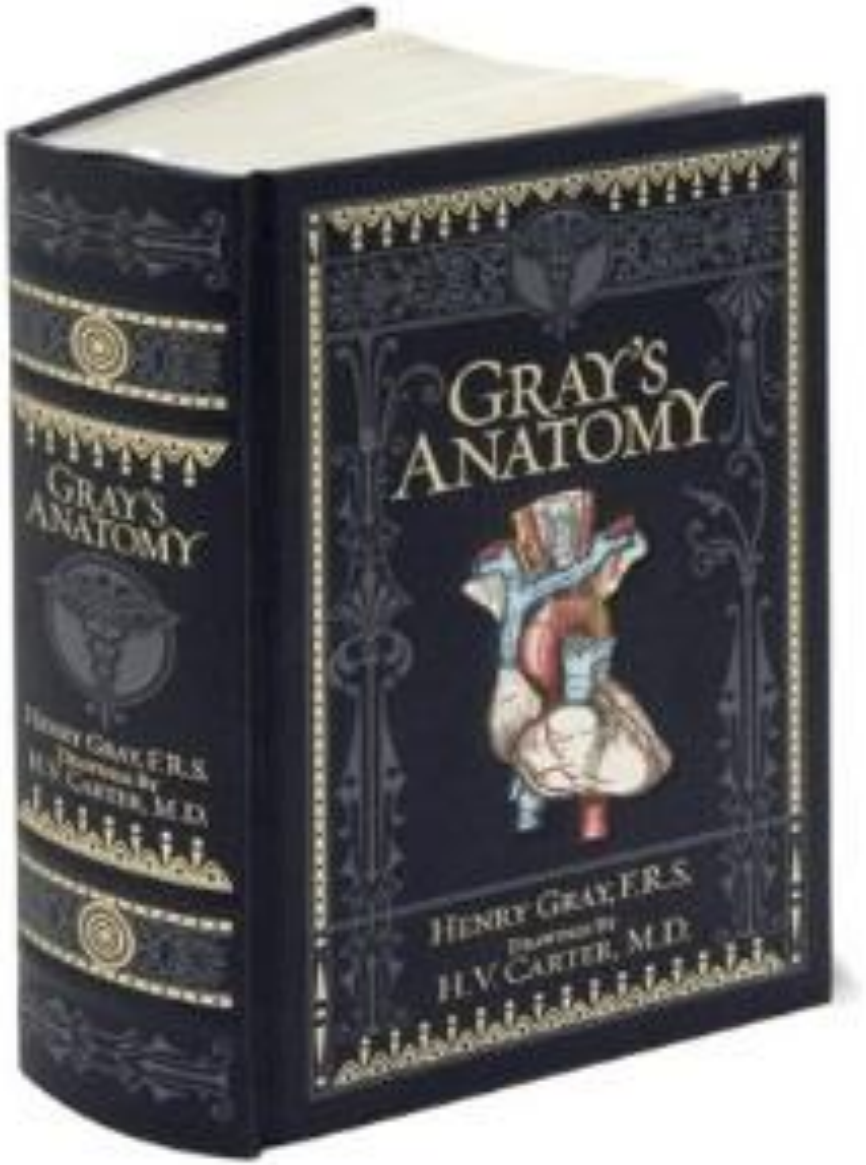
Prof. Dr. Kaplan ARINCI
Prof. Dr. Alaittin ELHAN

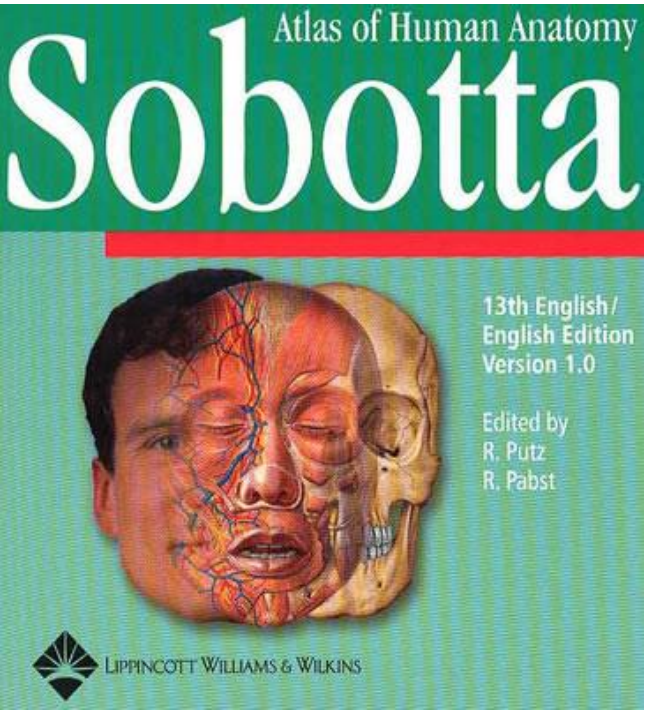
ANATOMİ

2. Cilt

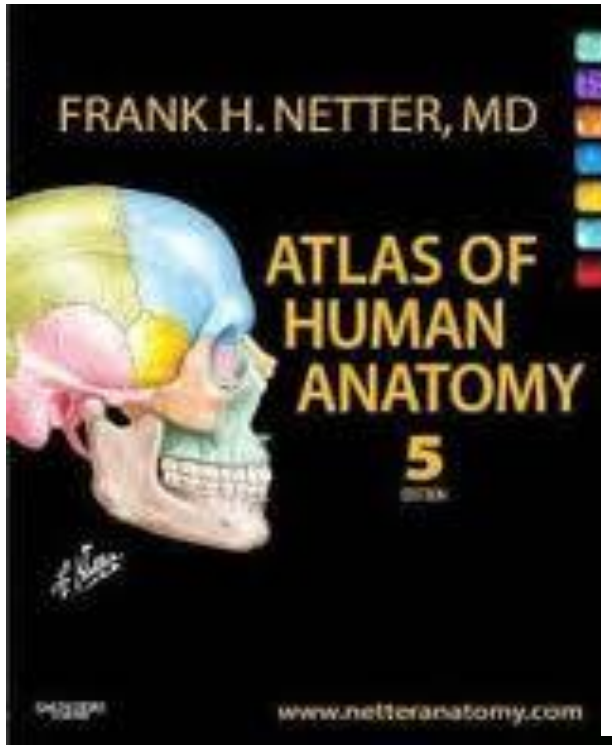
- Dolaşım Sistemi
- Periferik Sinir Sistemi
- Merkezî Sinir Sistemi
- Duyu Organları

Prof. Dr. Kaplan ARINCI
Prof. Dr. Alaittin ELHAN

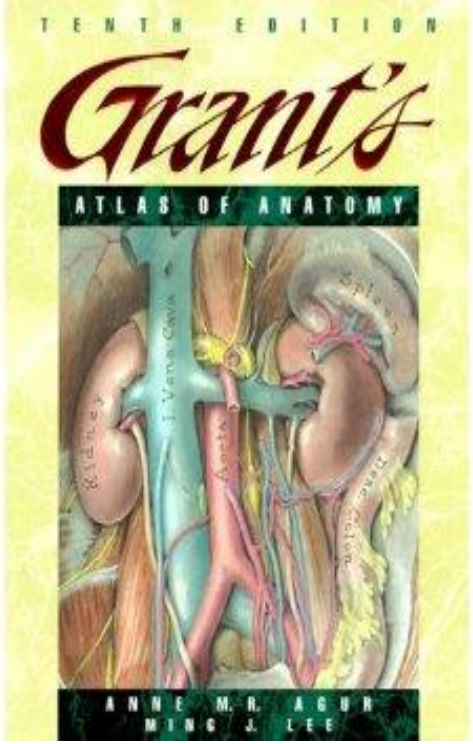

GRAY'S ANATOMY
HENRY GRAY, F.R.S.
H.V. CARTER, M.D.
GRAY'S ANATOMY



Sobotta - Atlas of Human Anatomy Single Volume Edition, Head, Neck, Upper Limb, Thorax, Abdomen, Pelvis, Lower Limb
Reinhard Putz
2009, 14th Edition, Churchill Livingstone, Edinburgh, Scotland



Netter's Atlas of Human Anatomy, with Student Consult Access
Frank H. Netter
2010, 5th Edition, Saunders, USA

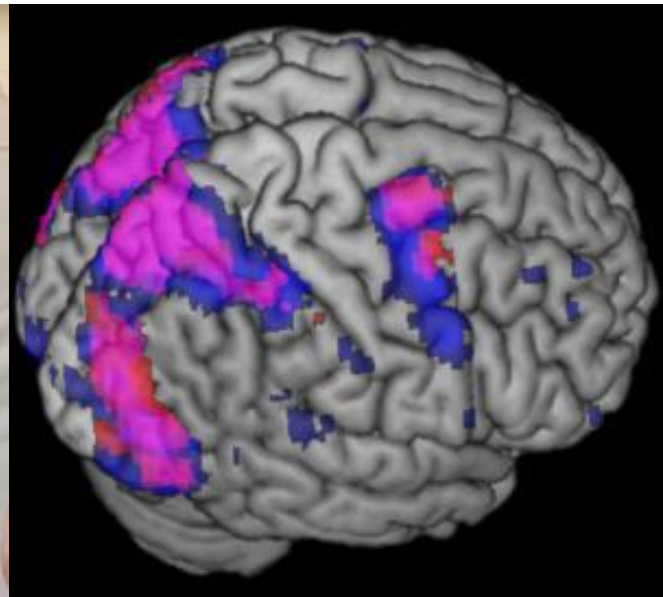


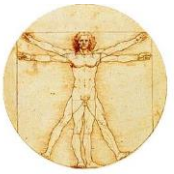
Grant' Atlas of Anatomy
Anne M.R. Agur
Arthur F. Dalley II
2009, 12th Edition, Lippincott Williams & Wilkins Philadelphia, USA

History of anatomy in the world

- The development of anatomy as a science extends from the earliest examinations of sacrificial victims to the sophisticated analyses of the body performed by modern scientists.

- It has been characterized, over time, by a continually developing understanding of the functions of organs and structures in the body.

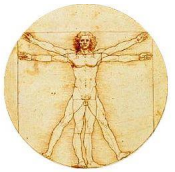




- The field of Human Anatomy has a prestigious history, and is considered to be the most prominent of the biological sciences of the 19th and early 20th centuries.

- Methods have also improved dramatically, advancing from examination of animals through dissection of cadavers to technologically complex techniques developed in the 20th century.

Ancient anatomy

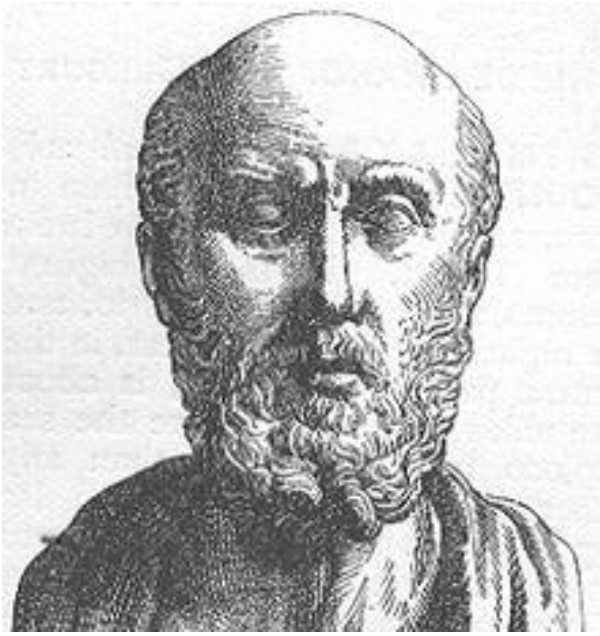


Egypt

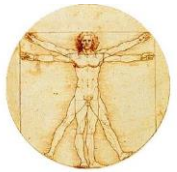
The study of anatomy begins at least as early as 1600 BCE.

Greece

The earliest medical scientist of whose works any great part survives today is Hippocrates (460 - 377 BCE).
Much of his work relies on speculation rather than empirical observation of the body.



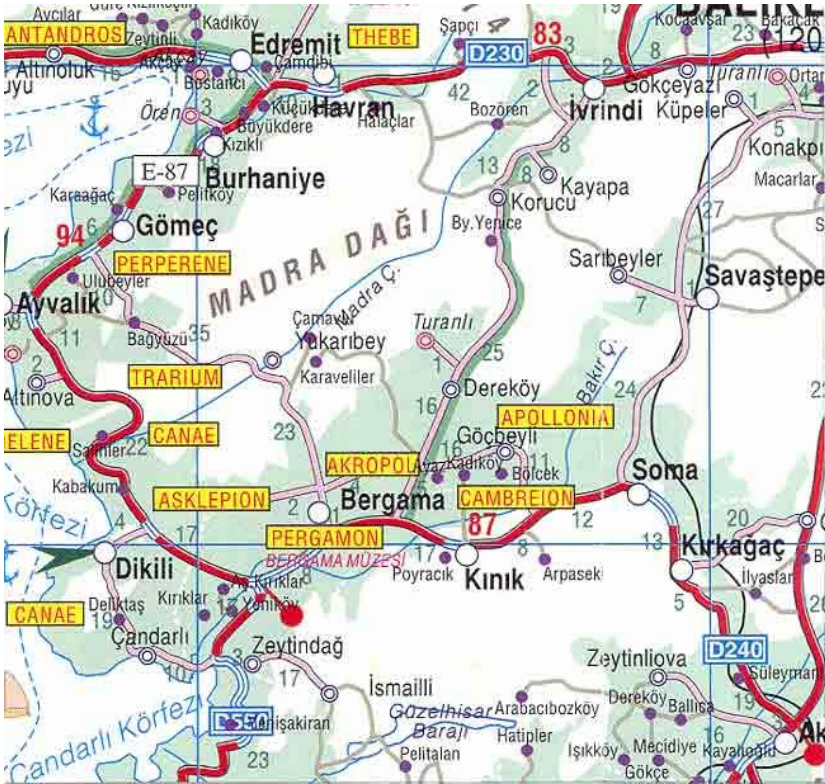
Galen



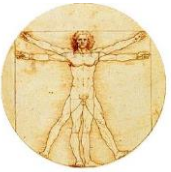
The final major anatomist of ancient times

active in the 2nd century

His collection of drawings, based mostly on dog anatomy, became the anatomy textbook for 1500 years.



EARLY MODERN ANATOMY



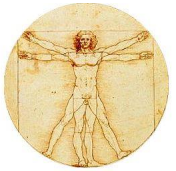
AVICENNA'S CANON OF MEDICINE

TEXTBOOK IN EUROPE

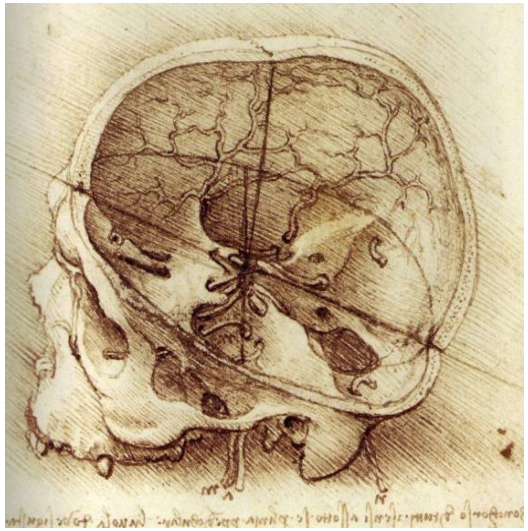
TILL 16TH CENTURY

AVICENNA (IBN-I SINA)

EARLY MODERN ANATOMY



The first major development in anatomy occurred at Bologna in the 14th to 16th centuries, where a series of authors dissected cadavers and contributed to the accurate description of organs and the identification of their functions.

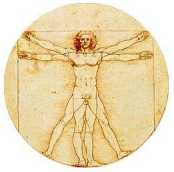


Andreas Vesalius

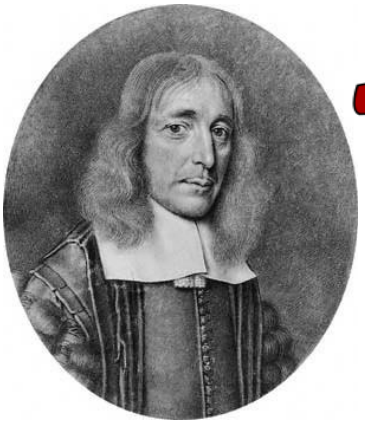
De humani corporis fabrica

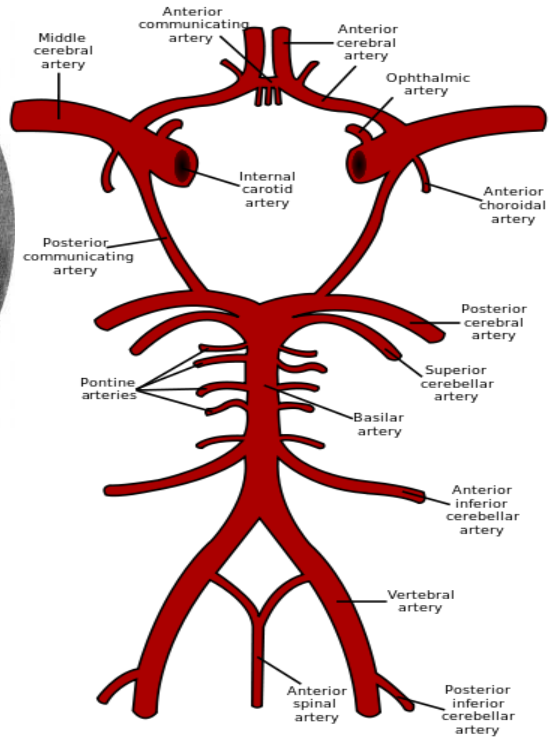
On the Fabric of the Human Body

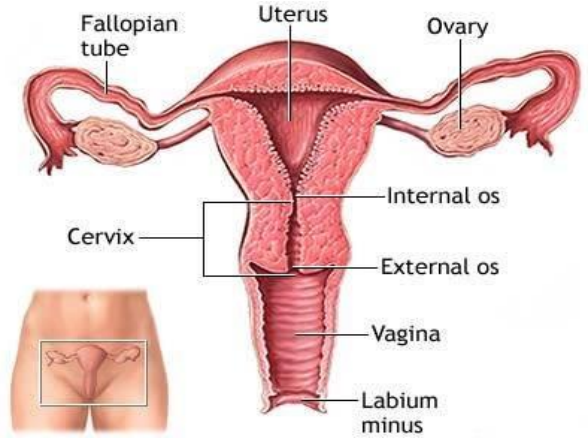
EARLY MODERN ANATOMY

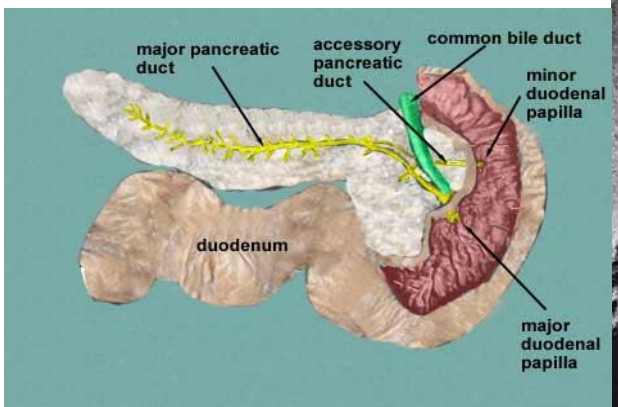


A succession of researchers proceeded to refine the body of anatomical knowledge, giving their names to a number of anatomical structures along the way.

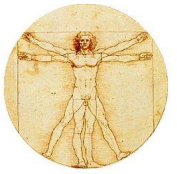






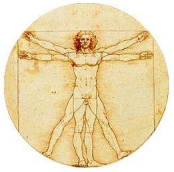


17th and 18th centuries



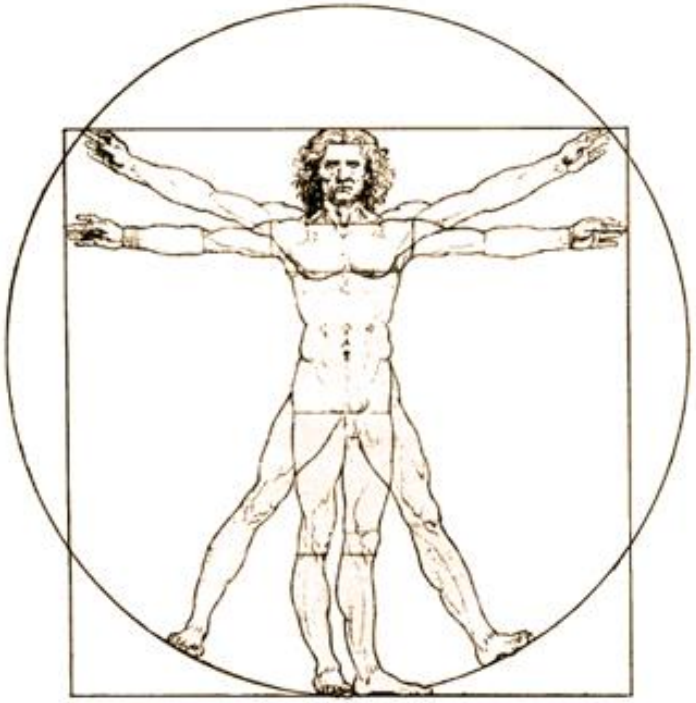
- The study of anatomy flourished in the 17th and 18th centuries.
- The advent of the printing press facilitated the exchange of ideas.
- The popularity of the anatomist was equal to the quality of his drawing talents, and one need not be an expert in Latin to take part.

17th and 18th centuries

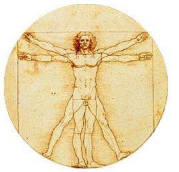


- Many famous artists studied anatomy, attended dissections, and published drawings for money, from Michelangelo & Rembrandt.

- For the first time, prominent universities could teach something about anatomy through drawings, rather than relying on knowledge of Latin.

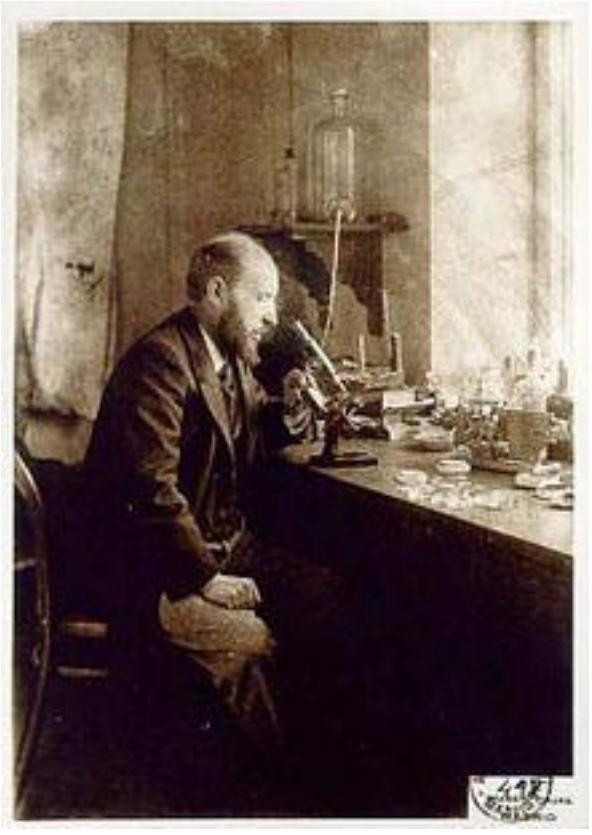


19th century anatomy



- Anatomists largely finalized and systematized the descriptive human anatomy of the previous century.

- Extensive research in more areas of anatomy.



History of anatomy education in Turkey

Pre-dissection period (1827-1841)

Anatomy education given theoretically, no cadavers yet

Photo from the
Edirne Health Museum

History of anatomy education in Turkey

Unmedicated cadaver period (1841-1908)

- Anatomy experts were appointed from abroad.
- Sultan Abdülmecid has signed the imperical decree allowing dissections with the purpose of education.

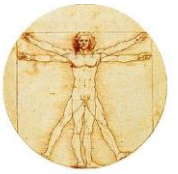
Dr. Charles Ambroise Bernard from Vienna

Mekteb-i Tıbbiyeyi Şahane

History of anatomy education in Turkey

Medicated cadaver period (1908-present)

In anatomy education by using the method of giving chemical substance through vein, cadavers began to be used initially without decaying in this period.

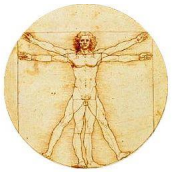


Anatomical position

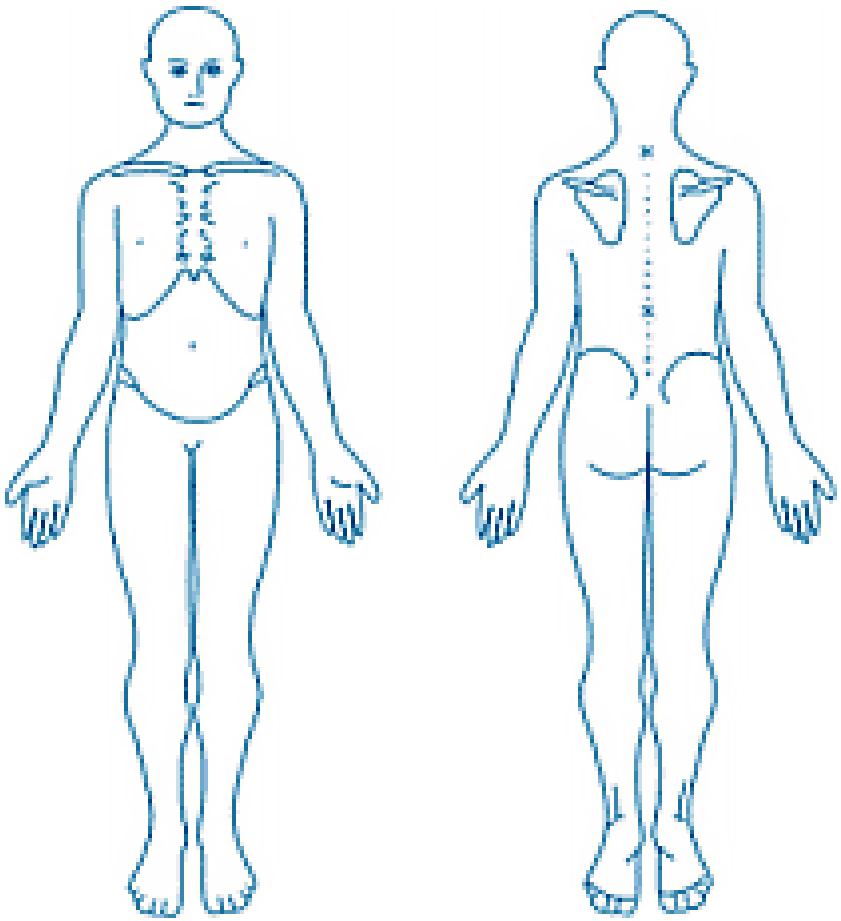
- All anatomical descriptions are expressed in relation to one consistent position, ensuring that descriptions are not ambiguous.

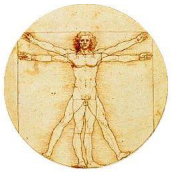
- One must visualize this position in the mind when describing patients (or cadavers), whether they are lying on their sides, supine (recumbent, lying on the back, face upward), or prone (lying on the abdomen, face downward).

The anatomical position refers to the body position as if the person were standing upright with the:



- **Head, eyes, and toes directed anteriorly (forward)**
- **Arms adjacent to the sides with the palms facing anteriorly**
- **Lower limbs close together with the feet parallel.**





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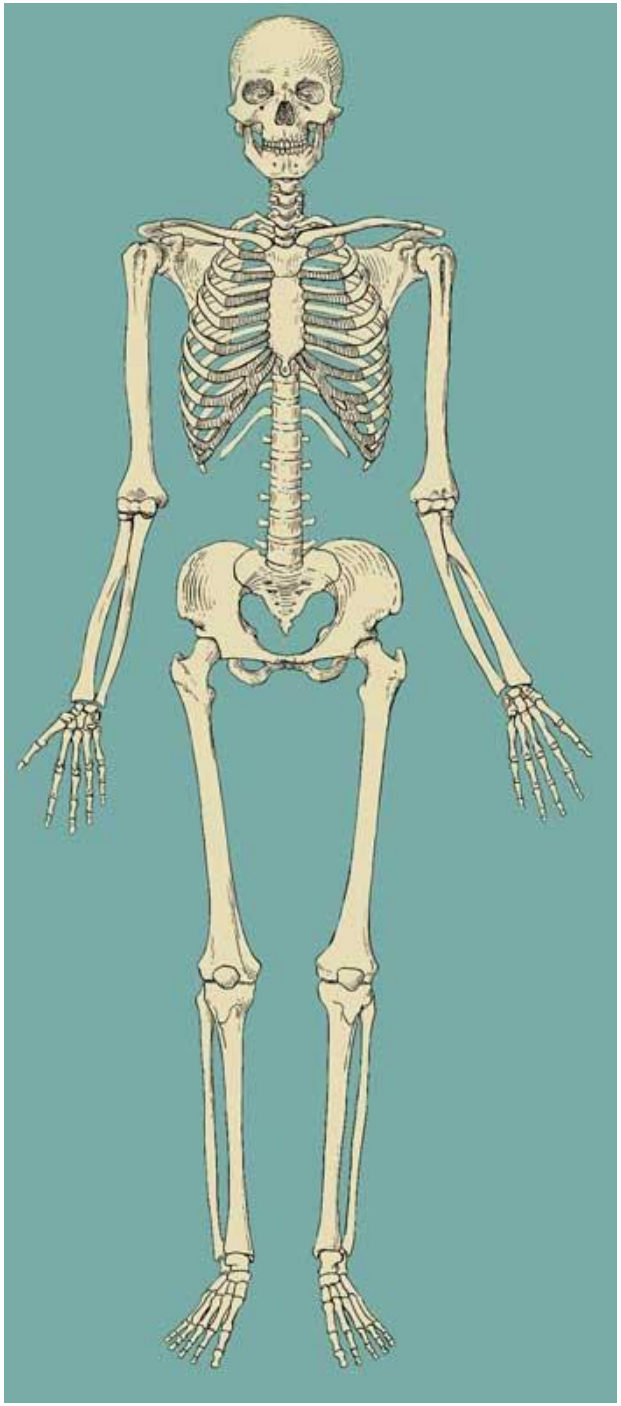


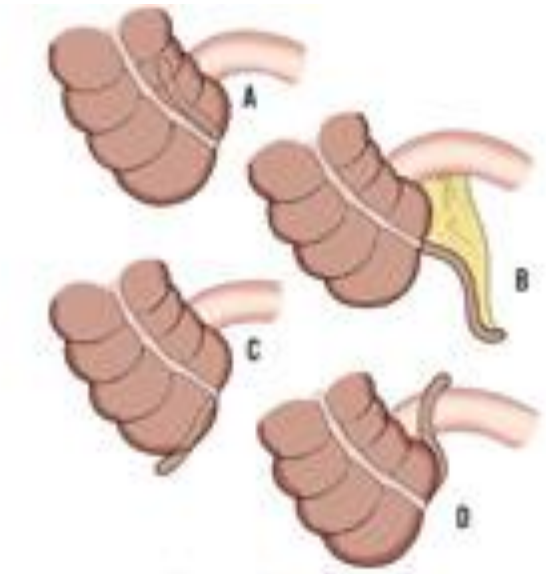
Front Back

Anatomical Position

Anatomical Variations

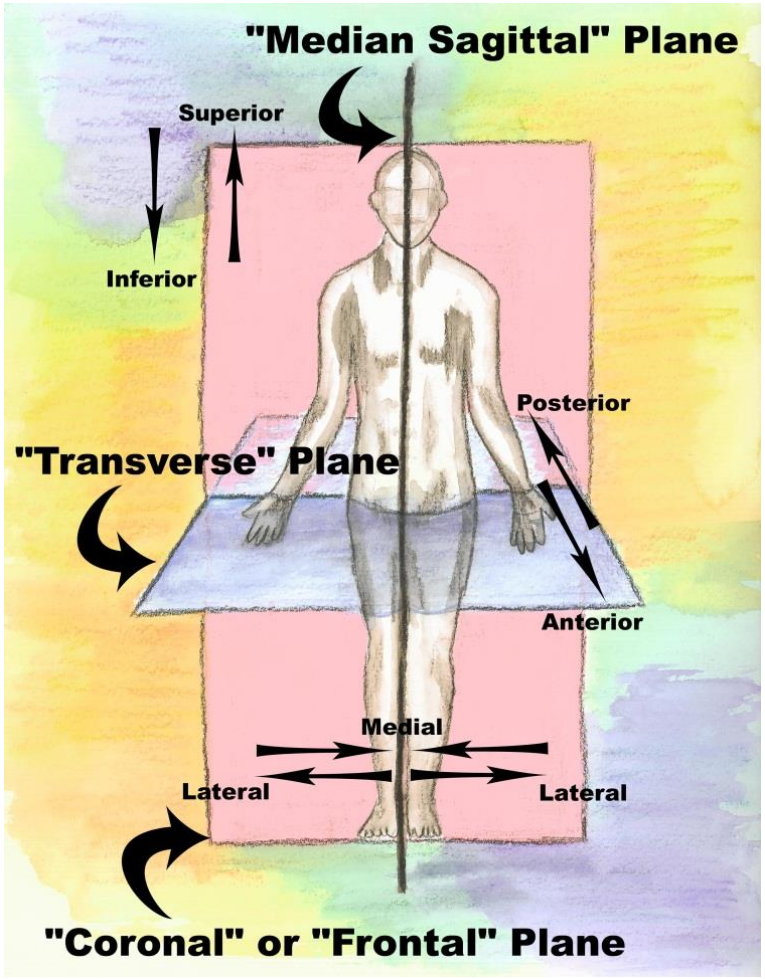
- Anatomy books describe (initially, at least) the structure of the body as it is usually observed in people—that is, the most common pattern.

- However, occasionally a particular structure demonstrates so much variation within the normal range that the most common pattern is found less than half the time!

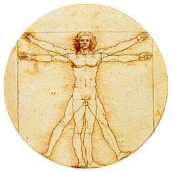


Variations in topographic position of the appendix.

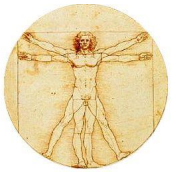
TERMINOLOGY IN ANATOMY



Terminology in anatomy

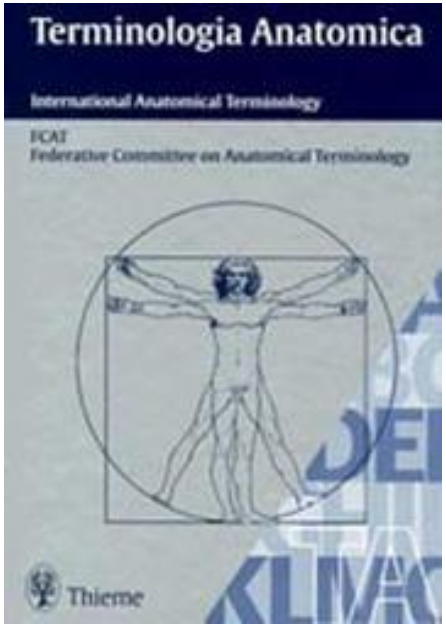


- It is important for medical personnel to have a sound knowledge and understanding of the basic anatomic terms.
- The accurate use of anatomic terms by medical personnel enables them to communicate with their colleagues both nationally and internationally.
- Without anatomic terms, one cannot accurately discuss or record the abnormal functions of joints, the actions of muscles, the alteration of position of organs, or the exact location of swellings or tumors.



Anatomical terms are descriptive terms standardized in an international reference guide, Terminologia Anatomica (TA).

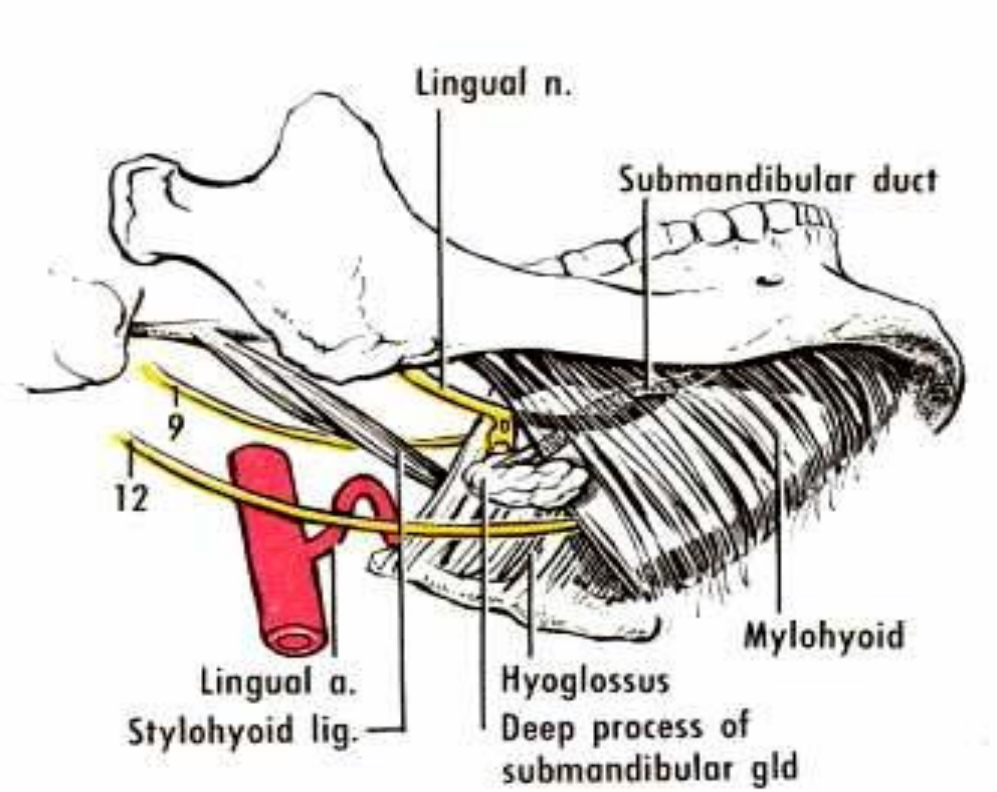
TA- International Anatomical Terminology

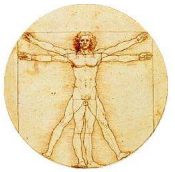


Created by the Federative Committee on Anatomical Terminology and approved by the International Federation of Associations of Anatomists, the most recent (6th) edition was published in 1998.

Many anatomical terms have both Latin and Greek equivalents.

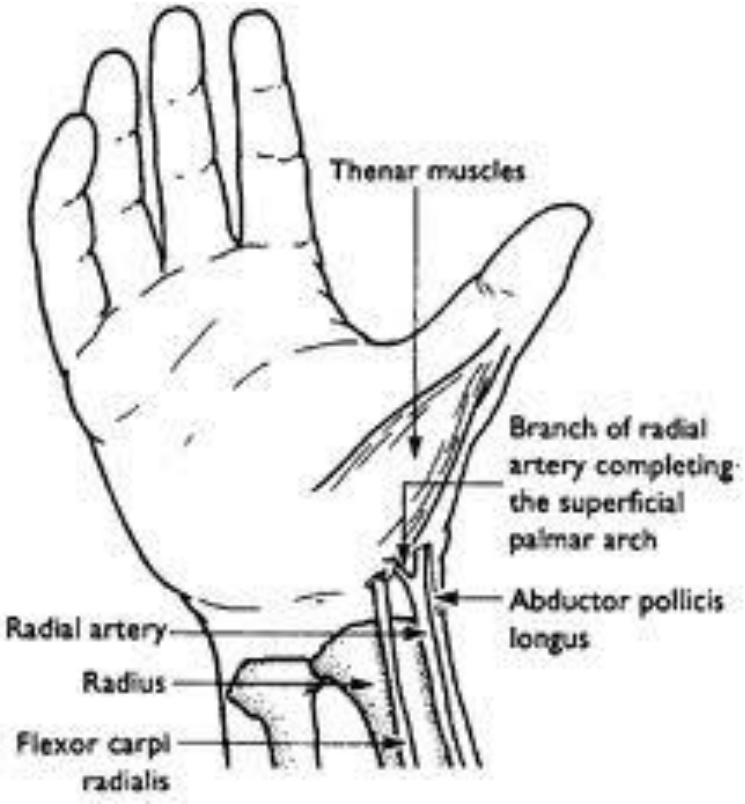
Thus the tongue is lingua (L.) and glossa (Gk), and these are the basis of such terms as lingual artery and glossopharyngeal nerve.



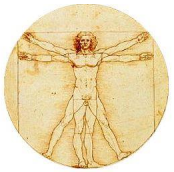


- ✓ Anatomical directional terms are based on the body in the anatomical position.

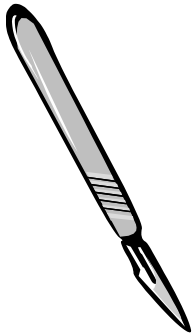
- ✓ Various adjectives, arranged as pairs of opposites, describe the relationship of parts of the body or compare the position of two structures relative to each other.

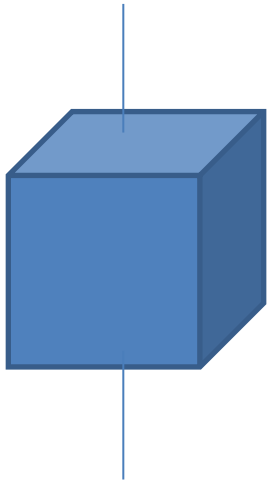


TERMS RELATED TO POSITION

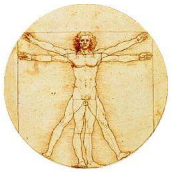


- All descriptions of the human body based on anatomic position.
- The various parts of the body then described in relation to certain **imaginary planes**
- 4 anatomical planes divide the body.





Anatomical Planes



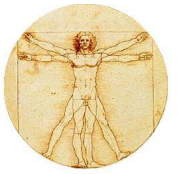
Anatomical descriptions are based on four imaginary planes (median, sagittal, frontal-coronal, and transverse-axial) that intersect the body in the anatomical position.

Sagittal= New Latin sagittālis < sagitta (“arrow”)

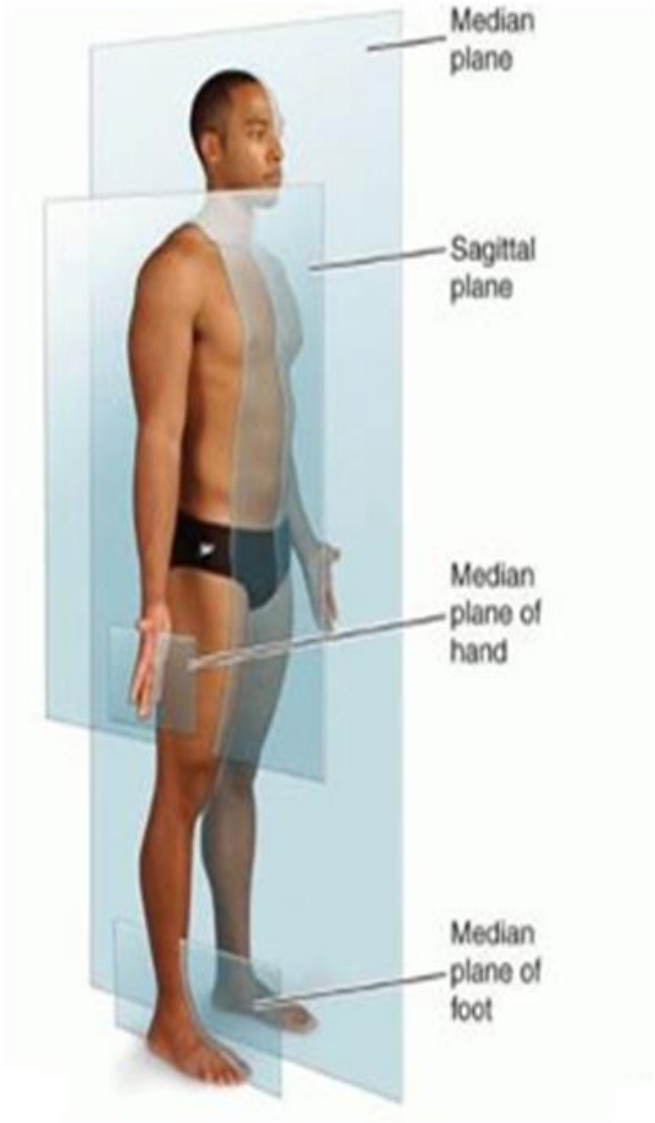
Coronal= L. corona "crown, garland»

Axial = "pertaining to an axis,«

Median Sagittal Plane



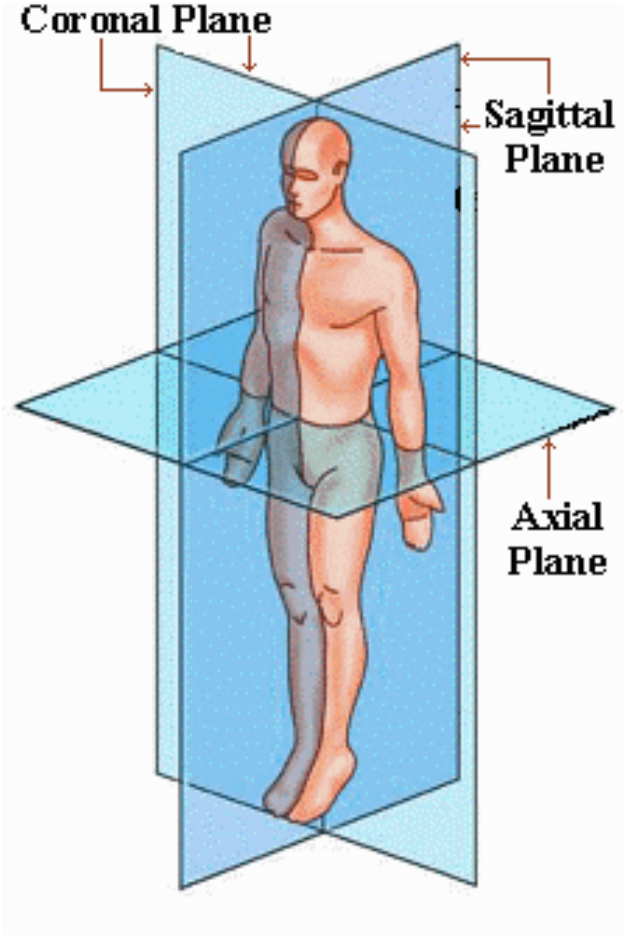
This is a vertical plane passing through the center of the body, dividing it into equal right and left halves.

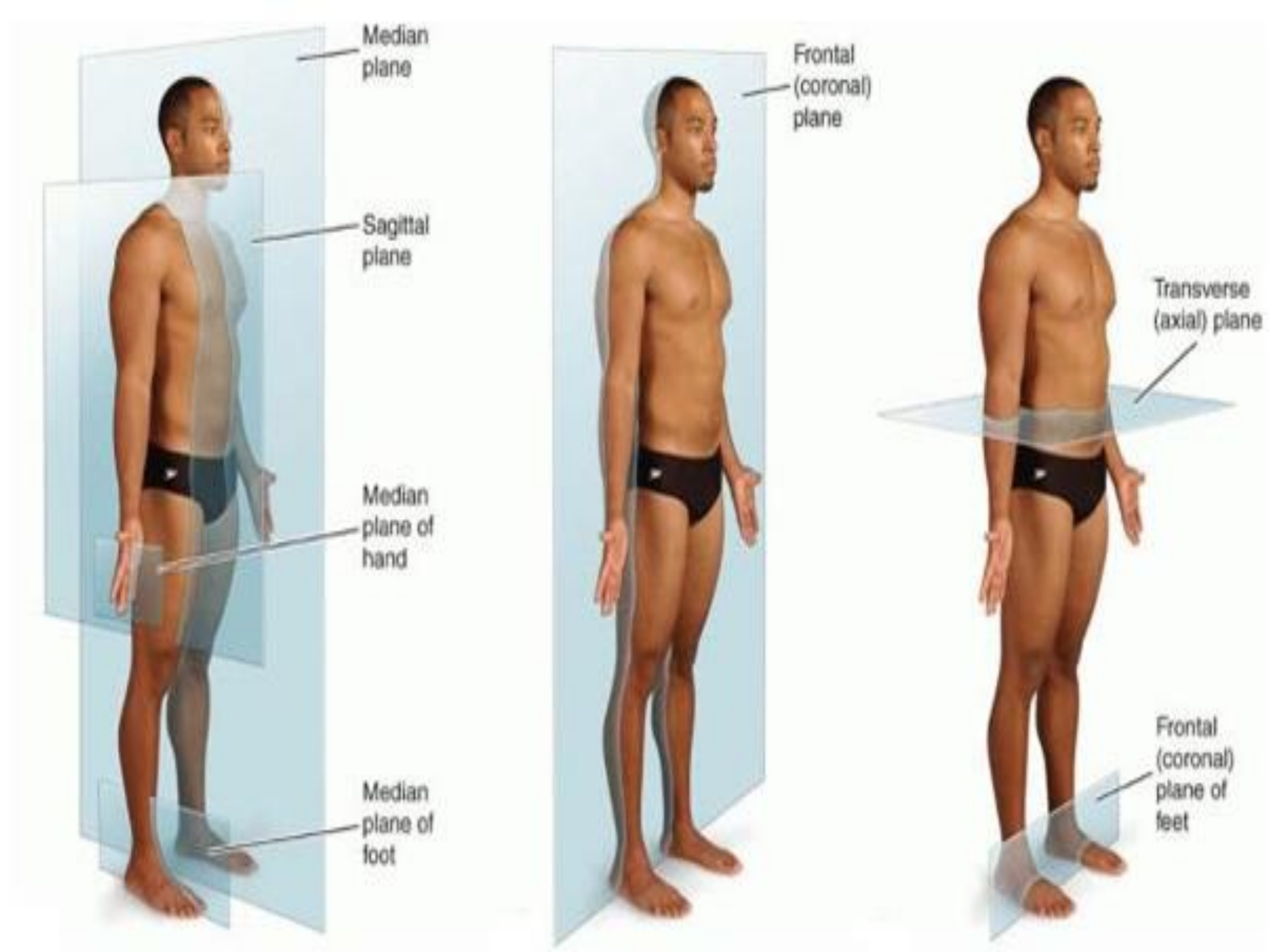


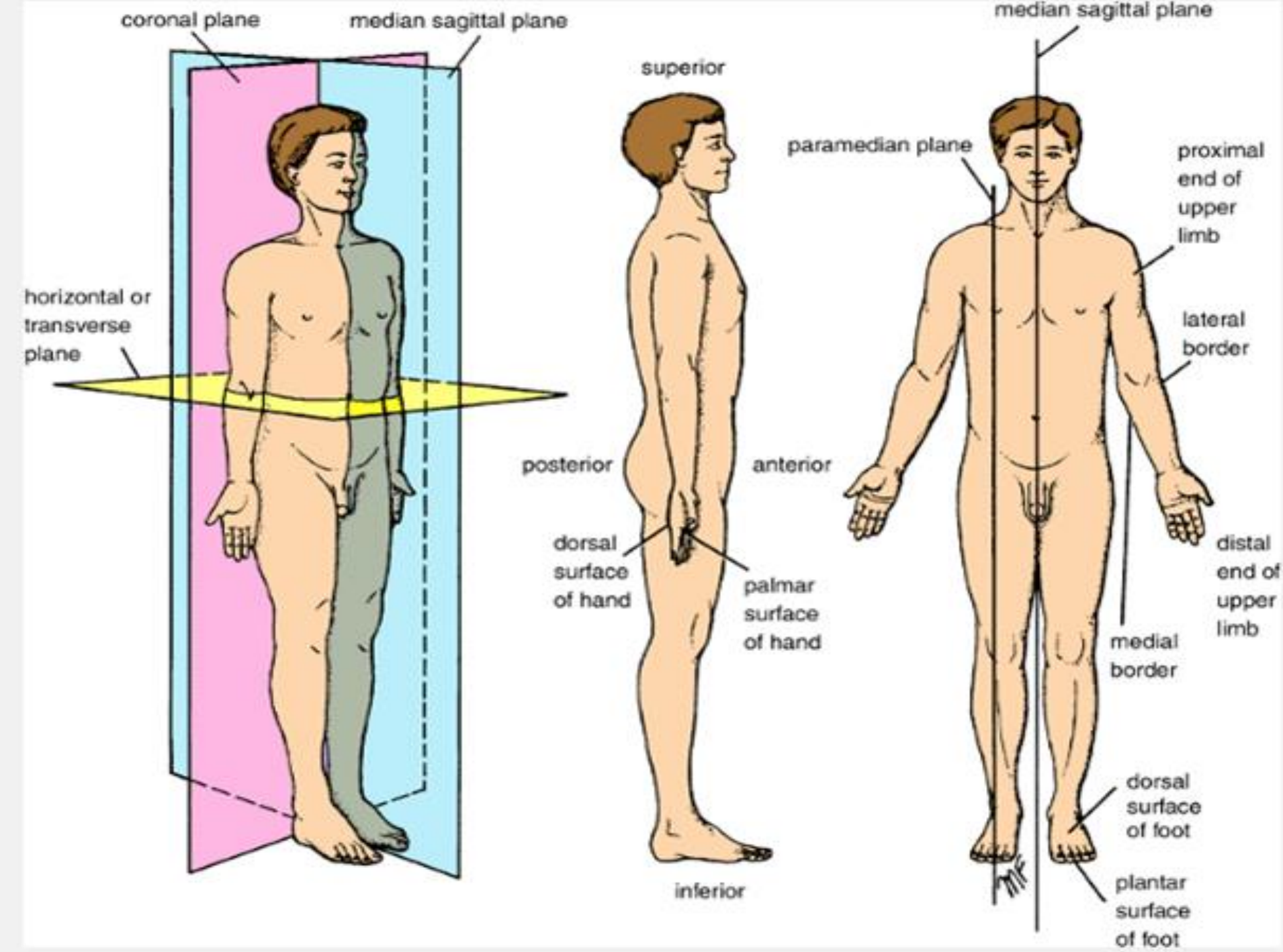
Coronal Planes

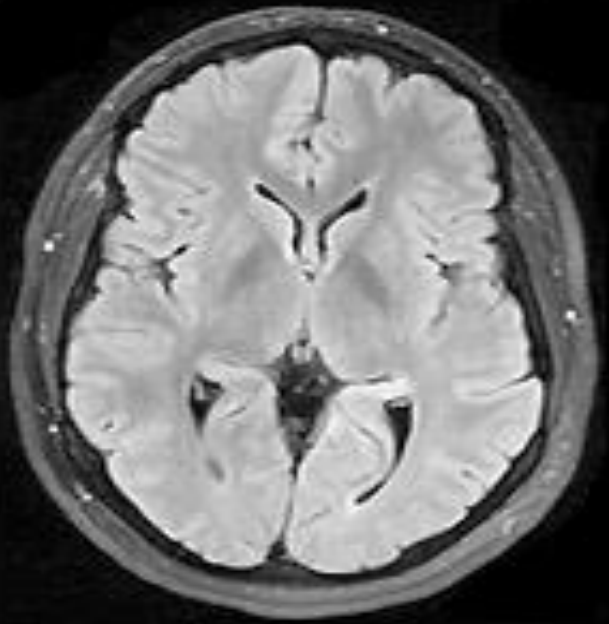
Imaginary vertical planes at right angles to the median plane.

Transverse planes are horizontal planes passing through the body at right angles to the median and frontal planes, dividing the body into superior (upper) and inferior (lower) parts.
Radiologists refer to transverse planes as transaxial, which is commonly shortened to axial planes.

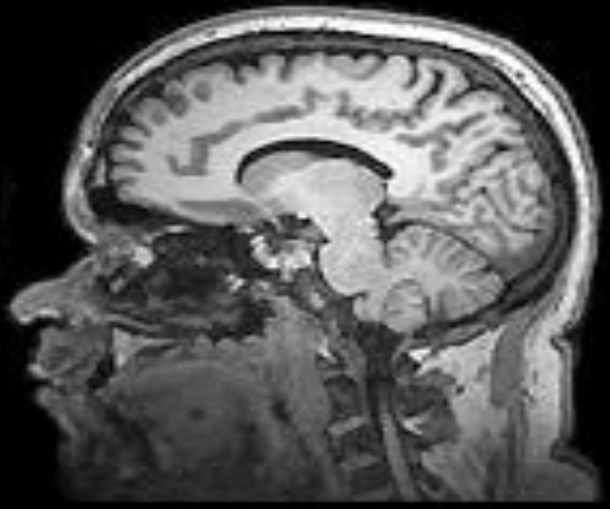



Median plane
Sagittal plane
Median plane of hand
Median plane of foot
Frontal (coronal) plane
Transverse (axial) plane
Frontal (coronal) plane of feet

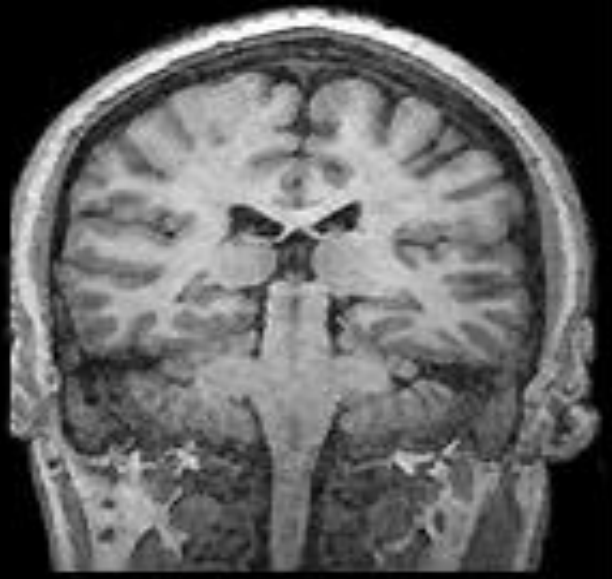

coronal plane
median sagittal plane
horizontal or transverse plane
superior
posterior
anterior
dorsal surface of hand
palmar surface of hand
inferior
median sagittal plane
paramedian plane
proximal end of upper limb
lateral border
distal end of upper limb
medial border
dorsal surface of foot
plantar surface of foot



An axial MRI looks at the brain from below in a series of images starting at the chin and moving to the top of the head.

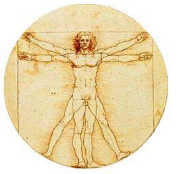


A sagittal MRI looks at the brain from the side in a series of images starting at one ear and moving to the other.



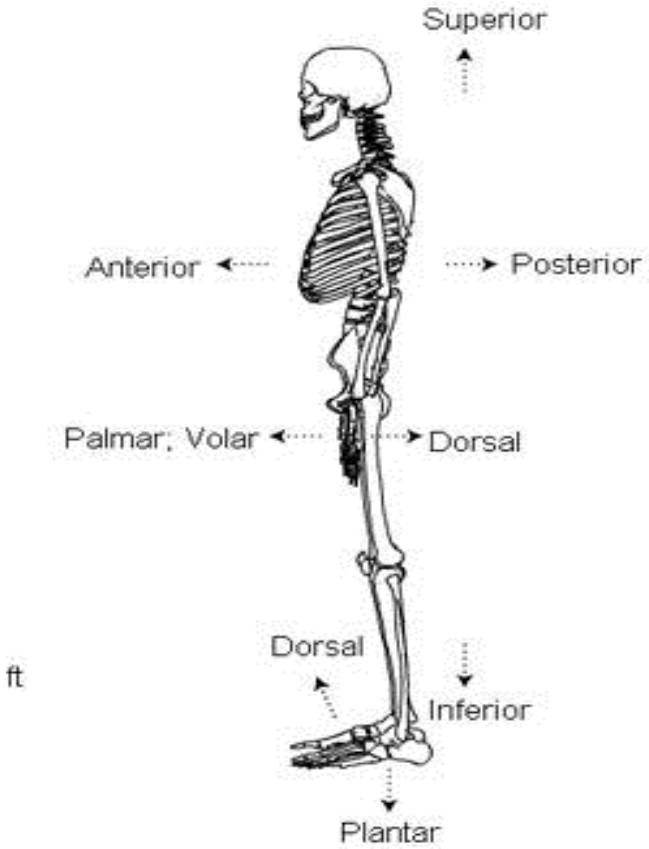
A coronal MRI looks at the brain from behind in a series of images starting at the back of the head and moving to the face.

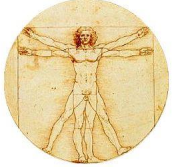
Anatomical terms are specific for comparisons made in the anatomical position, or with reference to the anatomical Planes:



- **Superior** refers to a structure that is nearer the vertex, the topmost point of the cranium (Mediev. L., skull).

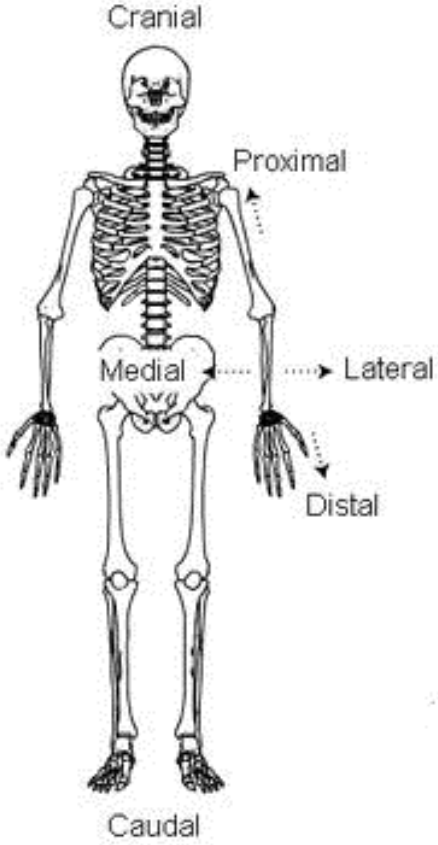
- **Inferior** refers to a structure that is situated nearer the sole of the foot.

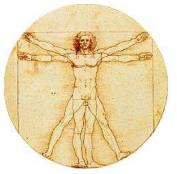




- **Cranial** relates to the cranium and is a useful directional term, meaning toward the head or cranium.

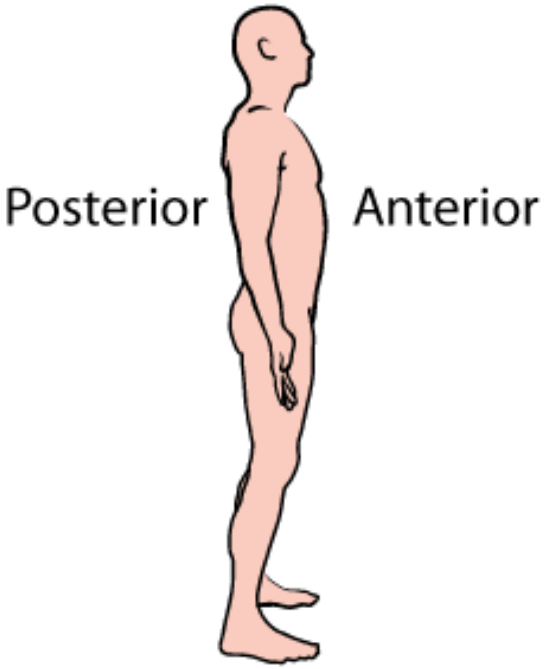
- **Caudal** (L. cauda, tail) is a useful directional term that means toward the feet or tail region, represented in humans by the coccyx (tail bone), the small bone at the inferior (caudal) end of the vertebral column.

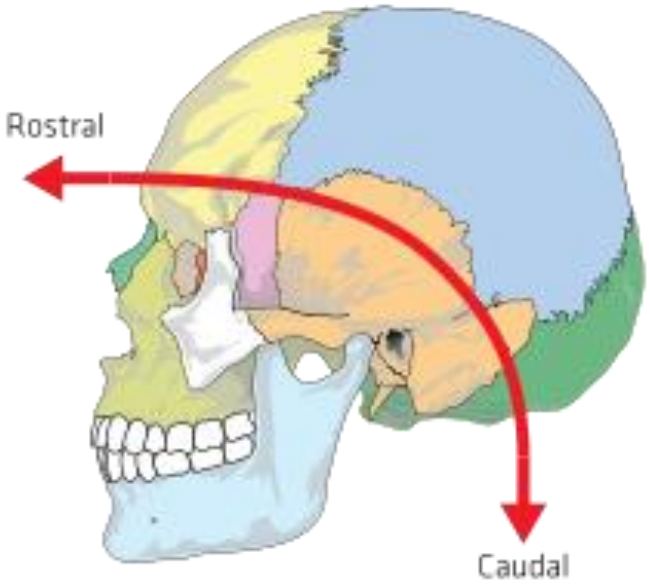


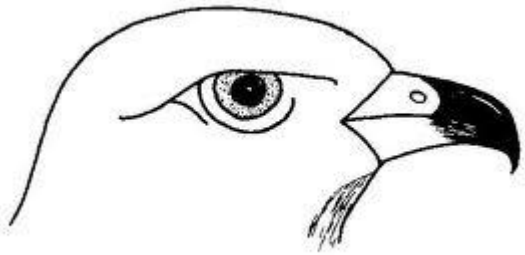


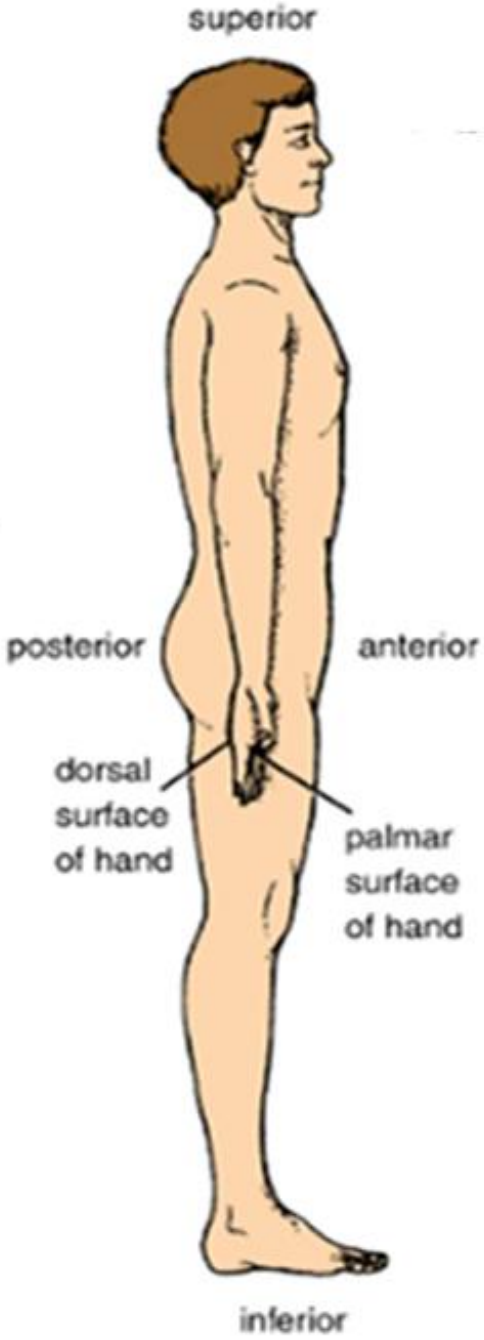
- **Posterior (dorsal)** denotes the back surface of the body or nearer to the back.
- **Anterior (ventral)** denotes the front surface of the body.
- **Rostral** is often used instead of anterior when describing parts of the brain; it means toward the rostrum (L. for beak).

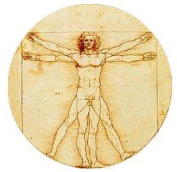
To describe the relationship of two structures, one is said to be anterior or posterior to the other insofar as it is closer to the anterior or posterior body surface.







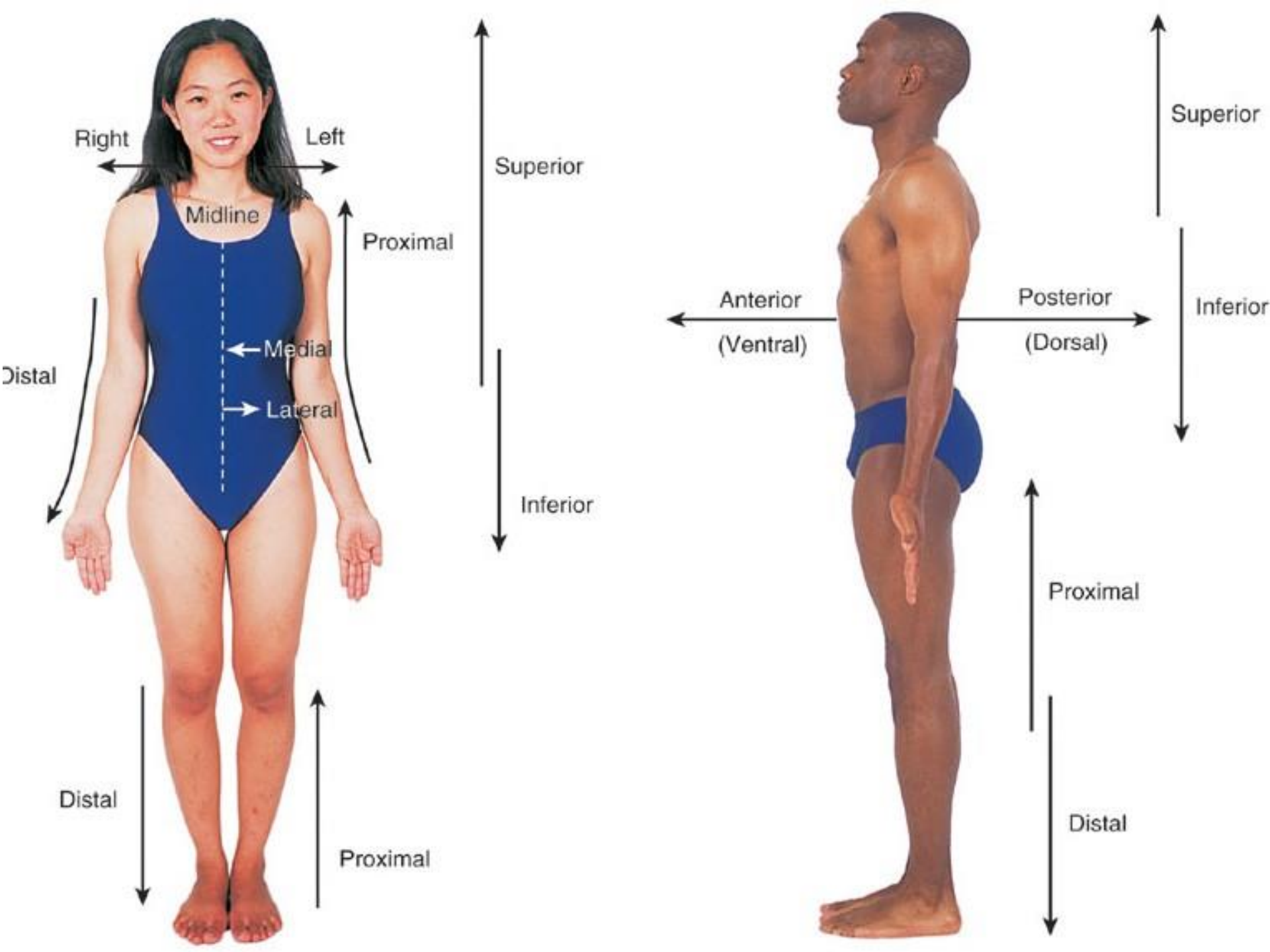

superior
posterior
anterior
dorsal surface of hand
palmar surface of hand
inferior

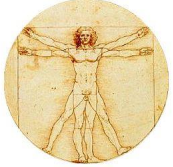


Medial is used to indicate that a structure is nearer to the median plane of the body. For example, the 5th digit of the hand (little finger) is medial to the other digits.

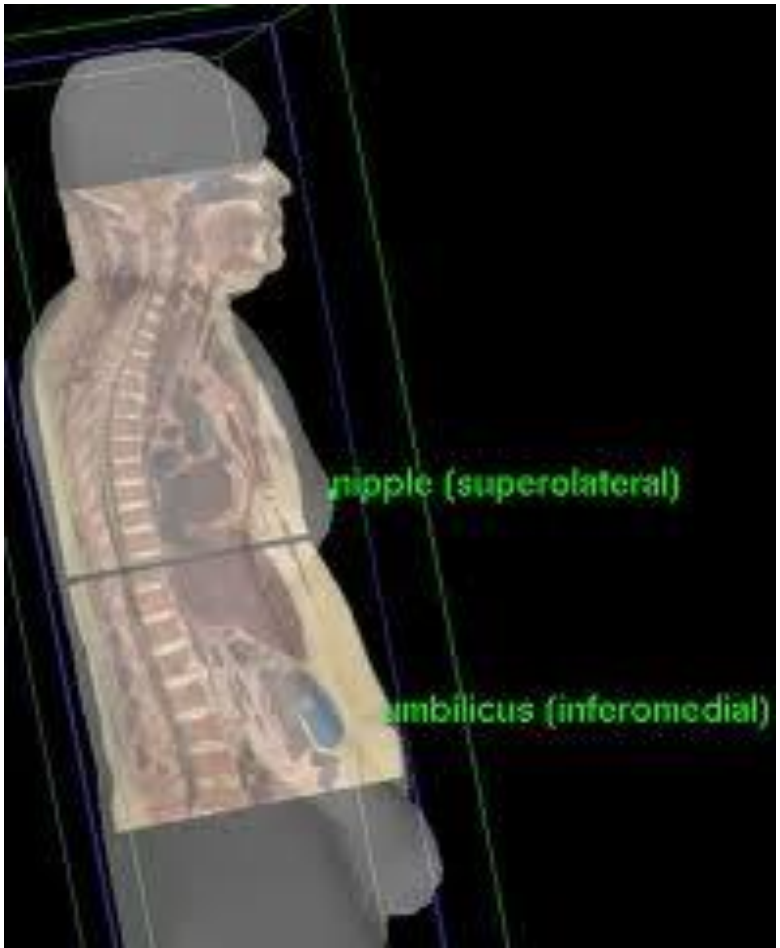
Lateral stipulates that a structure is farther away from the median plane. The 1st digit of the hand (thumb) is lateral to the other digits.

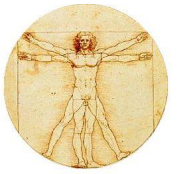
Dorsum usually refers to the superior aspect of any part that protrudes anteriorly from the body, such as the dorsum of the tongue, nose, penis, or foot


Right
Left
Midline
Proximal
Superior
Medial
Lateral
Distal
Inferior
Distal
Proximal
Superior
Anterior
(Ventral)
Posterior
(Dorsal)
Inferior
Proximal
Distal



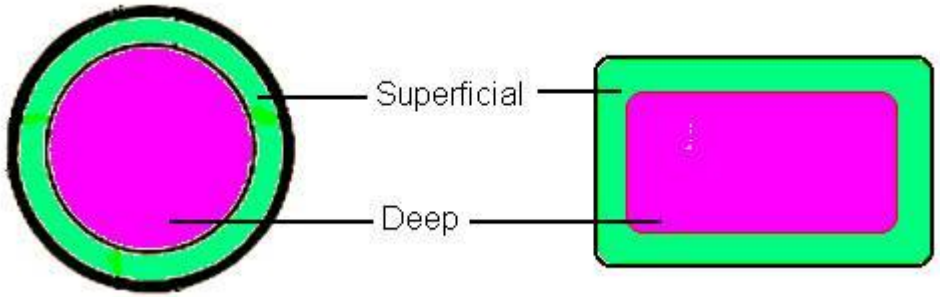
- Combined terms describe intermediate positional arrangements: inferomedial means nearer to the feet and median plane—for example, superolateral means nearer to the head and farther from the median plane.



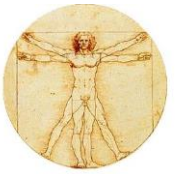


Other terms of relationship and comparisons are independent of the anatomical position or the anatomical planes, relating primarily to the **body's surface or its central core**:

Superficial, intermediate, and **deep (Lat. Profundus, profunda)** describe the position of structures relative to the surface of the body or the relationship of one structure to another underlying or overlying structure.



External means outside of or farther from the center of an organ or cavity, while **internal** means inside or closer to the center, independent of direction.



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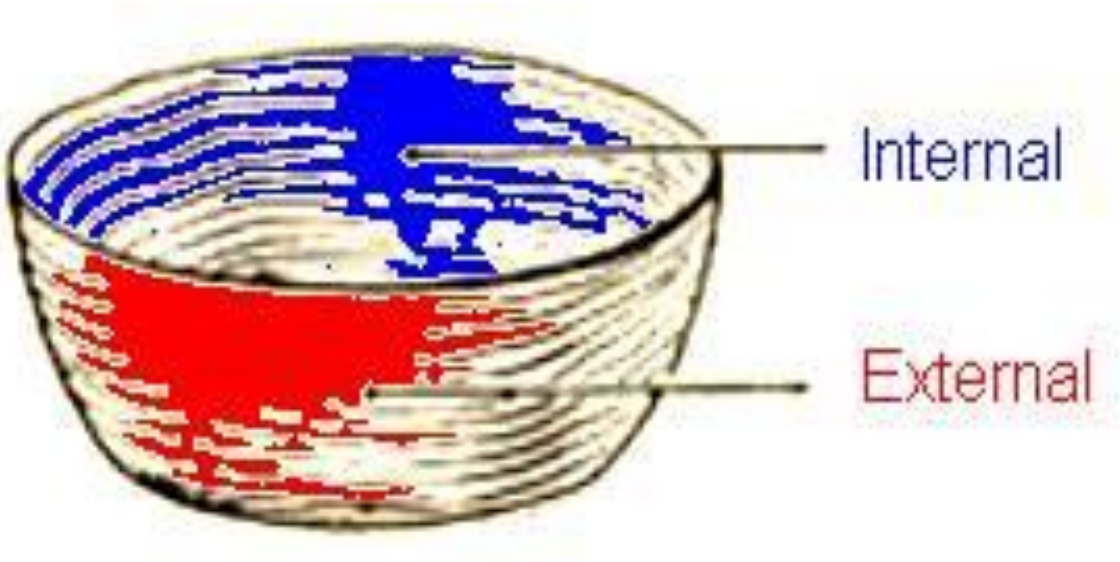
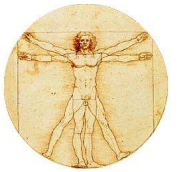
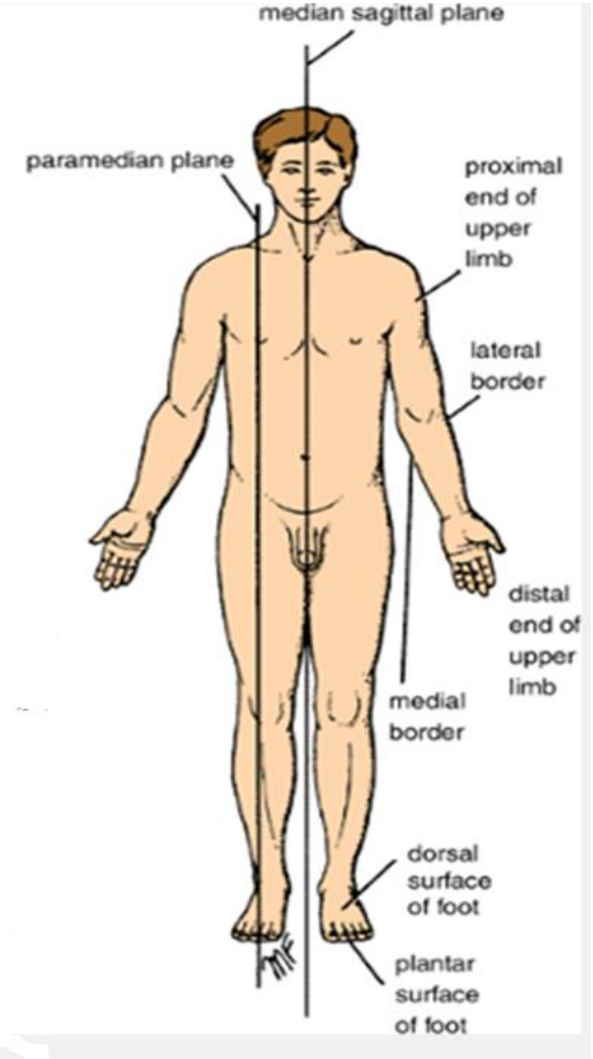
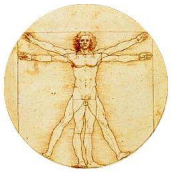




Proximal and **distal** are used when contrasting positions nearer to or farther from the attachment of a limb or the central aspect of a linear structure (*origin* in general), respectively. For example, the arm is proximal to the forearm and the hand is distal to the forearm.



TERMS OF LATERALITY

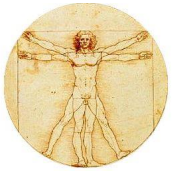


- Paired structures having right and left members (e.g., the kidneys) are **bilateral,** whereas those occurring on one side only (e.g., the spleen) are **unilateral.**

- Something occurring on the same side of the body as another structure is **ipsilateral**.

- **Contralateral** means occurring on the opposite side of the body relative to another structure.

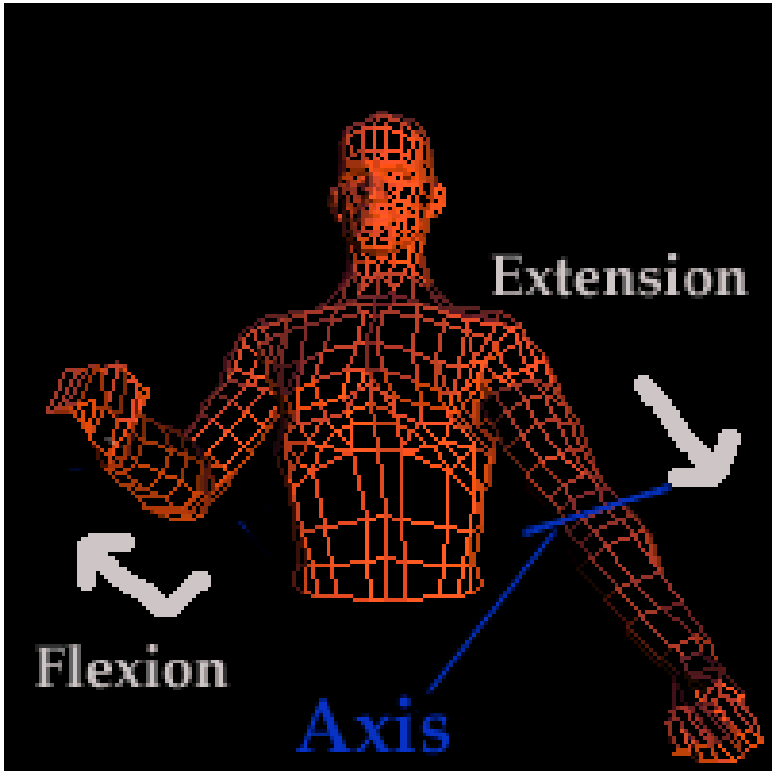
TERMS OF MOVEMENT



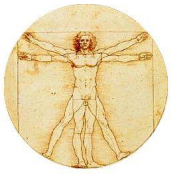
- Various terms describe movements of the limbs and other parts of the body.
- Most movements are defined in relationship to the anatomical position, with movements occurring within, and around axes aligned with, specific anatomical planes.
- While most movements occur at joints where two or more bones or cartilages articulate with one another, several non-skeletal structures exhibit movement (e.g., tongue, lips, eyelids).

Terms of movement may also be considered in pairs of oppositing movements:

Flexion and **extension** movements generally occur in *sagittal planes* around a transverse axis.



Flexion

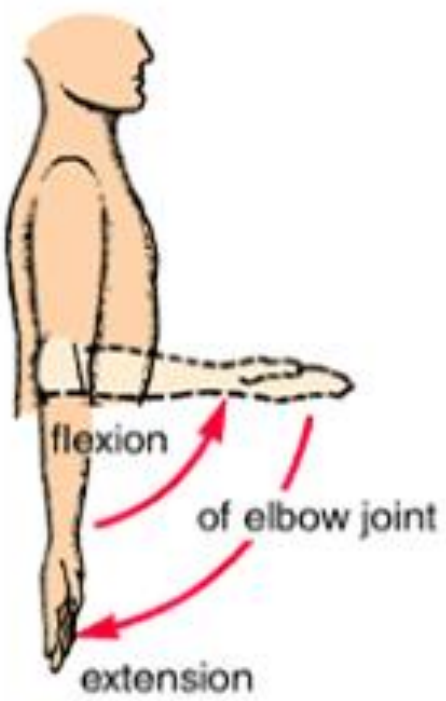


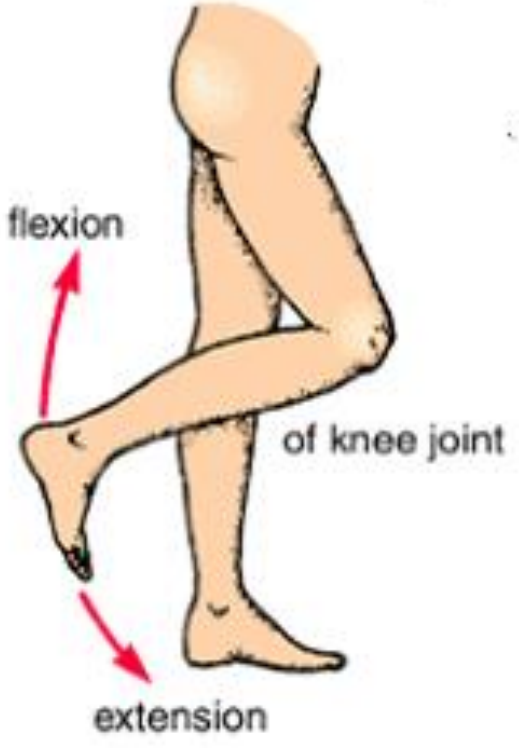
bending or decreasing the angle between the bones or parts of the body

For most joints (e.g., elbow) in an anterior direction
occasionally posterior

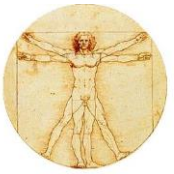
knee joint.

Lateral flexion
movement of the trunk in the coronal plane.





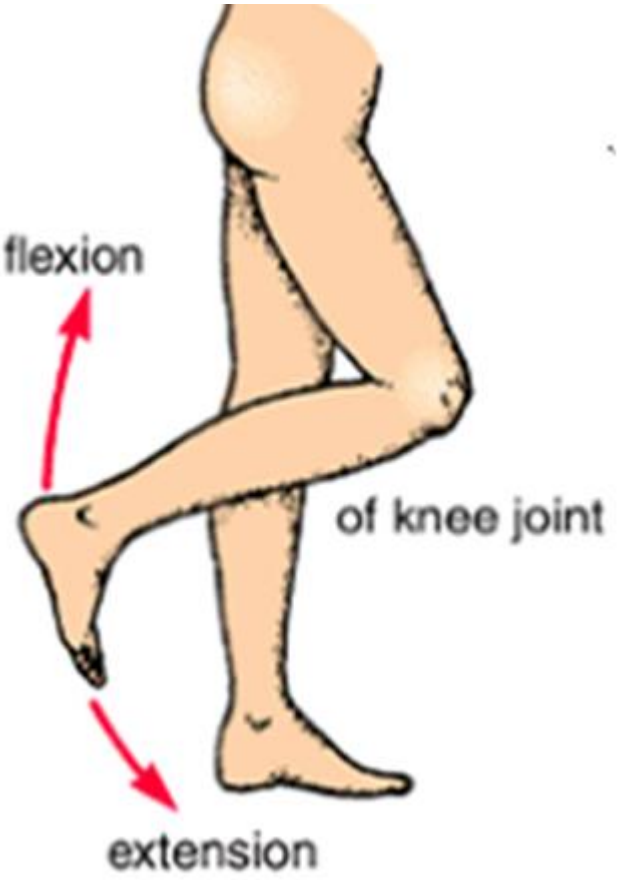
Extension

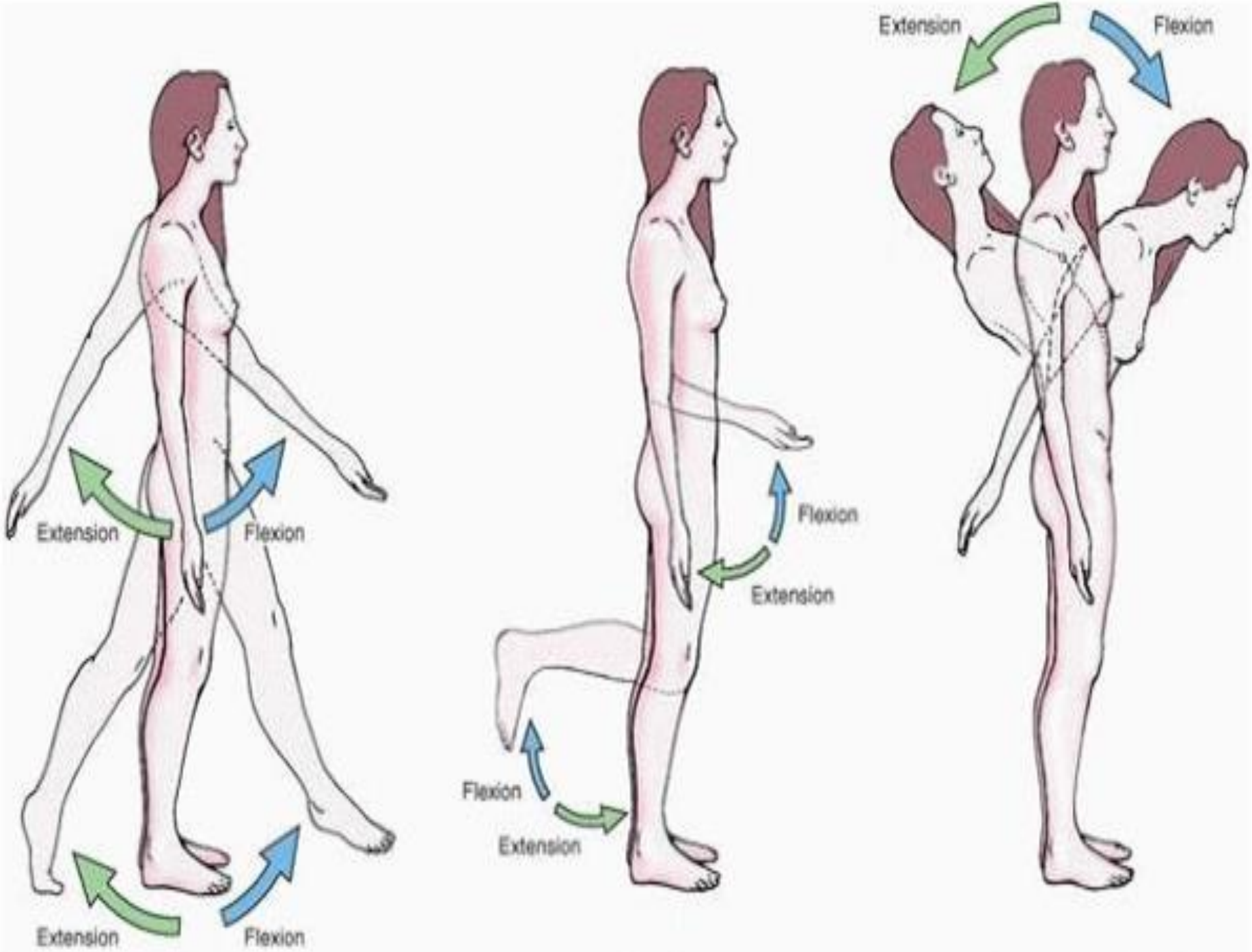


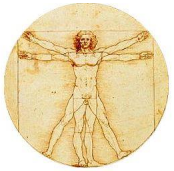
straightening or increasing the angle between the bones or parts of the body

usually occurs in a posterior direction.

Knee joint exceptional
flexion of the knee - posterior movement
Extension- anterior movement.




Extension
Flexion
Extension
Flexion
Extension
Flexion
Flexion
Extension
Flexion
Extension



Dorsiflexion

flexion @ ankle joint

when walking uphill

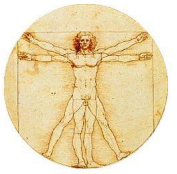
lifting the front of the foot and toes off the ground

Plantarflexion

bends the foot and toes toward the ground

when standing on your toes.

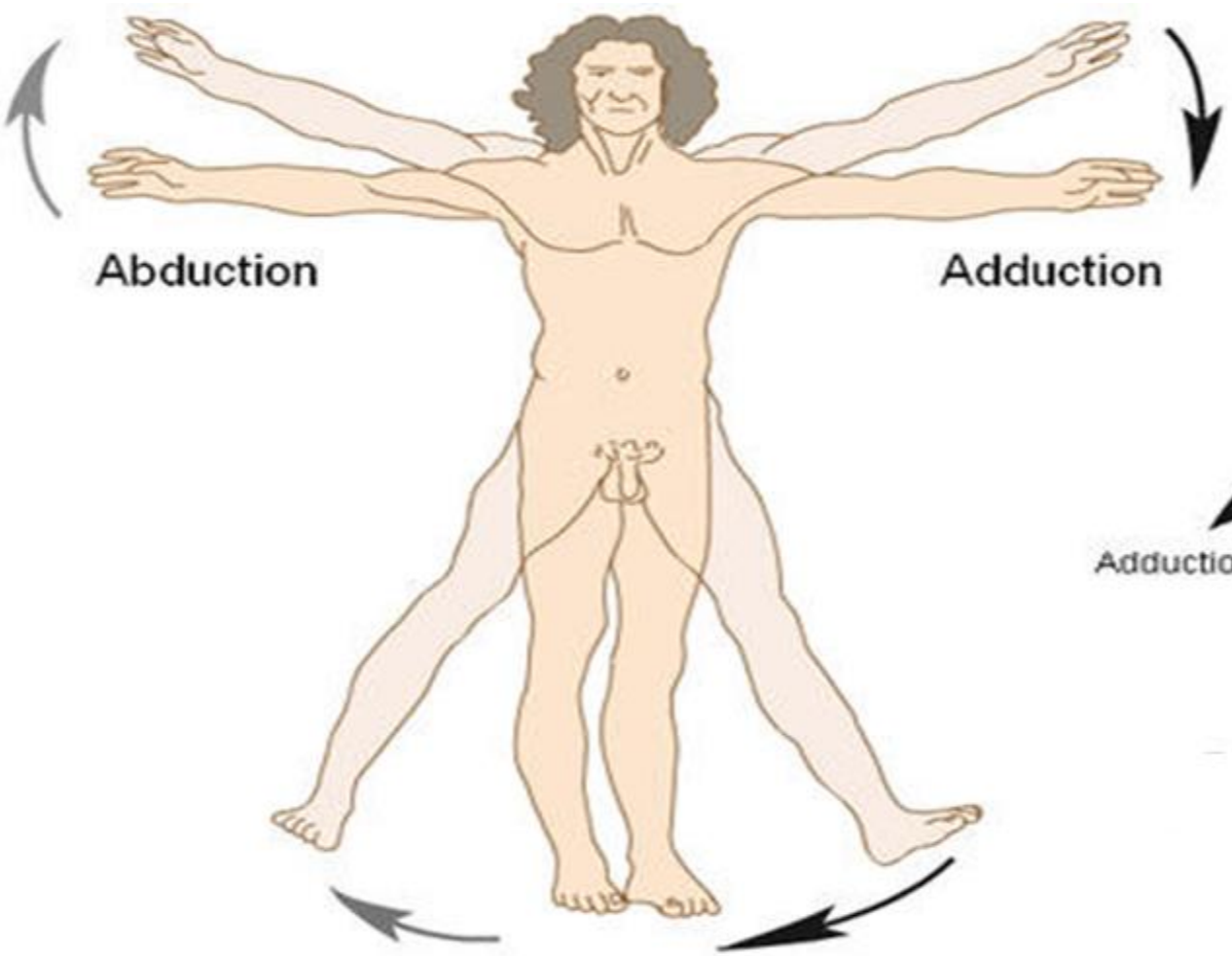
abduction & adduction

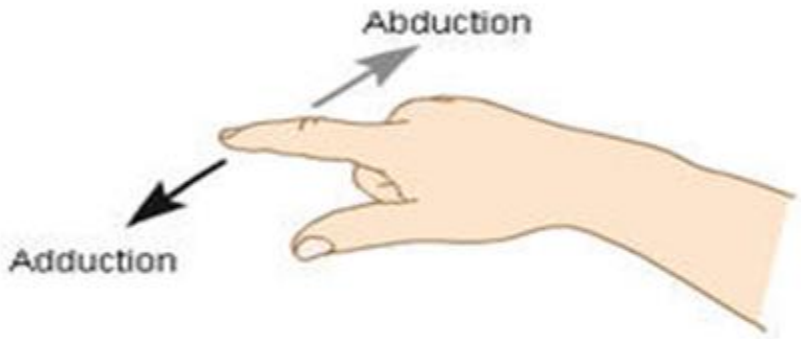


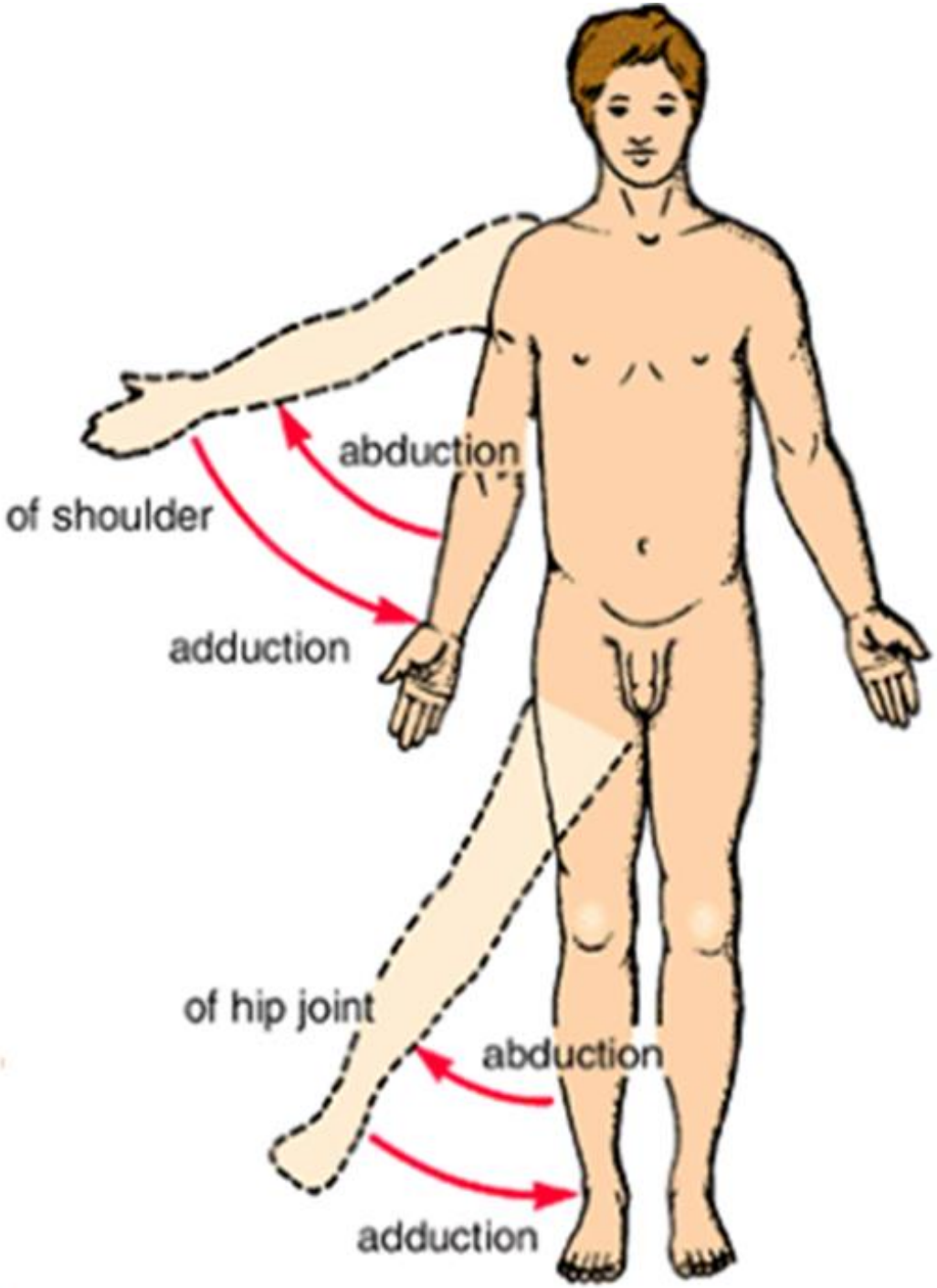
@ a frontal plane around an anteroposterior axis

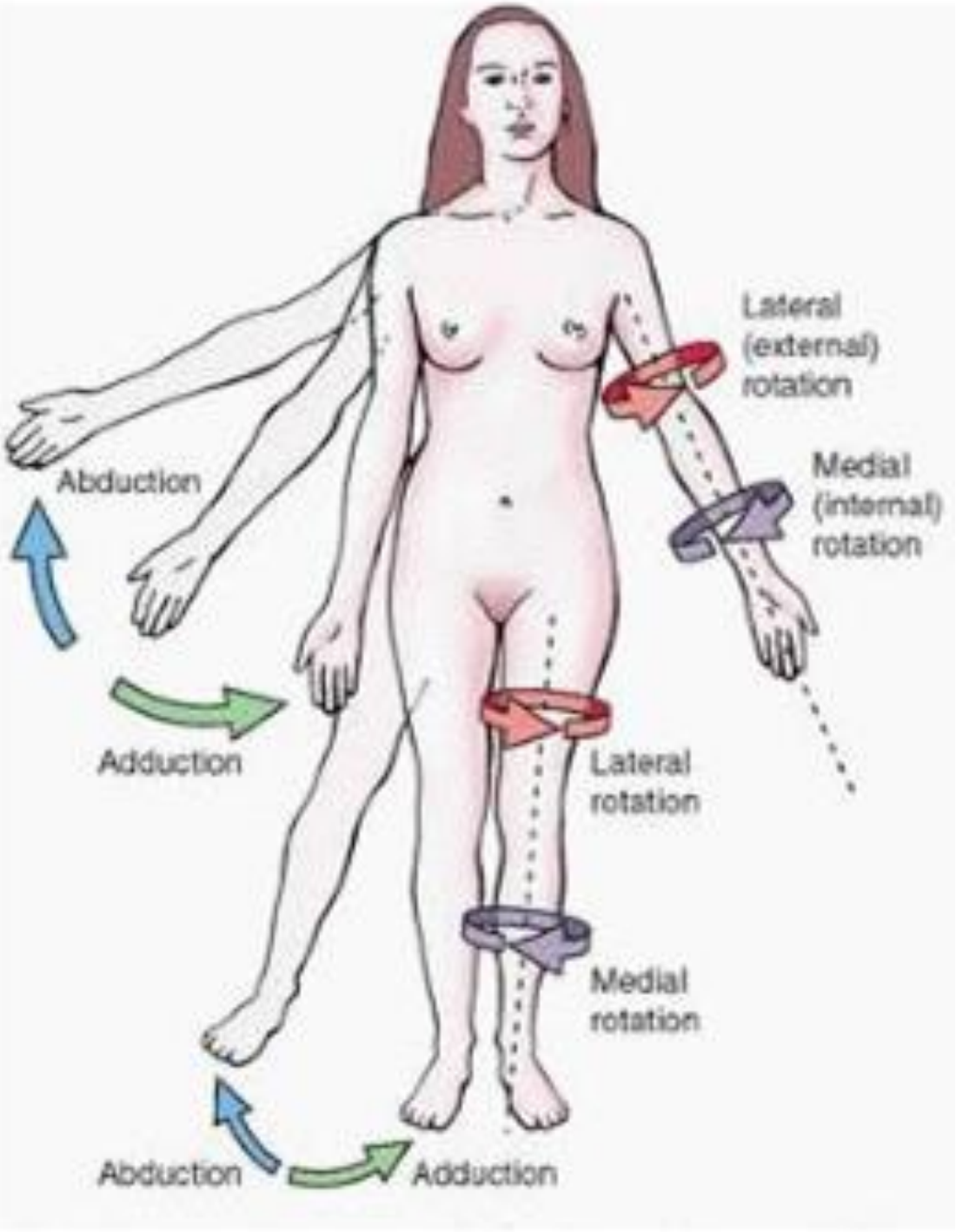
Abduction moving away from the median plane except digits

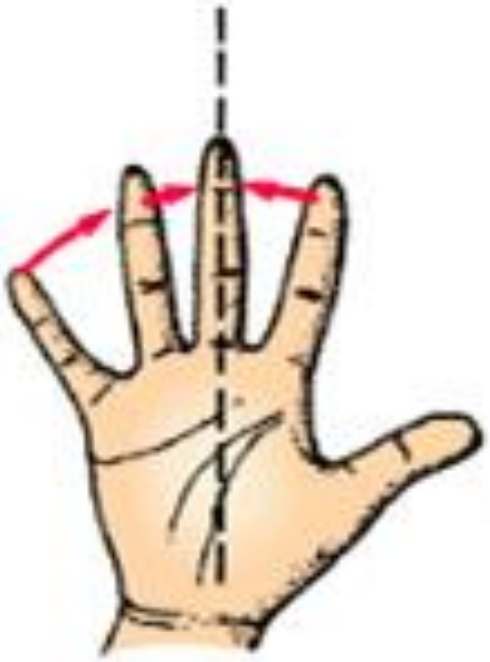
Adduction moving towards the median plane



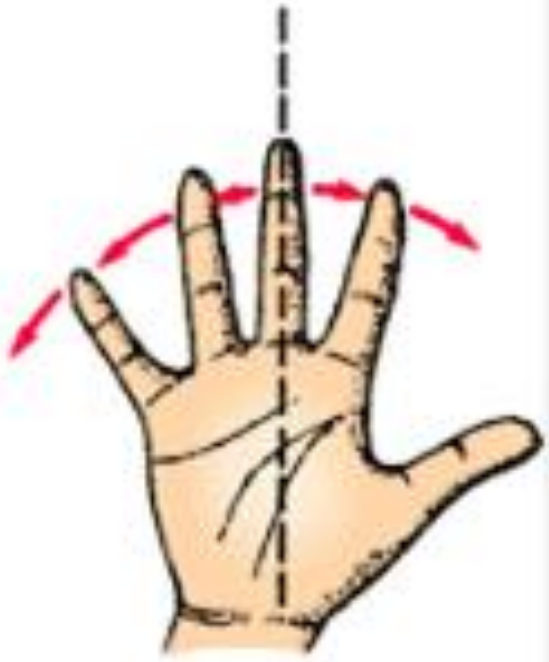



abduction
of shoulder
adduction
of hip joint
abduction
adduction


Lateral (external) rotation
Medial (internal) rotation
Abduction
Adduction
Lateral rotation
Medial rotation
Abduction
Adduction

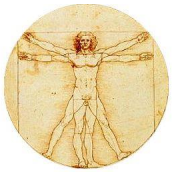


adduction of fingers



abduction of fingers

Circumduction

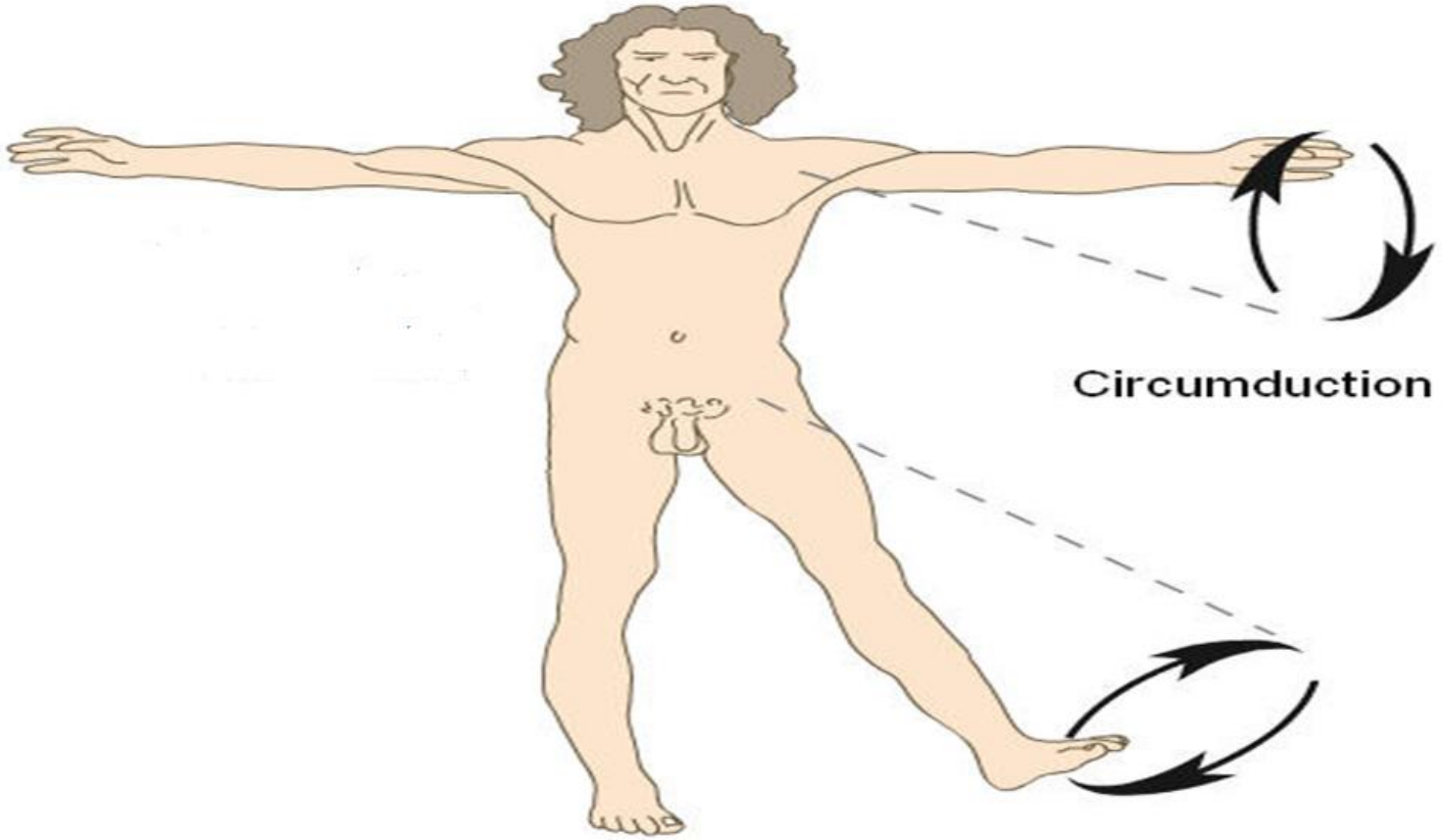


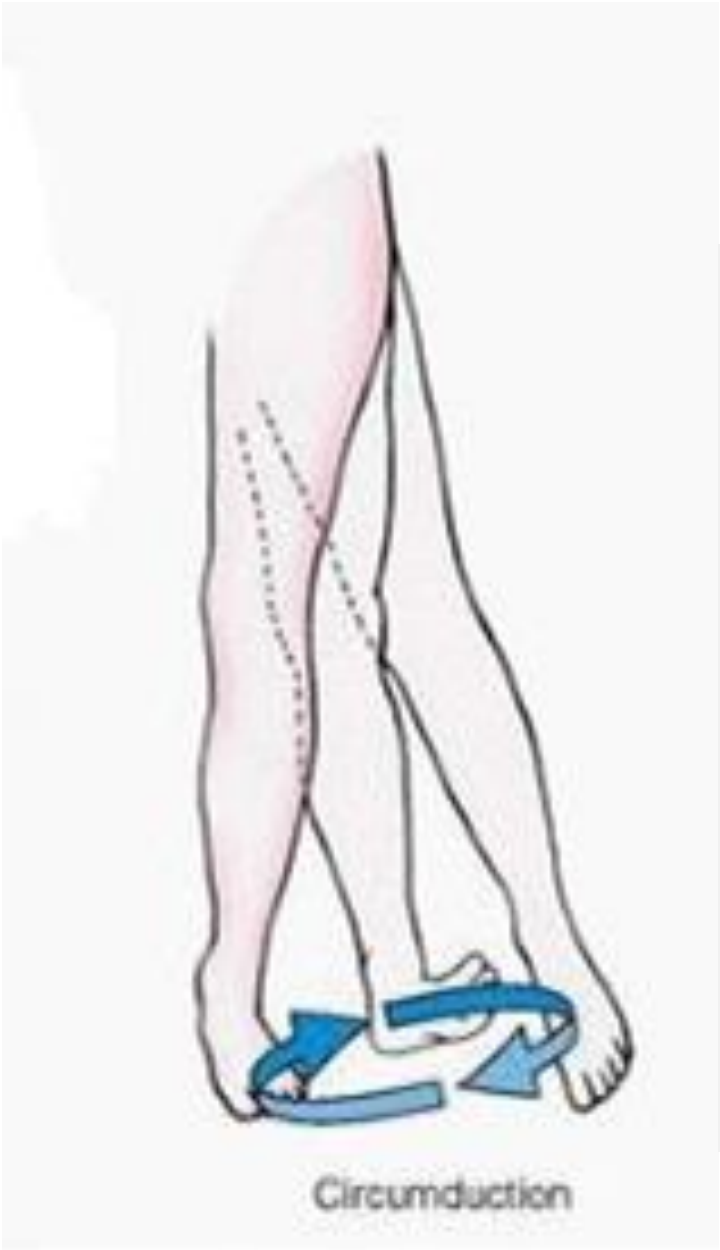
circular movement

sequential flexion, abduction, extension, and adduction

the distal end of the part moves in a circle.

- shoulder joint
- hip joint

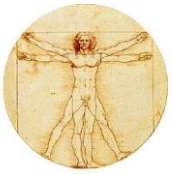




Circumduction

circumduction
of shoulder joint

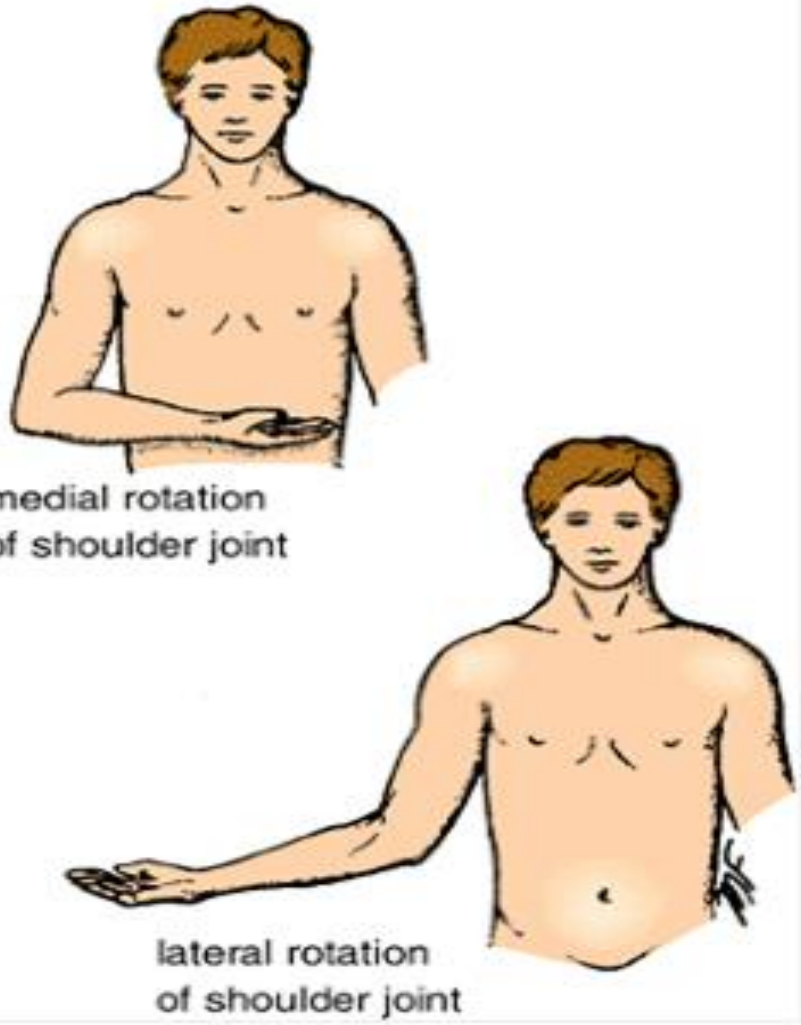
Rotation



turning or revolving a part of the body around its longitudinal axis such as 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.



Pronation

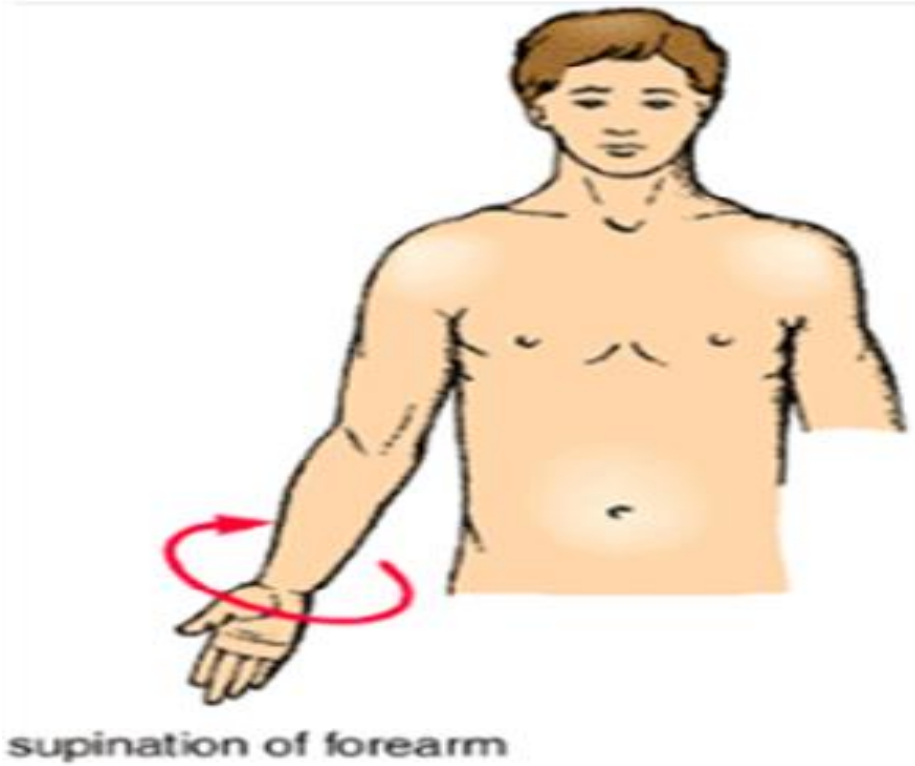
rotates forearm medially

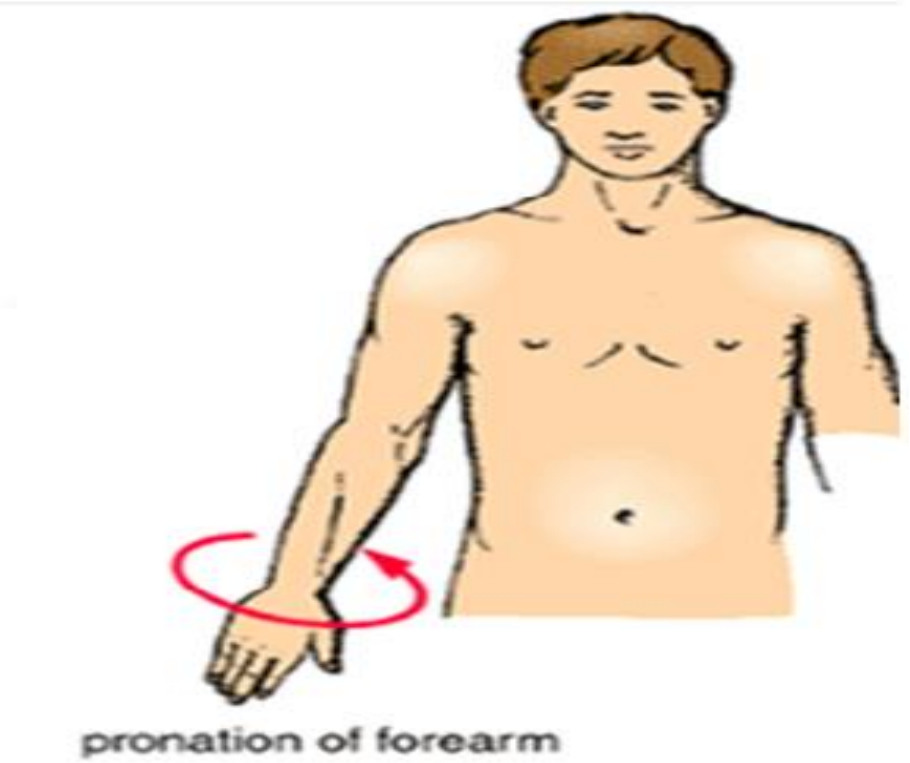
palm of the hand faces posteriorly

its dorsum faces anteriorly.

Supination

opposite rotational movement



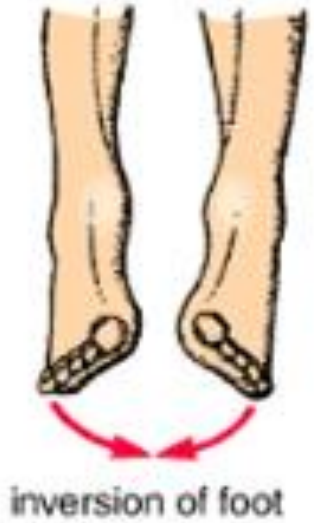


Eversion

sole of the foot away from the median plane
sole turns laterally

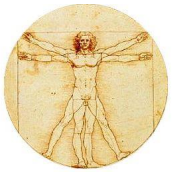
Inversion

sole of the foot toward the median plane (facing the sole medially).


inversion of foot

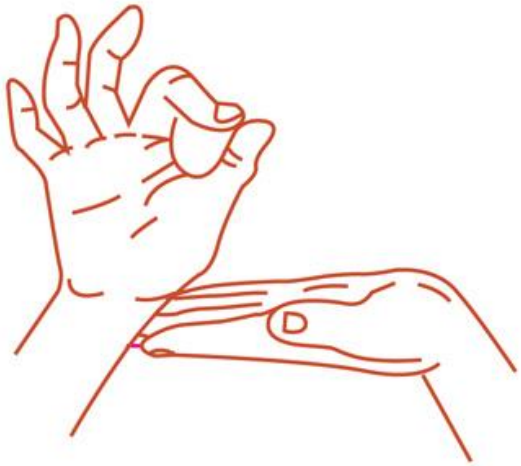

eversion of foot

Opposition



pad of the 1st digit (thumb) brought to another digit pad

tton a shirt - lift a teacup by the handle

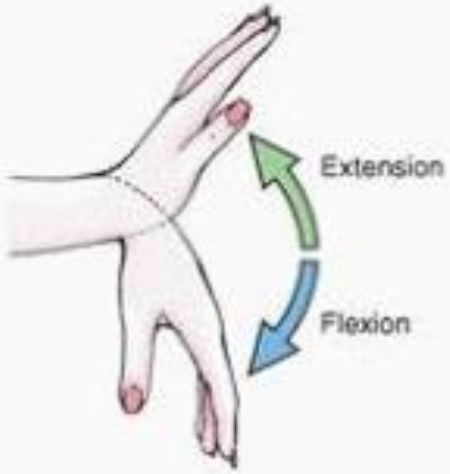


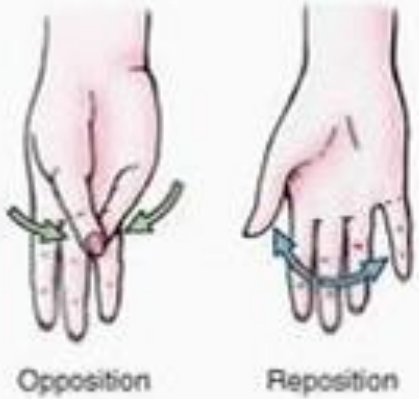
«tea» in sign language

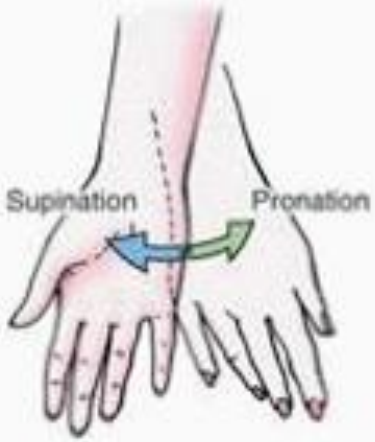
Reposition

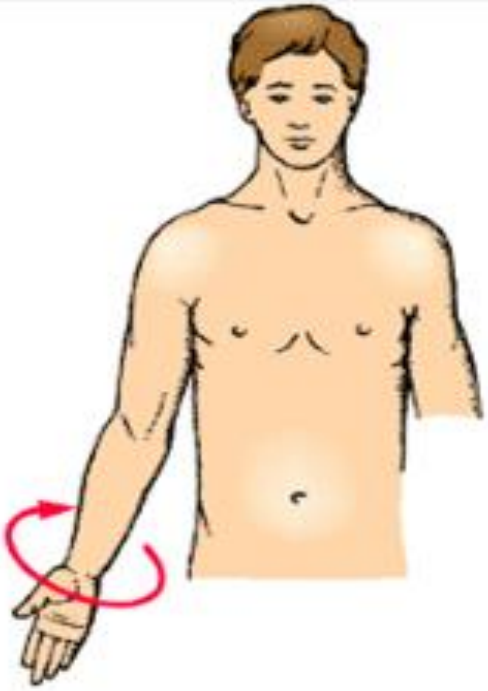
1st digit from the position of opposition

back to its anatomical position

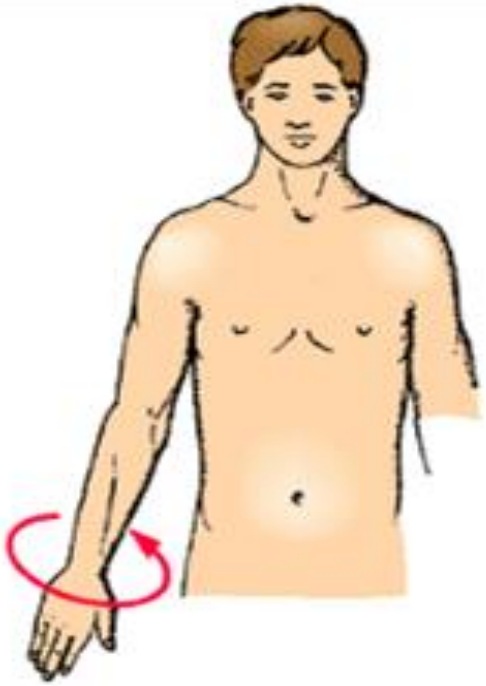




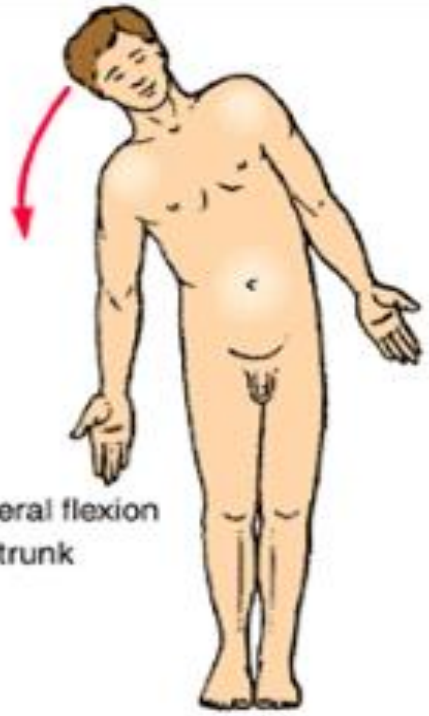


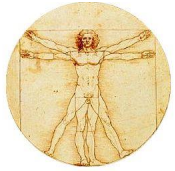


supination of forearm



pronation of forearm





Elevation

raises or moves a part superiorly
elevating the shoulders

Depression

lowers or moves a part inferiorly
depressing the shoulders